

# NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS GRADE 12 PREPAREDNESS RESEARCH COLLEGE COURSE CONTENT ANALYSIS STUDY

FINAL REPORT—APPENDICES

Submitted to:  
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# APPENDIX A

## Glossary

**Artifact:** A syllabus, assessment, assignment or textbook excerpt. Artifacts were systematically collected and organized into complete course packets.

**Artifact Inclusion Criteria:** Criteria, specific to a syllabus, assessment, assignment, or textbook excerpt, that defined the minimum requirement for the artifact to be included in a complete course packet.

**Code/Coding:** The category of a knowledge, skill or ability (KSA) statement, which is identified based on evidence within a course packet. The process of categorization conducted by the content reviewers is referred to as coding throughout the study. A coding scheme was developed with specific codes used by the content reviewers to facilitate analysis.

**Coding Scheme:** A systematic and formal structure for defining, identifying, and recording prerequisite knowledge, skills, and abilities in course artifacts during review.

**College Course Content Analysis (CCCA):** Acronym used throughout this study.

**Content Analysis:** An objective and systematic technique for making replicable and valid conclusions about course content from course packets (Krippendorff, 2013).

**Content Maps:** Visual representations of the group review applicability ratings and **NAEP-Specific KSA Exclusions** related to each of the **NAEP-Specific KSAs**. Applicability ratings represent the degree to which a KSA relates to evidence in a course packet..

**Content Review:** The application of the coding scheme to a course packet, an assembly of course artifacts. Content reviews were conducted independently and in a group.

**Content Reviewer:** A highly qualified and trained college-level mathematics or reading content expert who reviewed course packets for evidence of KSAs for the CCCA study.

**Content Review Group:** A group of three content reviewers who independently and collectively reviewed the same set of course packets.

**Course:** A class offered at a postsecondary institution. The CCCA study focused on one of eight course titles with mathematics and reading content that fulfilled a set of course inclusion criteria (see the Course Packets section for the criteria). Artifacts were solicited for these courses and used to construct course packets.

**Course/Artifact Submitter:** A college-level instructor who submitted a minimum of three artifacts for a single course to be organized into a single course packet.

**Course Inclusion Criteria:** Criteria that defined the minimum requirements for a course to be included in the study.

**Course Packet:** A set of three or more artifacts representing a single course title at one institution, including a syllabus, a textbook excerpt, and either an assignment or an assessment. There were a total of 28 course packets for each course title used for four different purposes: training reviewers to participate in the study, qualifying reviewers to participate in the study, operational use by reviewers in Phase 2 of the study, and validation of results compiled from the reviewers.

**Course Title:** A grouping of courses (e.g., U.S. history) that would be expected to have similar content regardless of the institution at which a given course is taught.

**Decision Rules:** Guidance on how to identify evidence during the review process, applying the coding scheme to areas identified as potentially ambiguous.

**Extant Artifacts:** Relevant artifacts from a repository of course materials that had been collected during previous studies by EPIC that EPIC was given permission to use for additional studies. These artifacts from EPIC's repository were included in the CCCA study.

**Generalizability Study:** A statistical analysis of the reliability of using content reviewers to code course packets and the results of CCCA study under specific constraints. This should not be confused with the term “generalizability” that refers to the extension of these research findings and conclusions to the population at large.

**Group Review:** A process, following independent review, where content reviewers attended a facilitated meeting to review the same 28 course packets and resolve coding disagreements as part of a convergent consensus process.

**Holistic Review:** An initial general review of course packets conducted as a training exercise prior to content reviewer training on the NAEP frameworks and the convergent consensus review methodology.

**Holistic Review Statement:** A statement of knowledge, skills and abilities identified during the Holistic Review, which is conducted before reviewers are asked to use the NAEP Frameworks as a reference. **Holistic Review Statements** are outputs of a training exercise that familiarizes the **Content Reviewers** with all of **Course Packets** they will review in the study, while also allowing reviewers to suggest prerequisite **KSAs** in their own words, based on the evidence identified in the **Course Packets**.

**Independent Review:** A process, preceding group review, where content reviewers reviewed a set of 28 course packets independently, as part of a convergent consensus process.

**Institution:** Postsecondary college or university that met representativeness criteria from which courses were selected and course artifacts were collected to form complete course packets.

**Institution Inclusion Criteria:** Criteria that defined the minimum requirements for an institution to become eligible to submit artifacts to be included in the CCCA study.

**KSA:** Knowledge, skills, and abilities.

**NAEP Expert:** A highly qualified doctoral-level expert in mathematics or reading content who served as an advisor to the CCCA study. Each NAEP expert had specialized expertise on the NAEP, including a deep understanding of the NAEP and participated in the development of the NAEP framework. All had extensive experience with previous NAEP studies, including the JSS and JTPC studies.

**NAEP Framework:** The blueprint that guides the development of the NAEP assessment instrument and determines the content to be assessed by NAEP. For the purposes of the CCCA, a NAEP framework is a selection of content statements used as the basis for **coding** the evidence found in course packets. The 2009 12th Grade NAEP Frameworks for Reading and Mathematics were used, and neither framework has changed since 2009.

**NAEP Item and NAEP Item Pool:** A set of basic scorable parts of the NAEP assessment or test questions (**NAEP Items**) available for administration. NAEP items are either multiple-choice or constructed-response. The CCCA study included a comparison of prerequisite KSAs with the 2009 and 2013 12th Grade NAEP item pools in mathematics and reading.

**NAEP-Specific KSA:** A statement of knowledge, skills, and abilities that is articulated in the NAEP framework. The NAEP-specific KSAs may not be evident as prerequisite in the course packets.

**NAEP-Specific KSA Exclusion:** A selection of text from a NAEP-specific KSA that does not apply to the coding by a content reviewer or content reviewer group.

**Non-NAEP Additional KSA:** A statement of knowledge, skills, and abilities that is not listed in the NAEP framework. These include the **Holistic Review Statements** that content reviewers within each **Subject Area** deemed appropriate to integrate into the operational **Coding** process.

**Objective:** Level of statement within the NAEP mathematics and reading framework referred to for content review and analysis.

**Online Submission Instrument:** The platform where a **Course/Artifact Submitter** attests that the artifacts being submitted relate to a course that meets the **Course Inclusion Criteria** for the CCCA study and submits the required artifacts for a complete **Course Packet**.

**Operational Packet:** One of 80 course packets in mathematics or one of 80 course packets in courses with substantial reading demands, 20 per course title, reviewed and coded for evidence of KSAs by content reviewers.

**Qualifying Packet:** One of two course packets in mathematics or one of two course packets in courses with substantial reading demands that were reviewed and coded by content reviewers after participating in training. The coding on these packets was used to assess content reviewers' understanding of the review process. If adequate understanding was not demonstrated in the qualifying packet reviews, a content reviewer was released from participating further in the study.

**Reviews:** Identification and coding of evidence of knowledge, skills, and abilities within the content of course artifacts compiled into packets by experts.

**Subject Area:** One of the areas assessed (or planned for assessment) by NAEP, which includes but is not limited to the arts, civics, economics, foreign language, geography, mathematics, reading, science, U.S. history, world history, and writing. CCCA examined two subject areas: mathematics and reading. The term **Course Type** has been used in CCCA-related materials and is considered synonymous with the term **Subject Area**.

**Subtopic:** A level in the hierarchy of an assessment framework; a statement that is more general than an **Objective** in the NAEP mathematics framework. For example, the NAEP mathematics framework is organized from highest level to lowest level as follows: Subject Area- 1. Content Area- 1.1 **Subtopic-** 1.1.a **Objective.** For example, Mathematics- 1. Number and Properties- 1.1 Number Sense- 1.1.a Represent, interpret, or compare expressions for real numbers, including expressions using exponents and logarithms.

**Standard:** A level in the hierarchy of an assessment framework; a statement that is more general than an **Objective** in the NAEP reading framework. For example, the NAEP reading framework is organized from highest level to lowest level as follows: Subject Area- 1. Cognitive Domain: 1.1 **Standard:** 1.1.a **Objective.** For example, Reading- 1. Locate/Recall- 1.1 Locate or recall textually explicit information and make simple inferences within and across both literary and informational texts- 1.1.a Locate or recall specific information such as definitions, facts, and supporting details in text or graphics

**Training Packet:** One of two course packets in mathematics or one of two course packets in courses with substantial reading demands that were reviewed and coded for evidence of KSAs by the content reviewers during their training and prior to conducting qualifying reviews.

**Validation Packet:** One of eight course packets in mathematics or one of eight course packets in courses with substantial reading demands, two per course title, reviewed by all content reviewers during the independent and group reviews to assess reviewer consistency. Reviewers' codings on validation packets provided the data analyzed during the generalizability studies.

# APPENDIX B

## Artifact Solicitation Email

From: College Course Content Analysis Study <cccastudy@epiconline.org>

Date: Wed, Jun 1, 2013 at 6:49 AM

Subject: National Assessment Governing Board-Research Survey

To: Potential Participant<potential\_participant@email.edu>

Dear Potential Participant,

We are writing to request your participation in a national research study, the College Course Content Analysis (CCCA) Study being conducted on behalf of the *National Assessment Governing Board*.

The *Educational Policy Improvement Center* (EPIC) has undertaken a research program to determine what and how the *National Assessment of Education Progress (The Nation's Report Card)* can report on the academic preparedness of 12th grade students in reading and mathematics as they enter the worlds of college and job training. For the CCCA Study, EPIC is seeking colleges and universities to submit course documents for entry-level college courses in: *Calculus, College Algebra, English Literature (not Composition courses), Finite/General Mathematics, Psychology, Statistics, U.S. Government, and U.S. History*. We would like to include a course in US History, US Government, or Psychology from your institution that meets the criteria outlined in this email.

EPIC has identified you as a contact for your department. We respectfully request that you forward this invitation to your institution's US History, US Government, or Psychology instructors. As an honorarium for participation, **a \$50 Amazon gift card will be sent to the email address associated with a verified complete submission.** Please note that although participant information will be collected with the survey, all documents will be made anonymous and your information will be kept secure and confidential.

Participation is estimated to require approximately 10-20 minutes. You will be asked to identify your institution and course, provide information about your course, and upload 2-4 course documents including a syllabus and an assignment or assessment. More detail is included in the survey instructions. EPIC staff may follow up to ask for clarification or additional course information.

You will be asked to verify that the course meets the following criteria:

- Does not require any college-level prerequisite courses (note: if your course requires *either* a placement exam score *or* credit from another course, you should indicate that your course *does not require a college-level prerequisite course*)
- Fulfills general education requirements for a four-year degree (at your institution or at a four-year institution.)

- Considered entry-level (beginning postsecondary students can enroll in this course)
- Not considered remedial
- Students earn college credit for taking this course
- Not considered honors level
- Not targeted to students in a particular major or program

In addition, we ask that course documents be from a course taught during the **2009–2010 or 2010–2011 academic year**. Course documents from subsequent years are also acceptable *if the content of the course is substantively unchanged*.

To participate, please click on this

link: <http://apps.epiconline.org/surveys/index.php?r=survey/index/sid/585883/token/yirb3/lang/en>. You will be able to save your progress if you are not able to complete the survey all at one time. **Submissions will be accepted through Friday, June 28 or until we have sufficient courses in this course title.** If you would like to participate but are unavailable during that time, please email [cccastudy@epiconline.org](mailto:cccastudy@epiconline.org) or call (877) 766-2279.

If the survey software prompts you for a token, it is yirb3.

EPIC looks forward to helping all participants complete the course submission process. Please contact us if you have any questions or need assistance. We are available weekdays between 5:30 a.m. and 5 p.m. PT and 8:30 a.m.–5 p.m. ET at (877) 766-2279. Ask for Paul, Emily, or Tris. You may email anytime at [cccastudy@epiconline.org](mailto:cccastudy@epiconline.org).

Thank you,

Tris O'Shaughnessy, Project Administrator

Educational Policy Improvement Center

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EPIC Eugene

1700 Millrace Drive

Eugene, OR 97403

EPIC Portland

SW 5th Avenue, Suite 2100

Portland, OR 97204

If you do not want to participate in this survey and don't want to receive any more invitations, please click the following link: <http://apps.epiconline.org/surveys/index.php?r=optout/tokens/langcode/en/surveyid/585883/token/yirb3>

# APPENDIX C

## Institution Course Titles Associated With Course Packets

### MATHEMATICS

Course name	Packet ID	Type	Group	Course packet contents
College algebra				
College algebra	2	Operational	I	Syllabus, assignment (2), and textbook
College algebra	3	Operational	I	Syllabus, assignment (2), assessment, and textbook
College algebra	8	Operational	I	Syllabus, assignment (2), and textbook
College algebra	15	Operational	I	Syllabus, assignment, and textbook
College algebra	18	Operational	I	Syllabus, assignment, and textbook
College algebra	4	Operational	2	Syllabus, assignment, and textbook
College algebra	9	Operational	2	Syllabus, assignment, and textbook
College algebra	11	Operational	2	Syllabus, assignment, and textbook
College algebra	13	Operational	2	Syllabus, assignment, and textbook
College algebra	20	Operational	2	Syllabus, assignment, and textbook
College algebra	6	Operational	3	Syllabus, assignment, assessment, and textbook
College algebra	12	Operational	3	Syllabus, assignment, and textbook
College algebra	16	Operational	3	Syllabus, assignment, assessment, other, and textbook
College algebra	19	Operational	3	Syllabus, assessment (2), and textbook
College algebra	22	Operational	3	Syllabus, assessment, and textbook
College algebra	7	Operational	4	Syllabus, assignment (2), other, and textbook
College algebra and trigonometry	10	Operational	4	Syllabus, assessment, and textbook
College algebra	14	Operational	4	Syllabus, assessment, and textbook
College algebra	17	Operational	4	Syllabus, assessment, and textbook
College algebra	21	Operational	4	Syllabus, assignment, and textbook
College algebra	1	Validation	All	Syllabus, assessment, and textbook
College algebra	5	Validation	All	Syllabus, assessment, and textbook
Functions and models	N/A	Training	All	Syllabus, assignment, and textbook
Precalculus/calculus				
Calculus I	6	Operational	I	Syllabus, assignment, assessment, and textbook
Differential calculus	11	Operational	I	Syllabus, assessment, and textbook
Precalculus algebra	12	Operational	I	Syllabus, assessment, and textbook
Precalculus	14	Operational	I	Syllabus, assignment, and textbook

Course name	Packet ID	Type	Group	Course packet contents
Precalculus algebra	17	Operational	1	Syllabus, assignment, and textbook
Analytic geometry and calculus A	7	Operational	2	Syllabus, assessment (2), other, and textbook
Precalculus/analytic geometry	8	Operational	2	Syllabus, assignment, assessment (2), and textbook
Calculus I	13	Operational	2	Syllabus, assignment, and textbook
Calculus with analytic geometry I	15	Operational	2	Syllabus, assignment, and textbook
Calculus with analytic geometry I	18	Operational	2	Syllabus, assignment, and textbook
Calculus I	3	Operational	3	Syllabus, assignment, assessment, other, and textbook
Calculus I	4	Operational	3	Syllabus, assessment, and textbook
Calculus I	19	Operational	3	Syllabus, assignment, and textbook
Brief calculus	20	Operational	3	Syllabus, assignment (2), and textbook
Precalculus	22	Operational	3	Syllabus, assessment, and textbook
Calculus I	5	Operational	4	Syllabus, assessment, and textbook
Calculus I	9	Operational	4	Syllabus, assessment, and textbook
Precalculus I	10	Operational	4	Syllabus, assessment, and textbook
Calculus I	16	Operational	4	Syllabus, assignment, and textbook
Calculus I	1	Validation	All	Syllabus, assignment, and textbook
Calculus I	2	Validation	All	Syllabus, assessment (3), assignment, other, and textbook
Calculus I	N/A	Training	All	Syllabus, assessment, and textbook

#### Finite mathematics

Contemporary mathematics	8	Operational	1	Syllabus, assessment (2), other, and textbook
Survey of mathematics	9	Operational	1	Syllabus, assessment, and textbook
Contemporary mathematics and quantitative analysis	14	Operational	1	Syllabus, assignment, and textbook
Modern college mathematics	15	Operational	1	Syllabus, assignment, and textbook
Contemporary mathematics	18	Operational	1	Syllabus, assignment, and textbook
Contemporary mathematics	11	Operational	2	Syllabus, assignment, and textbook
Introduction to contemporary mathematics	16	Operational	2	Syllabus, assignment, and textbook
Finite mathematics	20	Operational	2	Syllabus, assessment, other, and textbook
Discrete mathematics	21	Operational	2	Syllabus, assignment (2), assessment (2), and textbook

Course name	Packet ID	Type	Group	Course packet contents
Discrete mathematics	22	Operational	2	Syllabus, assignment, and textbook
Mathematics for business	3	Operational	3	Syllabus, assignment, other, and textbook
Contemporary mathematics	4	Operational	3	Syllabus, assignment, assessment, and textbook
Finite mathematics	12	Operational	3	Syllabus, assignment, and textbook
Mathematics for the 21st century	17	Operational	3	Syllabus, assignment, and textbook
Finite mathematics	19	Operational	3	Syllabus, assignment (2), and textbook
Mathematics for business and information	5	Operational	4	Syllabus, assessment (2), and textbook
Survey of mathematics	6	Operational	4	Syllabus, assignment, and textbook
Survey of contemporary mathematics	7	Operational	4	Syllabus, assignment, and textbook
College mathematics	10	Operational	4	Syllabus, assignment, and textbook
Finite mathematics	13	Operational	4	Syllabus, assignment, and textbook
Finite mathematics	1	Validation	All	Syllabus, assessment (2), and textbook
Finite mathematics	2	Validation	All	Syllabus, assignment, assessment, and textbook
Finite mathematics	N/A	Qualifying	All	Syllabus, assignment (2), and textbook

#### Statistics

Introduction to statistics	3	Operational	1	Syllabus, assignment, and textbook
Introduction to statistics	4	Operational	1	Syllabus, assignment, and textbook
Introduction to statistics	8	Operational	1	Syllabus, assignment, assessment, and textbook
Statistics	17	Operational	1	Syllabus, assignment (2), and textbook
Statistics	18	Operational	1	Syllabus, assignment, assessment (2), and textbook
Elementary statistics	6	Operational	2	Syllabus, assignment, and textbook
Statistics	9	Operational	2	Syllabus, assessment, and textbook
Elementary statistics	16	Operational	2	Syllabus, assignment, and textbook
Intro Stats	20	Operational	2	Syllabus, assessment, and textbook
Introduction to statistics	22	Operational	2	Syllabus, assessment, and textbook
Basic concepts of statistics	7	Operational	3	Syllabus, assessment (2), and textbook
Introduction to statistics	11	Operational	3	Syllabus, assessment, and textbook

Course name	Packet ID	Type	Group	Course packet contents
Introduction to statistics	13	Operational	3	Syllabus, assessment, and textbook
Elementary statistics	15	Operational	3	Syllabus, assessment, other, and textbook
Elementary statistics	21	Operational	3	Syllabus, assignment, assessment, and textbook
Basic statistics I	5	Operational	4	Syllabus, assessment (2), and textbook
Introduction to statistics	10	Operational	4	Syllabus, assignment, and textbook
Statistics	12	Operational	4	Syllabus, assignment, assessment, and textbook
Statistics and introduction to SPSS	14	Operational	4	Syllabus, assignment, and textbook
Introduction to statistics	19	Operational	4	Syllabus, assignment, and textbook
Introductory statistics	1	Validation	All	Syllabus, assignment, and textbook
Introduction to statistics	2	Validation	All	Syllabus, assessment, and textbook
Introduction to statistics	N/A	Qualifying	All	Syllabus, assessment (3), and textbook

## READING

Course name	Packet ID	Type	Group	Course packet contents
English literature				
General education: Classics of western literature	3	Operational	I	Syllabus, assignment (2), assessment, and textbook
Medieval and renaissance European literature	5	Operational	I	Syllabus, assignment (3), other, and textbook
Cosmopolitans	8	Operational	I	Syllabus, assignment, and textbook
Great books II	11	Operational	I	Syllabus, assignment, and textbook
Introduction to literature	18	Operational	I	Syllabus, assignment (3), and textbook
Introduction to literature-monstrous selves	7	Operational	2	Syllabus, assignment, and textbook
Introduction to literature	9	Operational	2	Syllabus, assignment (2), and textbook
Survey of British Literature	13	Operational	2	Syllabus, assignment, and textbook
Literature	14	Operational	2	Syllabus, assignment, and textbook
Introduction to Shakespeare	16	Operational	2	Syllabus, assignment, and textbook
Introduction to fiction	2	Operational	3	Syllabus, assignment (3), other, and textbook
Survey of American literature early American to realism	12	Operational	3	Syllabus, assignment, and textbook
American literature I	15	Operational	3	Syllabus, assignment (2), and textbook
American literature	17	Operational	3	Syllabus, assignment, and textbook
Survey of British literature I	21	Operational	3	Syllabus, assignment, and textbook
Survey of American literature	4	Operational	4	Syllabus, assignment (2), and textbook
Gothic literature	6	Operational	4	Syllabus, assignment, and textbook
Western literature: Classical, medieval, and renaissance	19	Operational	4	Syllabus, assignment, and textbook
Introduction to English studies	20	Operational	4	Syllabus, assignment, and textbook
Introduction to literature	22	Operational	4	Syllabus, assignment, other, and textbook
Shakespeare	1	Validation	All	Syllabus, assignment, and textbook
Introduction to literature	10	Validation	All	Syllabus, assignment, and textbook
Introduction to British literature I: From Beowulf to Bunyan	N/A	Training	All	Syllabus, assignment, other, and textbook

Course name	Packet ID	Type	Group	Course packet contents
<b>Psychology</b>				
Introduction to psychology (general psychology)	2	Operational	I	Syllabus, assignment, and textbook
General psychology	11	Operational	I	Syllabus, assignment, and textbook
Introduction to psychology	15	Operational	I	Syllabus, assignment, and textbook
General psychology	16	Operational	I	Syllabus, assessment, and textbook
Introductory psychology	22	Operational	I	Syllabus, assignment, and textbook
Introduction to psychology	4	Operational	2	Syllabus, assignment (2), and textbook
General psychology	8	Operational	2	Syllabus, assignment, assessment, and textbook
General psychology	10	Operational	2	Syllabus, assignment (2), assessment, and textbook
General psychology	12	Operational	2	Syllabus, assignment (3), and textbook
General psychology	13	Operational	2	Syllabus, assignment (3), and textbook
Introduction to psychology	5	Operational	3	Syllabus, assignment, and textbook
General psychology	7	Operational	3	Syllabus, assignment (3), and textbook
Introduction to psychology	9	Operational	3	Syllabus, assignment, and textbook
Understanding human behavior	14	Operational	3	Syllabus, assignment (3), and textbook
General psychology	17	Operational	3	Syllabus, assignment, and textbook
General psychology	6	Operational	4	Syllabus, assignment, and textbook
General psychology	18	Operational	4	Syllabus, assessment, and textbook
General psychology	19	Operational	4	Syllabus, assessment, and textbook
Introduction to psychology	20	Operational	4	Syllabus, assignment, and textbook
General psychology	21	Operational	4	Syllabus, assessment, and textbook
Introduction to psychology	1	Validation	All	Syllabus, assignment, assessment, other, and textbook
Introduction to psychology	3	Validation	All	Syllabus, assessment, and textbook
General psychology	N/A	Training	All	Syllabus, assignment (4), and textbook
<b>U.S. government</b>				
U.S. government and politics	1	Operational	I	Syllabus, assignment, and textbook
American political systems	14	Operational	I	Syllabus, assignment, and textbook
Introduction to American national	15	Operational	I	Syllabus, assignment (2) and textbook

Course name	Packet ID	Type	Group	Course packet contents
government				
Introduction to American government	18	Operational	1	Syllabus, assignment, assessment, and textbook
American government	20	Operational	1	Syllabus, assessment, and textbook
Introduction to American government and politics	3	Operational	2	Syllabus, assignment, and textbook
Introduction to American government	10	Operational	2	Syllabus, assignment (2), assessment (2), and textbook (2)
American politics	11	Operational	2	Syllabus, assignment (2), and textbook
U.S. government and politics	16	Operational	2	Syllabus, assignment (3), and textbook
Introduction to American politics	21	Operational	2	Syllabus, assignment, and textbook
Introduction to American government	5	Operational	3	Syllabus, assignment, assessment, and textbook
American national government	7	Operational	3	Syllabus, assessment, and textbook
None	8	Operational	3	Syllabus, assignment, and textbook
American politics	9	Operational	3	Syllabus, assignment, and textbook
Introduction to U.S. government and politics	13	Operational	3	Syllabus, assignment, and textbook
Essentials of government	6	Operational	4	Syllabus, assessment (2), other, and textbook
Introduction to political science	12	Operational	4	Syllabus, assignment (3), and textbook
Introduction to federal government	17	Operational	4	Syllabus, assignment, assessment, and textbook
American government and politics	19	Operational	4	Syllabus, assessment, and textbook
Power, politics, and democracy in America	22	Operational	4	Syllabus, assignment, and textbook
American federal government	2	Validation	All	Syllabus, assessment, and textbook
U.S. government: Structure, power, and participation	4	Validation	All	Syllabus, assignment (2), and textbook
American national government	N/A	Qualifying	All	Syllabus, assignment, and textbook
U.S. history				
War and American society	6	Operational	1	Syllabus, assignment, assessment (5), other (2), and textbook
U.S. history to 1877	12	Operational	1	Syllabus, assignment, and textbook

Course name	Packet ID	Type	Group	Course packet contents
U.S. history to 1865	16	Operational	1	Syllabus, assignment, and textbook
U.S. history from 1865	18	Operational	1	Syllabus, assignment (3), and textbook
American history I, to 1865	20	Operational	1	Syllabus, assessment, other, and textbook
Survey of modern US history, 1865-2000	2	Operational	2	Syllabus, assignment, and textbook
Evolution of American democracy	10	Operational	2	Syllabus, assignment, assessment, and textbook
Recent American history	11	Operational	2	Syllabus, assignment, and textbook
Development of the United States to 1877	13	Operational	2	Syllabus, assignment, other, and textbook
The United States to 1865	21	Operational	2	Syllabus, assessment (2), and textbook
History of the United States from 1600 to 1865	1	Operational	3	Syllabus, assignment (2), assessment, and other (3), Textbook
U.S. history I	7	Operational	3	Syllabus, assignment, and textbook
American civilization to 1877	8	Operational	3	Syllabus, assessment (4), other (2), and textbook
U.S. history since the Civil War	17	Operational	3	Syllabus, assignment, assessment, and textbook
American civilization to 1877	19	Operational	3	Syllabus, assignment, and textbook
American history	3	Operational	4	Syllabus, assignment, other, and textbook (2)
History of the United States 1900-2006	4	Operational	4	Syllabus, assignment (2), assessment, and textbook
The history of the United States to 1865	9	Operational	4	Syllabus, assessment, and textbook
Colonization to Civil War	14	Operational	4	Syllabus, assignment, and textbook
U.S. history I	22	Operational	4	Syllabus, assessment, and textbook
Race and ethnicity in U.S. history	5	Validation	All	Syllabus, assignment, assessment, and textbook
American history since 1877	15	Validation	All	Syllabus, assignment, and textbook
American history to 1877	N/A	Qualifying	All	Syllabus, assignment, assessment, other, and textbook

# APPENDIX D

## Artifact Collection Decision Rules and Inclusion Criteria

### EXTANT COURSE PACKETS

A repository, or extant artifact database, of course artifacts from previous EPIC studies were included in the final sample using a three-step process. First, extant artifacts from the extant artifact database were filtered to include only artifacts from the eight course titles selected for this study. Finite mathematics was the only course title with no artifacts in the extant artifact database. Second, course artifacts were excluded if they explicitly violated the course inclusion criteria. Third, courses were filtered based on institutional representativeness needs. The result was a database with complete and partial course packets. Complete course packets were included in the CCCA Artifact Bank.

### PARTIAL COURSE PACKETS

Project staff attempted to complete partial course packets through an initial data mining of postsecondary institutional websites in search of artifacts that matched the academic year of the original submission. If data mining was unsuccessful, project staff emailed instructors and asked them to submit the artifacts necessary to complete their packets. One follow-up phone call and one final email request was attempted before the instructor was considered unresponsive and the partial course packet was excluded from the study.

### NEW COURSE PACKETS

The collection of new course artifacts was used to fill the gap left after all possible extant and partial packets were collected. The remaining gap was filled through the collection of new artifacts from a survey submission tool, email and phone outreach, and online data mining.

Project staff targeted institutions from the IPEDS database that fit the representativeness needs left by the gap between the target number of institutions and the number of complete extant and partial course packets. The institutions contacted were selected at random after a preliminary list of institutions that met the representativeness needs was created. Project staff used online reviews of course catalogs and department websites to identify courses from the selected institutions that appeared to meet the inclusion criteria. An initial recruitment email was sent to the selected course instructor or a department contact. The email contents included an overview of the project, a request for participation via an online submission process, mention of a \$50 honorarium for successfully submitting course documents, the dates the online tool will be available for submission, and an opportunity to opt out of participation in the study.

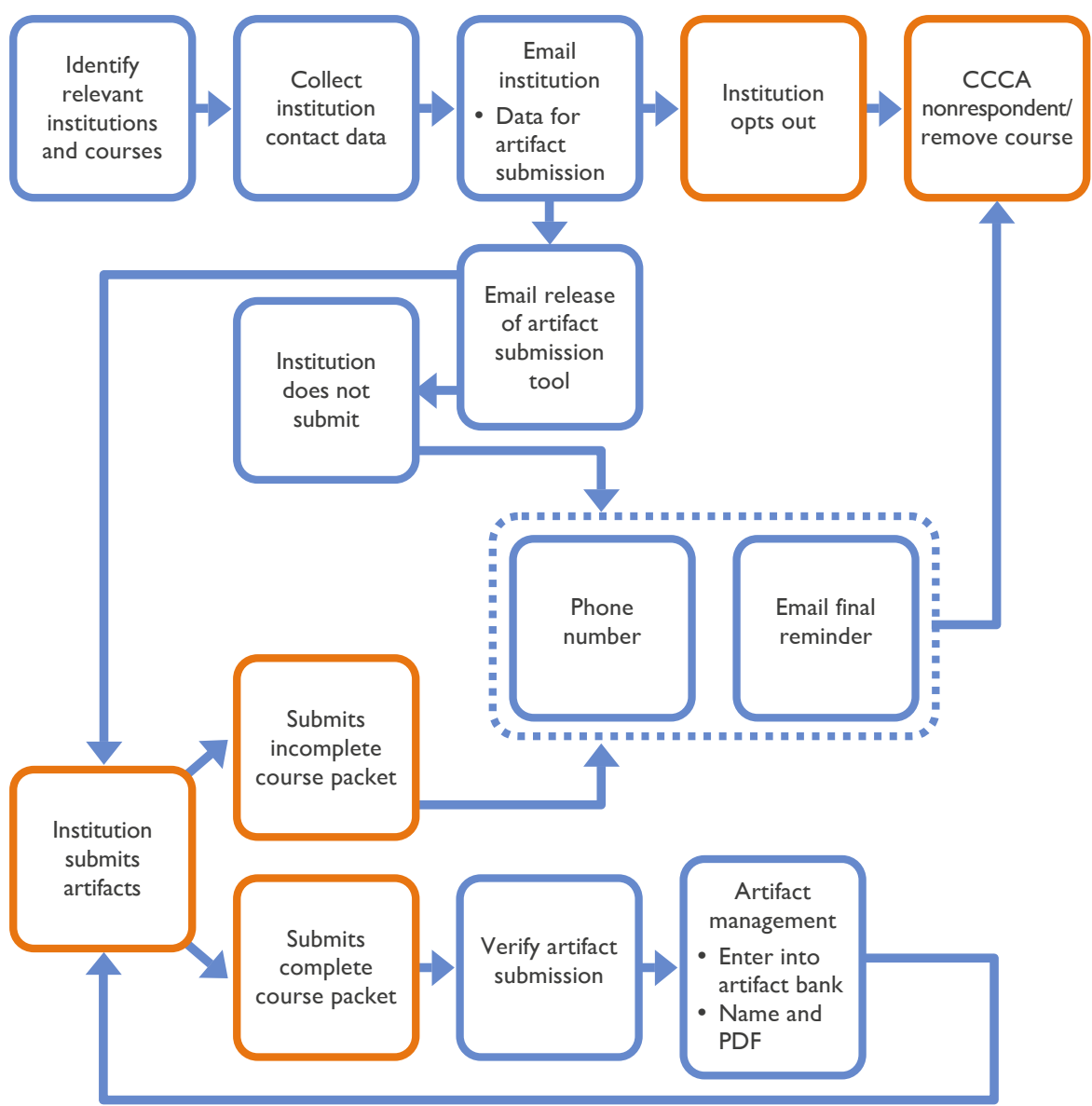
Collecting new artifacts proved challenging and the entire list of institutions that met the representativeness needs of the study was eventually exhausted and online data mining was used to collect the outstanding courses. General Google searches with key words were used to locate course artifacts. For example, the Google search “college algebra syllabus 2010 community” produced online syllabi for college algebra courses taught in

community colleges sometime during the 2010 academic year. Figure D1 displays the process used to collect new artifacts.

The collection and filtering of artifacts from the extant artifact database took place between November of 2012 and March of 2013. The resulting set of artifacts was used in preparing the Artifact Inventory, Sampling Gap Analysis, and portions of the Design Document from March to May 2013. New course artifacts were collected from early May till mid July 2013.

Table D1 displays the response rates for the different outreach efforts used during artifact collection. E-mails were sent to the instructors in the extant artifact database that had partial course packets that fit the inclusion

Figure D1. New Artifact Collection Process



criteria and representativeness needs of the study. Eighteen instructors out of the 177 contacted resulted in complete submissions for a response rate of approximately 10%. Of the 1,393 survey invitations sent from the submission tool, 64 resulted in complete and useable new course packets for a response rate of 5%. Phone calls were made to 633 of the 1,393 department contacts that received a survey invitation. Eleven of the 633 phone calls resulted in a complete submission for a response rate of approximately 2%.

**Table D1. Partial and New Artifact Collection Response Rates**

Course Title/Type	Partial Course Packets	New Artifacts Submission Tool	New Artifacts - Reminder Calls
Requests	177	1,393	633
Submissions	18	64	11
Response rate	10%	5%	2%

## TEXTBOOK ARTIFACT COLLECTION DECISION RULES

1. For courses with only one textbook, that textbook was considered the primary textbook.
2. For courses with two or more required textbooks and the syllabus did not indicate a primary textbook.
  - a. If the institution was contacted through the data collection process, the institution was asked to identify the primary textbook.
  - b. If a course schedule was available, the textbook covered earliest in the course schedule was considered the primary textbook.
  - c. If no course schedule was available, the following rules applied to gather the most appropriate text-based artifact:
    - i. if one of the textbooks was used by multiple courses, it was be selected;
    - ii. if topics were listed in the syllabus, EPIC inferred the primary textbook from the coverage of early topics; and
    - iii. if no other information was available, the textbook listed first was selected.
3. If no textbook was identified, the institution was contacted through the supplemental artifact collection process and requested to submit a primary textbook or provide a text-based artifact for consideration.

Once collected, an excerpt from the primary textbook was extracted and included in the course packet materials. The text excerpt selected for the textbook artifact also followed a hierarchical decision rule framework.

1. The table of contents was included when present.
2. One or two chapters were included depending on the length of the chapters. Typically, textbook artifacts did not exceed 100 pages.
  - a. If the course schedule was available, the first chapter(s) covered in the course was extracted.
  - b. If no course schedule was available, the first chapter(s) in the textbook was extracted.

This decision rule framework typically applied to calculus, college algebra, statistics, finite mathematics, psychology, U.S. government, and U.S. history textbooks. For English literature courses or other reading courses that uses novels rather than textbooks as their required texts, the first chapter(s) was included.

# APPENDIX E

## Course Packet Exemplars

The following course packets are representative of the artifacts reviewed for course content. These exemplar course packets have been abridged for accessibility purposes. The textbook artifacts contain only the title page and table of contents of the primary textbook for the course. The course packet cover sheets indicate the exact textbook extracts included in the training, qualifying, operational and validation course packets.

Packet Alg\_2\_357

### Packet Alg\_2\_357

---

#### Course Information

**Course Group:** College Algebra

**Course name:** College Algebra

**Course number:**

Calculator used in course?

☒ Yes

☐ No

☐ Optional/No information available

#### Course Artifacts

Syllabus

Assignment 1: In-Class Activity

Assignment 2: Problem Set

Text

#### Text Excerpt

**Title/Edition:** College Algebra/8<sup>th</sup>

**Author:** Sullivan

**Identified from:**

☒ Syllabus/Course schedule

☐ No schedule available – use first chapter

**Chapter/Sections included in excerpt:**

☒ Table of Contents

☐ Preview/preface (included if in textbook):

Preface to the Instructor

To the Student

Review Chapter

☒ Other chapters/sections:

3.1-3.2, 3.3-3.4, 3.4-3.5, 4.1-4.2 - per course schedule, weeks 1-4

Review Chapter

1/180

## College Algebra – Spring 2010

<b>Instructor:</b>	<b>Email:</b>
<b>Homework site:</b> <a href="http://coursecompass.com">coursecompass.com</a>	<b>Instructor's web page:</b>
<b>Office:</b>	<b>Office Hours:</b> M, W 12:00-1:30pm, Tues 1:30-3:30pm, or by appointment

*The instructor reserves the right to make changes to this syllabus as necessary.  
Any such changes will be announced in class and updated in the online syllabus.*

### Required Materials:

- Graphing Calculator : Examples of highly recommended models are the TI-84 or Casio fx-9850GB Plus. Calculators that perform symbolic algebra are **not permitted**. (TI-89, TI-92 Casio FX-2, Casio 9970Gs, for example)
- Course Compass Access: May be purchased online or in bookstore. Course ID will be given in class and listed on instructor's website. Registration provides access to both homework AND an online text.

### Optional Materials:

- College Algebra, 8<sup>th</sup> Edition*; by Sullivan, Pearson/Prentice Hall Publishing Company  
(note: if you choose to purchase a text and it is new/shrinkwrapped, it will include a code for coursecompass access – you will not need to purchase it separately)

### TI Graphing calculator workshops:

Date	Time	Place
01/28/10	4:30-6:30 pm	NEEB 105
01/29/10	4:30-6:30 pm	NEEB 105

These workshops cover many features typically needed in 100-200 level math courses, such as basic order of operations, graph zooming and calculations such as locating peaks or intersections, and matrix or statistical entry and associated calculations. If you do not know how to do these sorts of things on your graphing calculator, please attend a workshop, as class time will not be devoted to teaching calculator use. See flyer .

### Attendance:

- Attendance will be taken daily via sign-in sheet. If you do not sign in, you are absent.
- A maximum of **4** absences is allowed for MW classes.
- There are no “excused” absences other than for pre-approved, school-sanctioned activities.
- Students who exceed the maximum number of absences will receive a grade of EN.

**Grades:** A: 90-100%    B: 80-89.9%    C: 70-79.9%    D: 60-69.9%    E: <60%

Point Distribution	
Homework/Quizzes	30%
3 Mid-term Tests	50%
Final Exam	20%

Current course grades will be available to students through the homework website.  
Grades will not be curved or rounded.

**Lecture Topic Schedule**

Week	Dates	Topics	Text Sections	Notes
1	1/18-1/22	Functions & their graphs	3.1 – 3.2	Drop Deadlines: In person = Jan 22 Online = Jan 24
2	1/25-1/29	Function properties, “Library of Functions”	3.3 – 3.4	
3	2/01-2/05	Piecewise functions, Transformations	3.4 – 3.5	
4	2/08-2/12	Linear Functions	4.1 – 4.2	
5	2/15-2/19	Review, Factoring polynomials, Synthetic Division	R.5, R.6	Midterm #1 (3.1 – 4.2)
6	2/22-2/26	Quadratic and other polynomial functions & properties	4.3, 5.1	
7	3/01-3/05	Graphs of rational functions, Zeros of polynomial functions	5.2 – 5.3, 5.5	Academic Status Report #1
8	3/08-3/12	Complex Zeros, Composition of functions, Inverse functions	5.6, 6.1 – 6.2	
9	3/15-3/19	<b>SPRING BREAK</b>		
10	3/22-3/26	Review, Exponential and logarithmic functions	6.3 – 6.4	Midterm #2 (R.5,R.6,4.3 – 6.2)
11	3/29-4/02	Log properties, Logarithmic & Exponential equations	6.5 – 6.6	
12	4/05-4/09	Compound interest, Exponential growth & decay, Logistic models	6.7 – 6.8	Academic Status Report #2 Withdrawal Deadlines: In person = Apr 09 Online = Apr 11
13	4/12-4/16	Systems of equations	8.1 – 8.2	
14	4/19-4/23	Review, Numeric sequences	9.1	Midterm #3 (6.3-6.8, 8.1-8.2)
15	4/26-4/30	Arithmetic sequences, Geometric sequences & series	9.2 – 9.3	
16	5/03-5/04	<b>Review</b>		

**Testing Schedule**

Exam	Sections	Dates
Midterm #1	3.1 – 3.5, 4.1 – 4.2	Wed-Thu February 17-18
Midterm #2	R.5, R.6, 4.3, 5.1 – 5.6, 6.1 – 6.2	Wed-Thu March 24-25
Midterm #3	6.3 – 6.8, 8.1 – 8.2	Wed-Thu April 21-22
Final Exam	All above + 9.1 – 9.3	

**Homework** : Homework will be done through [coursecompass.com](https://coursecompass.com) . Additional written work may be assigned by the instructor. CourseCompass contains questions pertaining to each topic, each of which may be tried repeatedly. All CourseCompass homework due dates are available on the site, and all due times are 11:58pm. Students should be working daily to complete assignments and to be prepared for upcoming quizzes. Students will not be able to access the assignments for credit after the due date has passed, so late work will not be recognized, however students will be able to re-try questions (with new numbers) after the due date purely for practice (will not affect grade).

**Quizzes** : Short quizzes may be given occasionally in class or assigned at the end of class as a take-home quiz due at the start of the next class meeting. On these quizzes students are typically permitted to work together and to use notes and calculators. Quizzes will cover recent lecture material and may or may not be announced in advance. No make-up quizzes will be given. Missed quizzes will count as 0's in the student's grade. No quizzes are dropped.

**Midterm Exams**: Students will take 3 mid-term exams during the semester. These exams will be taken in the \_\_\_\_\_ located in \_\_\_\_\_, outside of class time. The testing center allows student entry Monday -Thursday between 9am and 6:30pm, with closing at 8pm. For more details, click the link above. It is the student's responsibility to make time in his or her schedule to be able to take the tests on the assigned days. On tests, no notes are permitted and assistance will not be provided by the testing center proctors.

**Final Exam**: The final exam for this course takes place according to the \_\_\_\_\_. The location will be announced later in the term. It may or may not be in our regular classroom, but will not be in the testing center. The final is a cumulative test with no notes permitted or formulas provided.

**Makeup tests**: Make up tests are given at the discretion of the instructor and only in the case of verified medical or other documented emergencies. Students should notify the instructor **before the test is given** if possible. Call the Math Department Office \_\_\_\_\_ and leave a message or directly notify the instructor. If the event is not an emergency, the instructor must be notified in advance to request a make up. The instructor is not required to accommodate you.

#### **Class Expectations**

- Come to class on time daily with notes and calculator
- Try assignment questions daily
- Ask questions or come to office hours if you'd like further explanation or examples
- Review your notes to prepare for quizzes and upcoming tests
- Read the online text to prepare for the next day's new material
- Leave cell phones or other electronics off and put away during class

#### **Student Resources** :

- **Tutoring**: The \_\_\_\_\_ (free of charge) operates in 4 locations around campus. Their main location is \_\_\_\_\_, and opens the second week of classes. Other locations include \_\_\_\_\_ and residential sites in \_\_\_\_\_ and \_\_\_\_\_. Hours at each location are available by clicking the link above. \_\_\_\_\_ is required for entry.
- **Learning Support Services** ( \_\_\_\_\_ ) provides counseling, tutoring in math (and many other subjects), supplemental instruction, and other types of support to students. See the website for more information.

---

Please schedule an appointment to see me during office hours if you have any questions, concerns, or if you have a disability that will require accommodations in this class.

*Note:* To qualify for disability accommodations at \_\_\_\_\_, students must apply for services through the Disability Resource Center (DRC), which is located \_\_\_\_\_.

---

**First Year Mathematics Courses: Spring Semester 2010  
Departmental and University Policies and Procedures**

For semester deadlines related to enrollment, withdrawal or payments, see the academic calendar available at

**Course Withdrawal:** A student may withdraw from a course with a grade of **W** during the withdrawal period. The instructor's signature is not required. It is a student's responsibility to verify that they have in fact withdrawn from a class.

**The grade of Incomplete:** A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents the student who is doing acceptable work from completing a **small** percentage of the course requirements. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed.

**Instructor-Initiated Drop:** At the instructor's discretion, any student who has not attended class during the first week of classes may be administratively dropped from the course. However, students should be aware that non-attendance will NOT automatically result in their being dropped from the course. Thus, a student should not assume they are no longer registered for a course simply because they did not attend class during the first week. It is the student's responsibility to be aware of their registration status.

**Final Exam Make-up Policy:** The final exam schedule listed in the Schedule of Classes will be strictly followed. Exceptions to the schedule and requests for make-up final examinations can be granted only by the Department Chair, Associate Department Chair, or the Director of First Year Mathematics, and for one of the following reasons:

1. Religious conflict (e.g., the student celebrates the Sabbath on Saturday)
2. The student has more than three exams scheduled on the same day as the math final
3. There is a time conflict between the math final and another final exam.

If there is a last-minute personal or medical emergency, the student may receive a grade of Incomplete and make up the final within one calendar year. The student must provide written documentation and be passing the class at the time to receive an Incomplete. Make-up exams will NOT be given for reasons of non-refundable airline tickets, vacation plans, work schedules, weddings, family reunions, and other such activities. Students should consult the final exam schedule before making end-of-semester travel plans. *The Dean of the student's college must approve any exceptions to these rules.*

**Honor Policy:** The highest standards of academic integrity are expected of all students. The failure of any student to meet these standards may result in suspension or expulsion from the University or other sanctions as specified in the University Student Academic Integrity Policy. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities.

**The grade of XE:** A grade of XE is reserved for "failure for academic dishonesty." The XE grade may be petitioned after 1 year.

**Ethics:** It's highly unethical to bring to your instructor's attention the possible impact of your mathematics grade on your future plans, including graduation, scholarships, jobs, etc. For the university's complete policy regarding ethics, including cheating, plagiarism and other forms of academic dishonesty, see the Student Academic Integrity Policy at the following web address:

MAT 117: Wednesday In-Class Activity

**Basic Example:** (done together – specific calculator directions refer to TI-83/84)

x	3	5	7	9	11	13
y	0	2	3	6	9	11

- a) Enter the data into the calculator, using STAT → edit
  - to clear out old data – move cursor up to the list name, then press “Clear”
- b) Plot the points to see any pattern formed
  - from “y = ” button, select Plot1 option at the top of the screen so that it is darkened (to stop seeing scatter plots, de-select this option when you're done)
  - use the “graph” button
  - to re-center the graphing window around where the points are if you can't see them, use the “zoom” button, and select option “ZoomStat”  
(To go back to the “normal” window, later select “ZoomStandard”)
- c) Do a linear regression on the calculator using STAT → Calc → LinReg
  - by default the calculator will use L1 & L2
  - when taken back to the main screen you'll see LinReg (ax + b)...hit enter again!
  - The “a” and “b” values are the slope and y-intercept you want
  - round to 2 decimal places, and write these values into a linear equation
- d) Graph the line created in the previous step
  - use the “y = ” button and type in the equation you wrote down
  - press “graph” and you should see your scatter plot AND a line
- e) **Suppose that x is number of burritos eaten in a week and y is number of pounds gained per month.**
  - what are the basic units of the slope ... $\Delta y / \Delta x$  (*pounds per burrito!*)
  - according to the formula, if you ate 4 burritos per week, how much weight would you gain in a month? (*let  $x = 4$  since  $x$  is # of burritos, and solve for  $y$ !*)
  - according to the formula, how many burritos per week can you eat to gain 0 pounds in a month? (*let  $y = 0$ , since it's pounds, and solve for  $x$ !*)

MAT 117: Wednesday In-Class Activity

1. Animal gestation periods

Animal	Gestation or incubation (days)	Life Expectancy (years)
Cat	63	11
Chicken	22	7.5
Dog	63	11
Duck	28	10
Goat	151	12
Lion	108	10
Parakeet	18	8
Pig	115	10
Rabbit	31	7
Squirrel	44	9

- a) Enter the data into the calculator
- b) Do a linear regression and graph the points and line together.
  - What is the equation of the line graphed?  
\_\_\_\_\_
  - What does your x stand for; what does your y stand for?  
\_\_\_\_\_
  - What is the meaning of the slope of this line – include units!  
\_\_\_\_\_
- c) Estimate the life expectancy of an animal whose gestation period is 100 days, using your equation from (b). (show work!!)  
  
\_\_\_\_\_

## MAT 117: Wednesday In-Class Activity

2. Scientists for NASA measured and compared bone lengths of the humerus and tibia of rats that were sent into space. The data collected is in the chart below.

Humerus (mm)	Tibia (mm)
24.8	36.05
24.59	35.57
24.29	34.58
23.81	34.2
24.87	34.73
25.9	37.38
26.11	37.96
26.63	37.46

- a) Enter the data into the calculator and perform a linear regression

- What is the equation of the line graphed?

---

- What does your x stand for; what does your y stand for?

---

- What is the meaning of the slope of this line – include units!

---

- b) Use the equation created to predict the length of the tibia bone for a rat when its humerus bone is 24.3mm. (Show work!)

---

**Assignment 2: Problem Set**

**Packet Alg\_2\_357**

MAT 117 – Exponential Growth & Decay

Name \_\_\_\_\_

1. A fruit fly colony is known to contain 400 fruit flies right now. Also, the colony grows in number by 3% per day (continuous growth). Use this information to complete the following.

a) Write an growth model for the fruit fly population \_\_\_\_\_

b) How many fruit flies (to the nearest whole number) will there be in 10 days. \_\_\_\_\_

c) How many days (to the nearest whole day) will it be until the population doubles? \_\_\_\_\_

work for #1

2. A bank account pays 4.2% annual interest, compounded monthly. You have \$1000 in the account now.

a) Using the information in the statement above, write out the formula for calculating future value of this account after time  $t$ . \_\_\_\_\_

b) How long will it be until the account contains \$1200? (to 2 decimal places) \_\_\_\_\_

c) If your interest changes to 4% *continuously compounded*, how long would it take your \$1000 to become \$1200?? (answer to two decimal places) \_\_\_\_\_

work for #2

**Assignment 2: Problem Set**

**Packet Alg\_2\_357**

MAT 117 – Exponential Growth & Decay

Name \_\_\_\_\_

3. Right now the concentration of free chlorine in a swimming pool is 2.5 ppm (parts per million). The concentration decays continuously over time.

a) In 24 hours, the concentration falls to only 2.2 ppm. Use this information to \_\_\_\_\_

determine the decay rate,  $r$ . (to 4 decimal places)

b) Using your result from (a), how long would it be until the concentration of chlorine dropped to only 1.0 ppm? (answer to 2 decimal places) \_\_\_\_\_

c) **Bonus:** What is the half-life of free chlorine in this swimming pool? (2 dec places) \_\_\_\_\_

work for #3

10/180

Text Excerpt

Packet Alg\_2\_357

Eighth Edition

# College Algebra

Michael Sullivan

*Chicago State University*



Upper Saddle River, New Jersey 07458

11/180

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## Packet His\_18\_1936

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### Course Information

**Course Group:** US History  
**Course name:** United States History to 1877  
**Course number:** HS 115

### Course Artifacts

Syllabus  
Assignment: Richard Godbeer Reading and Discussion Questions  
Assignment: Paper 1  
Assignment: Give Me Liberty Reading and Discussion Questions  
Text

### Text Excerpt

**Title/Edition:** Give Me Liberty! An American History, vol. 1  
**Author:** Eric Foner  
☒ Textbook  
☐ Other

**Identified from:**  
☒ Syllabus/Course schedule  
☐ No schedule available – use first chapter  
☐ Other:

**Chapter/Sections included in excerpt:**  
☒ Table of Contents  
☒ Chapters/sections:  
Chapter 2: Beginnings of English America, 1607-1660

## HS 115 UNITED STATES HISTORY TO 1877

Fall 2010

Section 01: MWF 11:00 a.m. in 406 Founders Hall  
Section 02: MWF 2:00 p.m. in 309 Founders Hall

ext.  
e-mail:

Office Hours:  
MWF 9:00-10:50 a.m.  
TTh 9:00-10:20 and 2:00-3:00 p.m.  
and by appointment

History 115 explores the development of the United States from its earliest European settlements to the aftermath of the Civil War. In the process, this course emphasizes two interrelated goals (as adapted from the *National Standards for United States and World History*):

1. "Historical thinking skills that enable students to evaluate evidence, develop comparative and causal analyses, interpret the historical record, and construct sound historical arguments and perspectives on which informed decisions in contemporary life can be based."
2. "Historical understandings that define what students should know about the history of their nation . . . [and that] are drawn from the record of human aspirations, strivings, accomplishments, and failures in at least five spheres of human activity: the social, political, economic, [geographic/environmental], and cultural."

READINGS: The required readings include:

Eric Foner, *Give Me Liberty! An American History*, vol. 1, Seagull edition (but the regular edition is also acceptable). First or second edition acceptable.  
Richard Godbeer, *Escaping Salem: The Other Witch Hunt of 1692*.  
Thomas Paine, *Common Sense*.  
Frederick Douglass, *Narrative of the Life of Frederick Douglass*.  
Alexander Gardner, *Gardner's Photographic Sketch Book of the Civil War*, available at:  
  
Mary Lynn Rampolla, *A Pocket Guide to Writing in History*.  
Documents available on the P: drive under Hsiung\HS 115.

Copies are available at the  bookstore and will soon be available on Reserve at  Library.

STRUCTURE AND ORGANIZATION: Your course grade consists of the following components:

1. *Class Participation and Discussion (30%).*

Information and learning do not move in just one direction (from instructor to student); everyone will learn from everyone else. Your participation plays an essential role in the success of this course because it allows you the chance to teach and to learn from your peers in a supportive atmosphere. Most of the class meetings will be devoted to small group discussions of the week's reading and assignments. The other classes, although primarily lectures, will contain ample opportunities for questions and discussion.

On the first day of class you have a grade of "C-" and zero points for discussion.

- You will earn a point every day you take an active, constructive, and significant role in discussing the material (for example, is the class better off having heard what you said?). On discussion days, you can earn one point for contributing to your small group, and another point if you contribute to the class-wide discussion that follows. You will be especially rewarded for taking positions that are informed and provocative or imaginative.
- You will earn no points if you attend class but rarely say a word or only repeat insights made by your classmates.
- You will lose two points with every unexcused absence or incident of gross under-preparation, inattentiveness (like falling asleep), or disruptive behavior because such actions hinder your and your classmates' efforts at learning.

At the end of the semester, the student(s) with the highest point total will have earned an "A+," those with zero points will have earned a "C-," and the other letter grades will be distributed evenly throughout the point range. Those with negative points will have earned grades of "D+" and below according to a more compressed point scale.

On discussion days (noted in the schedule below), please bring a 1-2 page typed response to the questions that have been distributed ahead of time. These questions can be found on the P drive under \HS 115\assignments.

- On the days we discuss Foner, *Give Me Liberty*, please answer the questions on the "Give Me Liberty questions 2010" file.
- On the days we discuss one of the other supplemental readings or primary sources, please answer the questions tied to those readings, also available on the P drive.

These write-ups will make discussion more useful and fun for everybody. You will be graded on your preparation, not necessarily on "right" answers: one discussion point for complete and thoughtful preparation; a "check" for average work (every three "checks" during the semester earns one discussion point); a loss of one point for poor preparation (little effort and/or many mistakes); and a loss of two points if you do not have this typed response at the start of class. You may work with a single partner and together turn in one typed response, or you can choose to work by yourself. In class, you will work in groups to correct and enhance your responses.

On the day of the final examination, the class will meet to discuss the larger patterns of U.S. history to 1877 and the different skills historians need to understand this subject. This takes the place of a written final exam. Your participation can boost or drop your overall discussion grade by as much as one-third of a letter grade. Being absent from the final discussion will lead to one full-letter deduction.

## 2. Map Quiz

At the end of this syllabus you will find a list of the items you will need to identify for the map quiz on Monday, Sept. 27. If you achieve a perfect score, you will receive two discussion points. Those with a minor error or two will lose one point but will not have to retake the quiz. Those who make more errors must take the quiz again, during office hours, until they do achieve a perfect score. Each additional attempt at the quiz costs two discussion points.

## 3. Paper 1: Analyzing Colonial Society (15%)

This paper, due Monday, Sept. 20, asks you to analyze colonial New England society by using Godbeer's *Escaping Salem* and Foner's *Give Me Liberty*. You may work with one partner and together turn in a single paper, or you may choose to work by yourself. See details on the P drive under \HS 115\assignments.

## 4. Paper 2: Primary Source Analysis (25%)

This paper, due Wednesday, November 10, asks you to find a primary source not mentioned or included in *Give Me Liberty* or its website, and explain how Eric Foner could use that source in a new edition of his book. You may work with one partner and together turn in a single paper, or you may choose to work by yourself. Details will appear on the P drive under \HS 115\assignments.

## 5. Examinations (30% total)

On Friday, Oct. 15, and on Friday, Dec. 3, you will have in-class examinations covering all lectures and reading materials up to those points in the semester. The first exam is worth 10%; the second exam 20%.

**POLICIES:** Late work will be severely penalized—one full letter grade for each 24-hour period it is late. Exceptions to this policy can only be made in cases of illness or family emergency. If you have a valid reason for an excused absence (such as a class field trip or athletic competition), turn in the work ahead of time. You are responsible for understanding academic integrity policies, located in the *Pathfinder* at [http://www.gml.gmu.edu/pathfinder](#). If you have any questions about these policies, see me. I am happy to accommodate special learning needs; see [http://www.gml.gmu.edu/academic-support](#) in the Office of Academic Support Services first. You may withdraw from this course at any time the Registrar allows.

**SCHEDULE:** Although this initial calendar provides lecture topics and assignments, we might have to make adjustments as the semester proceeds. “GML” refers to *Give Me Liberty*.

Mon. 8/30	Introductions and Expectations. Reading and taking notes.
Wed. 9/1	The Spanish in Early America

Syllabus

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Fri. 9/3	Imagining the Other. Please print out and bring to class the images located on the P drive under \HS 115\document sets\Roanoke images. No write-up required.
Mon. 9/6	Power and Freedom. Please print and bring to class "Power Relationships handout," located on the P drive under "assignments".
Wed. 9/8	Discussion: GML chap. 2
Fri. 9/10	Discussion: Godbeer, Prologue to p. 87.
Mon. 9/13	Discussion: GML chap. 3
Wed. 9/15	Witchcraft at Salem. Please print and bring to class "Salem Village 1692 map," located on the P drive under "document sets"
Fri. 9/17	Discussion: Godbeer, chap. 5 to p. 173 (write-up optional)
Mon. 9/20	PAPER 1 DUE. Sensory History.
Wed. 9/22	Discussion: GML chap. 4
Fri. 9/24	Colonial Crisis
Mon. 9/27	MAP QUIZ; Discussion: GML chap. 5
Wed. 9/29	The Logic of Revolution
Fri. 10/1	Discussion: Paine (entire).
Mon. 10/4	Discussion: GML chap. 7
Wed. 10/6	--Meet in Library for session on finding primary sources--
Fri. 10/8	Discussion: Madison, <i>The Federalist</i> , no. 10, available on the P drive under "document sets"
Mon. 10/11	Discussion: GML chap. 8 (write-up optional)
Wed. 10/13	The Whiskey Rebellion
Fri. 10/15	EXAM 1
Mon. 10/18	--Fall Recess--
Wed. 10/20	Discussion: GML chap. 9
Fri. 10/22	Discussion: "1804 Inventory," typed and written versions, located on the P drive.
Mon. 10/25	The Roots of Individualism
Wed. 10/27	Discussion: GML chap. 10
Fri. 10/29	The Second Party System
Mon. 11/1	Discussion: GML chap. 11
Wed. 11/3	Reforming America
Fri. 11/5	--Class canceled (History conference)--
Mon. 11/8	Discussion: Douglass, to p. 69 (write-up optional)
Wed. 11/10	PAPER 2 DUE. Susan Hamlin and Susan Hamilton
Fri. 11/12	Sensory History and Slavery

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**Syllabus**

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Mon. 11/15 Discussion: GML chap. 13  
Wed. 11/17 Go West, Young Man (and Woman)  
Fri. 11/19 Discussion: primary source on the Overland Trail TBA

Mon. 11/22 The Logic of Secession  
Wed. 11/24 --Thanksgiving Recess--  
Fri. 11/26 --Thanksgiving Recess--

Mon. 11/29 Discussion: GML chap. 14 (write-up optional)  
Wed. 12/1 Gettysburg and the Gettysburg Address  
Fri. 12/3 EXAM 2

Mon. 12/6 Analyzing Photographs. Please print and bring to class "Niagara Falls, 1853" and "Hoepker 9.11", both located on the P drive (write-up optional).  
Wed. 12/8 Discussion: Alexander Gardner photographs, available at:

Fri. 12/10 Discussion: GML chap. 15 (write-up optional). BRING LAPTOP FOR COURSE EVALUATION.

Mon. 12/13 Liberty and Power in the Second American Revolution

FINAL DISCUSSION DAYS AND TIMES TO BE ANNOUNCED

6/70

## MAP IDENTIFICATION ITEMS

You must be able to locate all of the following items on the blank map. When identifying states, use the abbreviations provided. If the space is too small, draw arrows pointing to the specific place. For the physical features, carefully indicate the extent of the region along with your identification.

STATES: Alabama (AL); Alaska (AK); Arizona (AZ); Arkansas (AR); California (CA); Colorado (CO); Connecticut (CT); Delaware (DE); Florida (FL); Georgia (GA); Hawaii (HI); Idaho (ID); Illinois (IL); Indiana (IN); Iowa (IA); Kansas (KS); Kentucky (KY); Louisiana (LA); Maine (ME); Maryland (MD); Massachusetts (MA); Michigan (MI); Minnesota (MN); Mississippi (MS); Missouri (MO); Montana (MT); Nebraska (NE); Nevada (NV); New Hampshire (NH); New Jersey (NJ); New Mexico (NM); New York (NY); North Carolina (NC); North Dakota (ND); Ohio (OH); Oklahoma (OK); Oregon (OR); Pennsylvania (PA); Rhode Island (RI); South Carolina (SC); South Dakota (SD); Tennessee (TN); Texas (TX); Utah (UT); Vermont (VT); Virginia (VA); Washington (WA); West Virginia (WV); Wisconsin (WI); Wyoming (WY).

BODIES OF WATER: Atlantic Ocean; Chesapeake Bay; Gulf of Mexico; Lake Erie; Lake Huron; Lake Michigan; Lake Ontario; Lake Superior; Mississippi River; Missouri River; Ohio River; Pacific Ocean.

OTHER PHYSICAL FEATURES: Appalachian Mountains; Rocky Mountains; Great Plains.

COUNTRIES: Canada; Mexico

For some fun websites to help you with states and countries, see:

- <http://www.mccollam.com/fun/geoquiz/>
- <http://www.addictinggames.com/50states.html>

For outline maps of the United States, see: <http://www.eduplace.com/ss/maps/usa.html>

### Historical Understanding: Spheres of Human Activity

People live complex lives and we must look at those lives from a variety of perspectives in order to have any chance at understanding their thoughts and actions. The following five overlapping spheres of human activity (as adapted from the *National Standards for United States and World History*) highlight different ways of looking at the past. Try to address as many of these spheres as possible and look at the ways in which these activities interrelate. In no particular order, the spheres of human activity include:

#### 1. Social History

Through social history, students come to deeper understandings of society: of different and changing views of family structures, of men's and women's roles, of childhood and of children's roles, of various groups and classes in society, and of relationships among all these individuals and groups. This sphere incorporates developments shaping the destiny of millions: the history of class conflict; of mass migration and immigration; the human consequences of plague, war, and famine; and of changing standards of living.

#### 2. Political History

Students need to comprehend the political sphere of history as it has developed in their local community, their state, their nation, and in various societies of the world. Efforts to construct governments and institutions; the drive to seize and hold power over others; the struggle to achieve and preserve basic human rights, justice, equality, law, and order in societies; and the evolution of regional and world mechanisms to promote international law all fall within this sphere.

#### 3. Geographic and Environmental History

The historical record is inextricably linked to the geographic setting in which it developed. Population movements and settlements, scientific and economic activities, geopolitical agendas, and the distribution and spread of ideas are all related in some measure to geographic factors. The opportunities and constraints with which any people have addressed the issues of their time have been influenced by the environment in which they lived or to which they have had access, and by the traces on the landscape irrevocably left by those who came before.

#### 4. Economic History

With this sphere, students appreciate the economic forces that have played crucial roles in determining the quality of people's lives, in structuring societies, and in influencing the course of events. Exchange relationships within and between cultures have had major impacts on society and politics, producing changing patterns of regional, hemispheric, and global economic influence.

#### 5. Cultural History

Through cultural history, students learn how ideas, beliefs, and values have profoundly influenced human actions throughout history. Religion, philosophy, art, and popular culture have all been central to the aspirations and achievements of all societies, and have been a mainspring of historical change from earliest times.

### Historical Thinking: Going Beyond Just the Facts

Understanding history depends on knowing facts, dates, names, places, events, and ideas, but it also relies on much more. True historical understanding requires students to engage in historical thinking: to raise questions and to gather solid evidence in support of their answers; to examine imaginatively the historical record by taking into account the historical context in which these records were created and by comparing the multiple points of view of those on the scene. As you wrestle with the readings, strive for this level of historical thinking.

#### 1. Chronological Thinking

Students should work towards being able to distinguish between past, present, and future time; identify the temporal structure of a historical narrative or story; establish temporal order in constructing historical narratives of their own; and compare alternative models for periodization.

#### 2. Historical Comprehension

Students should work towards being able to identify the creator of a historical source and assess its credibility; reconstruct the literal meaning of a historical passage by identifying who was involved, what happened, where it happened, what events led to these developments, and what consequences or outcomes followed; identify the central question(s) the historical narrative addresses and the purpose, perspective, or point of view from which it has been constructed; differentiate between historical facts and historical interpretations; and appreciate historical perspectives (describing the past on its own terms, through the eyes and experiences of those who were there, considering the historical context in which the events unfolded by taking into account values, outlooks, options, and contingencies of that time and place, and avoiding the “present-mindedness” of judging the past solely in terms of present-day beliefs and values).

#### 3. Historical Analysis and Interpretation

Students should work towards being able to compare and contrast differing sets of ideas, values, behaviors, and institutions; consider multiple perspectives by demonstrating peoples’ differing motives and beliefs; analyze cause-and-effect relationships by bearing in mind (a) the importance of the individual, (b) the influence of ideas and beliefs, and (c) the role of chance; distinguish between unsupported expressions of opinion and informed hypotheses grounded in historical evidence; formulate examples of historical contingency—of how different choices could have led to different consequences; and hold interpretations of history as subject to change.

#### 4. Historical Research Capabilities

Students should work towards being able to formulate historical questions from encounters with historical documents; obtain historical data from a variety of sources; question historical data by examining the contexts in which they were created; and support interpretations with historical evidence and closely reasoned arguments.

#### 5. Historical Issues-Analysis and Decision-Making

To address problems of the past, students should be able to gather appropriate evidence; identify historical antecedents; evaluate alternative courses of action; formulate a position on an issue; and evaluate the implementation of a decision.

HS 115

## Richard Godbeer, ESCAPING SALEM

### Reading and Discussion Questions

On Friday, Sept. 10, please come to class with a 1-2 page essay answering one of the following questions. You may work with a single partner or by yourself. Support your answer with examples from the book, and cite your information (whether you quote directly or not) by giving page numbers in parentheses at the end of the sentence or paragraph. Please be ready to discuss each of the questions in class.

1. Why do people believe in the supernatural and in witchcraft? Why do they think Katherine Branch is the victim of witchcraft? Why do others think Branch is faking?
2. Some people give testimony before a special court, but others do not. What motivates some people to testify and others to remain silent?
3. What are the most important parts of the social sphere in Stamford, Connecticut? What are the most important power relationships between people?

On Friday, Sept. 17, please be ready to discuss the following questions. You may turn in a write-up on one question and possibly earn a point, but you are not required to do so.

1. What is the court's position on the acceptability of specters and images as evidence for conviction? Of illness or misfortune following arguments? Why does the court hold the position it does?
2. What are the results of the trial? What are the consequences for the people of Stamford? For Disborough?
3. Why are women more likely to get accused of witchcraft? What sorts of women are most vulnerable to accusations?
4. In order for witchcraft accusations to occur, what three factors/conditions need to exist?

10/70

HS 115  
Fall 2010

## PAPER 1: ANALYZING COLONIAL SOCIETY

This assignment, due Monday, September 20, asks you to analyze primary sources using the insights gained from reading Richard Godbeer's *Escaping Salem* and Eric Foner's *Give Me Liberty*. Please address the following question:

**Imagine that your mother or father visited a museum and found a document from the town meeting of Dorchester, Massachusetts, from 1645 and some legal documents related to the witchcraft trial of John Willard in 1692. Your parent does not fully understand what is going on in these documents. Your parent asks you, "Why do people do and say the things that are recorded in these primary sources?" Choose ONE of the topics, either Dorchester or John Willard, and explain to your parent the larger patterns of life in New England at this time.**

For example, the Selectmen order that "all men shall attend unto what is propounded by the seven men and thereunto afford their best help as shall be required in due order, avoiding all janglings by two or three in several companies, as also [avoiding] to speak unorderly or unseasonably." Explain to your parent why the Selectmen might have made such an order, and what it suggests about village life. Similarly, Lydia Nichols and Margaret Knight recalled seeing Willard "running in a strange distracted frame." Why would they bring this small matter up in court? What does it indicate about their beliefs? Were such beliefs common at that time?

1. Your paper should be 4-5 pages long, double-spaced, in 12-point font, and with one-inch margins. Put your student I.D. number, not your name, at the top of the first page.
2. When citing the Dorchester source, put the paragraph number in parentheses at the end of the sentence: (para. 2). When citing the Willard sources, use the document's number: (doc. 3).
3. You must support your explanations with information or examples from Godbeer and Foner. When you quote directly or use their ideas, you must cite the exact source. At the end of a sentence or paragraph, give the author and page number in parentheses, such as (Godbeer, 62).
4. What are the two or three most important features of colonial life that you see in the sources and that your parent should understand? As you try to decide what is most important, use Foner and Godbeer as guides.
5. You may work with one classmate and together turn in a single paper (put both I.D. numbers on the first page). You may, of course, work by yourself.

## An Order for the Town Meeting of Dorchester, Massachusetts

By the mid-1600s, the residents of New England had adopted the town meeting as their form of local government. Most, or all, of the male householders participated and in addition served on a variety of committees and held position in town offices. The members of the Dorchester meeting also chose seven "Selectmen," a board of leading citizens who supervised the government. The following document comes from the *Fourth Report of the Boston, Massachusetts, Record Commissioners*, Document No. 9 (Boston, 1880), reprinted in John Demos, ed., *Remarkable Providences, 1600-1760* (New York: George Braziller, 1972), pp. 198-199.

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The 27<sup>th</sup> [day] of the 11<sup>th</sup> month, 1645: An order for the ordering of our town meetings.

Forasmuch as the intemperate clashings in our town meetings, as also the unorderedly departings of sundry before other brethren and neighbors, and the undigested and importunate motives by diverse divulged, have been not only grievous but justly offensive unto diverse, as also great occasion of misspent precious time and an hindrance [such] that good orders and other business have not succeeded as otherwise probably they might have done—the premises being taken into consideration, it hath pleased the freemen and brethren of Dorchester to commend the care of the redress unto the seven men [the Selectmen] for the time being. These are therefore to declare unto all our loving brethren and neighbors of Dorchester that, according to the care commended unto us and by the authority conferred on us, it is ordered:

First, that whensoever the seven men shall have occasion of the assembling of the town or freemen thereof [we] shall give due notice and cognizance unto them. And we account this to be due notice, viz., that if it be on a lecture day that so many as are present shall take it for notice; or if it be by sending a special messenger from house to house, that if notice be left at the house with wife or child above the age of twelve years, the husband or father not being within or not at home, if he come home before the day appointed and not repair to the seven men, or four of them, to give in his excuse or appear upon the day of meeting, so many as shall have such notice and cognizance and attend not nor give in some valuable excuse unto the seven men shall forfeit six pence for the first offense.

Secondly, when the company is assembled as aforesaid, it is ordered that all men shall attend unto what is propounded by the seven men and thereunto afford their best help as shall be required in due order, avoiding all janglings by two or three in several companies, as also [avoiding] to speak unorderedly or unseasonably—[from] which nevertheless is this to be construed, that we intend not the least infringement of any brother or neighbor's liberty, nor [in] any way to suppress the abilities of any, nor to quench the smoking flax, but [we expect] that all in due time and order may communicate and contribute such help as they may have opportunity to do; but [we intend] only that confusion may be avoided and business [be] more orderly dispatched. For the ends before mentioned we, the seven men, have appointed one of us to be

our moderator to propound and also to order our meetings; and [we require] that all the assembly shall address and direct their speech unto him and shall be attentive unto the business of the assembly.

Thirdly, [we order] that no motions be divulged or propounded but such as the seven men shall have seasonable knowledge of, and they [are] to propound the same; which is thus to be understood, that in case the seven men shall refuse to propound any man's motion, the party shall after some competent times of patience and forbearance have liberty to propound his own cause for hearing at some meeting, provided all disturbance and confusion be avoided.

Fourthly, [we require] that no man shall depart the assembly without giving due notice unto the moderator and declaring such occasion [of his departure] as shall be approved by the seven men, upon pain of twelve pence for the first offence.

## The Trial of John Willard

**What follows is a selection of court documents related to the witchcraft trial of John Willard. He was executed on 19 August 1692. These sources, and many more, can be found at:** *The Salem witchcraft papers, Volume 3: verbatim transcripts of the legal documents of the Salem witchcraft outbreak of 1692*. Edited and with an introduction and index by Paul Boyer and Stephen Nissenbaum (New York: Da Capo Press, 1977). **Available from the** Electronic Text Center, University of Virginia Library, "Salem Witch Trials: Documentary Archive and Transcription Project," <http://etext.virginia.edu/salem/witchcraft/texts/transcripts.html>

### 1. Henry Wilkins, Sr. v. John Willard

The Deposition of Henry Wilkins sen aged 41 years who testifieth and sayth that upon the third of May last John Willard came to my house: and very earnestly entreated me to go with him to Boston w<sup>ch</sup> I at length consented to go with him. My Son Daniel comeinge and understanding I was goinge with him to Boston and seemed to be much troubled that I would go with the sayd Willard: and he sayd he thought it were wel If the sayd Willard were hanged: w<sup>ch</sup> made me admire for I never heard such an expression come from him to any one beeing since he came to yeares of discretion.

But after I was gone in a few days he was taken sicke: and grew every day worse & worse where upon we made application to a phisitian who affirmed his sickness was by some preternatural cause & would make no application of any phisicke. Some tymes after this our neighbours comeing to visit my son Mercy Lewis came w<sup>th</sup> them and affirmed that she saw the apparition of John Willard affecting him: quickly after came Ann Putnam and she saw the same apparition. And then my eldest daughter was taken in a sad manner & the sayd Ann saw the sayd Willard affecting her. At Another tyme Mercy Lewes and Mary Walcut came to visit him

and they saw the same apparition of Willard afflicting him, and this not but a litle tyme before his death.

## 2. Thomas Putnam and Edward Putnam v. John Willard

The deposition of Thomas Putnam agged 40 years and Edward Putnam agged 38 years who testifie and say that we haveing been conversant with severall of the afflicted persons as namly Mary Walcott, Mercy Lewes, Elizabeth Hubbert, Abigail Williams, and Ann Putnam Jun'r and we have seen them most greviously tormented by pinching and pricking and being all most choaked to death, most greviously complaining of John Willard for hurting them. But on the 18'th day of May 1692, being the day of his examination, the afforesaid afflicted persons were most greviously tormented dureing the time of his examination for if he did but cast his eies upon them they ware strocken down or all most choak: also severall times sence we have seen the afforesaid afflicted persons most greviously tormented as if their bones would have been disjoined, greviously complaining of John Willard for hurting them. And we verly beleve that John Willard the prizsoner at the barr has severall times tormented and afflicted the afforesaid persons with acts of witchcraft.

## 3. Lydia Nichols and Margaret Knight v. John Willard

The deposition of Lydia Nicoles aged 46 yeares, and of Margaret Knight aged 20 yeares, who testefy and say That the wife of John Willard being at her fathers house when the sayd Willard lived at Groton, she made a lamentable complaynt how cruelly her husband had beaten her. She thought her selfe that she should never recover of the blows he had given her: the next morninge he was got into a litle hole under the stayres, and then she thought, some thing extra ordinary had befallen him. Then he ran out at the dore and ran up a steep hill almost impossible for any man to run up, as she sayd. Then she tooke her mare and rid away, fearing some evil had been intended agaynst her and when she came to the house of Henery or Benjamin Willard she told how it was with her, and the sayd Henery Willard, or both, went to looke after him and met him runninge in a strange distracted frame.

## 4. Thomas Bailey v. John Willard

The deposition of Thomas Baly aged 36 yeares who testefieth and sayth That I, being at Groton some short tyme after John Willard, as the report went, had beaten his wife, I went to call him home, and comeinge home with him in the night I heard such a hideous noyse of strang creatures I was much affrighted for I never had heard the like noyse. I fearinge they might be some evil spirits, I enquired of the sayd Willard what might it be that made such a hideous noyse. The sayd Willard sayd they ware Locust. The next day, as I suppose, the sayd Williards wife, with a younge childe and her mother, being upon my mare ridinge betweene Groton Mil and Chelmsford, they being willing to goe on foote a litle, desired me to ride. Then I taking my

mare, being willing to let her feed a litle there, as I remember I aprehend I heard the same noyse agayne where at my mare started and got from me.

### 5. Examination of John Willard, 18 May 1692 (selection)

*The afflicted in most miserable fits upon this examinant drawing near.*

*After several of them were recovered, he lookt upon them, & they again fell into fits, whilst the warrant & returne was reading.*

Court: Here is a returne of the warrant that you were fled from Authority. That is an acknowledgment of guilt, but yet notwithstanding we require you to confess the truth in this matter.

Willard: I shall, as I hope, I shall be assisted by the Lord of Heaven, & for my going away I was affrighted, & I thought by my withdrawing it might be better, I fear not but the Lord in his due time will make me as white as snow.

Court: What do you say? Why do you hurt these? It is you, or your appearance.

Willard: I know nothing of appearance.

Court: Is this the man?

*Several of the afflicted said yes.*

Court: They charge you. It is you or your appearance.

Willard: I know nothing of appearance, & the God of Heaven will clear me.

Court: They charge you, not only with this, but with dreadfull murders, & I doubt not if you be guilty, God will not want evidence.

*Eliz: Hubbard testified that he afflicted her, & then he lookt upon her & she fell into a fit.*

*Mercy Lewis testimony read.*

Court: If you desire mercy from God, then you must confesse & give Glory to God.

Willard: As to sins I am guilty of, if the minister asks me I am ready to confesse . . . .

HS 115  
Fall 2010

### Evaluation Form for Paper 1: Analyzing Colonial Society

ID number \_\_\_\_\_

Used documents related to \_\_\_\_\_ Dorchester \_\_\_\_\_ John Willard

Criteria	Excellent	Good	Needs improvement	Unacceptable
1. Focus	Sharp focus on the question; selects most important issues	Most points are tied to the question; selects important issues	Answers question but has tangents; some minor issues	Doesn't answer question; selects issues of little importance
2. Insight	Makes a valid and insightful analysis of the sources	Some insights, but issues not fully explored	Mostly description without analysis	No insights; no meaningful attempt to do so
3. Context	Gives a thorough explanation of 17 <sup>th</sup> -century New England	Explains key parts of 17 <sup>th</sup> -century New England	Makes only a few connections to New England context	Provides little or no context of 17 <sup>th</sup> -century New England
4. Use of evidence	Provides many relevant examples from primary and secondary sources	Provides relevant examples but misses some key ones	Provides only a few specific examples; some less relevant	Few or no examples, or key sources not addressed
5. Citations	All information cited, and cited correctly	Most information is cited; all citations correct	Some information not cited; citations incomplete	Many citations missing, incomplete, or wrong
6. Writing quality	Clear prose; no errors in grammar, punctuation, or spelling	Understandable prose; few writing errors	Some unclear writing; many writing errors	Confusing or unreadable writing; more than 10 errors

Strengths:

Assignment: Paper 1

His\_18\_1936  
7

Needs Work:

Grade \_\_\_\_\_

\* \* \*

ID number \_\_\_\_\_

Name \_\_\_\_\_

### Class Participation

Points earned \_\_\_\_\_

Highest point total in section \_\_\_\_\_

Absences: \_\_\_\_\_ excused

\_\_\_\_\_ unexcused

Approximate grade \_\_\_\_\_

Comments:

17/70

History 115, Fall 2010

Reading and Discussion Questions for *Give Me Liberty*

On the discussion days for *Give Me Liberty*, please come to class with a 2-page TYPED response to Part One and Part Two. This preparation on your part will make discussion more useful and fun for everybody. You will be graded on your preparation more than on having the “right” answers.

- one discussion point for complete and thoughtful preparation;
- a “check” for average work (3 checks = 1 point);
- a loss of one point for poor preparation (little effort and/or many mistakes);
- a loss of two points if you do not have this typed response at the start of class.

You may work with a single partner and together turn in one typed response, or you can choose to work by yourself. In class, you will work in groups to correct and enhance your responses. Remember to cite your information by giving page numbers in parentheses at the end of the sentence or paragraph. Strive to use your own words rather than relying on or copying Foner’s.

\* \* \*

**PART ONE: Please identify and briefly describe the main development(s) in the assigned chapter (maximum of three). For each development, please identify and briefly describe two examples (people, events, ideas, actions, etc.) that support and explain the development. Prioritize your choices so that you describe the most important developments and examples.**

Feel free to put your write-up in the form of a checklist or outline. For example . . .

Development 1: one or two sentences of explanation.

Example 1: brief description with connection to development 1.

Example 2: brief description with connection to development 1.

Development 2: one or two sentences of explanation.

Example 3: brief description with connection to development 2.

Example 4: brief description with connection to development 2.

- Avoid choosing a “topic,” which is a category, subject, or issue. A “development” involves some sort of change over time. A chapter might address the topic of slavery, but the development is that slavery plays a more important role in society during the time period. Example 1 might be a new law that now makes slaves the property of the owner.
- Don’t just settle for the first development you come across. Step back and look at the bigger picture Foner presents. Scan the entire chapter first, then read more closely, and at the end try to pick the most important development(s) and best examples. Historians must use their judgment to determine what is more and what is less important in order to build the most convincing argument possible.

**PART TWO:** Please answer one of the following, writing about one-half to a full double-spaced page:

1. What is the most important power relationship described in the chapter? Why is it so important?
2. Eric Foner focuses on the changing meanings of freedom, the social conditions that make freedom possible, and the boundaries of freedom (see *Give Me Liberty*, p. xxi). How does the chapter address any of these topics?
3. Describe a key development in the chapter using as many of the five spheres of human activity (social, political, environmental/geographic, economic, and cultural—see the syllabus for descriptions) as you can.

His\_18\_1936

# GIVE ME LIBERTY!

## AN AMERICAN HISTORY



by **ERIC FONER**

SEAGULL THIRD EDITION

W. W. NORTON & COMPANY · NEW YORK · LONDON

20/70

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# APPENDIX F

## 2009 NAEP Grade 12 Mathematics and Reading Frameworks for Alignment Studies

### MATHEMATICS

Level	Description
<b>I</b>	<b>Number properties and operations</b>
I.1	Number sense
I.1.d	Represent, interpret, or compare expressions for real numbers, including expressions using exponents and logarithms.
I.1.f	Represent or interpret expressions involving very large or very small numbers in scientific notation.
I.1.g	Represent, interpret, or compare expressions or problem situations involving absolute values.
I.1.i	Order or compare real numbers, including very large and very small real numbers.
I.2	Estimation
I.2.b	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.
I.2.c	Verify solutions or determine the reasonableness of results in a variety of situations.
I.2.d	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.
I.3	Number operations
I.3.a	Find integral or simple fractional powers of real numbers.
I.3.b	Perform arithmetic operations with real numbers, including common irrational numbers.
I.3.c	Perform arithmetic operations with expressions involving absolute value.
I.3.d	Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.
I.3.f	Solve application problems involving numbers, including rational and common irrationals.
I.4	Ratios and proportional reasoning
I.4.c	Use proportions to solve problems (including rates of change).
I.4.d	Solve multistep problems involving percentages, including compound percentages.
I.5	Properties of number and operations
I.5.c	Solve problems using factors, multiples, or prime factorization.
I.5.d	Use divisibility or remainders in problem settings.
I.5.e	Apply basic properties of operations, including conventions about the order of operations.
I.5.f	Recognize properties of the number system (whole numbers, integers, rational numbers, real numbers, and complex numbers) and how they are related to each other, and identify examples of each type of number.
I.6	Mathematical reasoning using number

Level	Description
1.6.a	Give a mathematical argument to establish the validity of a simple numerical property or relationship.
1.6.b	* Analyze or interpret a proof by mathematical induction of a simple numerical relationship.
<b>2</b>	<b>Measurement</b>
2.1	Measuring physical attributes
2.1.b	Determine the effect of proportions and scaling on length, area, and volume.
2.1.c	Estimate or compare perimeters or areas of two-dimensional geometric figures.
2.1.d	Solve problems of angle measure, including those involving triangles or other polygons or parallel lines cut by a transversal.
2.1.f	Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures.
2.1.h	Solve problems by determining, estimating, or comparing volumes or surface areas of three-dimensional figures.
2.1.i	Solve problems involving rates such as speed, density, population density, or flow rates.
2.2	Systems of measurement
2.2.a	Recognize that geometric measurements (length, area, perimeter, and volume) depend on the choice of a unit, and apply such units in expressions, equations, and problem solutions.
2.2.b	Solve problems involving conversions within or between measurement systems, given the relationship between the units.
2.2.d	Understand that numerical values associated with measurements of physical quantities are approximate, are subject to variation, and must be assigned units of measurement.
2.2.e	Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of measurement of the dimensions to obtain a specified accuracy of area) and find the measure to that degree of accuracy.
2.2.f	Construct or solve problems involving scale drawings.
2.3	Measurement in triangles
2.3.a	Solve problems involving indirect measurement.
2.3.b	Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) stay constant in similar triangles.
2.3.c	Use the definitions of sine, cosine, and tangent as ratios of sides in a right triangle to solve problems about length of sides and measure of angles.
2.3.d	Interpret and use the identity $\sin^2 q + \cos^2 q = 1$ for angles $q$ between $0^\circ$ and $90^\circ$ ; recognize this identity as a special representation of the Pythagorean theorem.
2.3.e	* Determine the radian measure of an angle and explain how radian measurement is related to a circle of radius 1.
2.3.f	* Use trigonometric formulas such as addition and double angle formulas.
2.3.g	* Use the law of cosines and the law of sines to find unknown sides and angles of a triangle.
<b>3</b>	<b>Geometry</b>
3.1	Dimension and shape
3.1.c	Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space.
3.1.d	Draw or sketch from a written description plane figures and planar images of three-dimensional figures.

Level	Description
3.1.e	Use two-dimensional representations of three-dimensional objects to visualize and solve problems.
3.1.f	Analyze properties of three-dimensional figures including spheres and hemispheres.
3.2	Transformation of shapes and preservation of properties
3.2.a	Recognize or identify types of symmetries (e.g., point, line, rotational, self-congruence) of two- and three-dimensional figures.
3.2.b	Give or recognize the precise mathematical relationship (e.g., congruence, similarity, orientation) between a figure and its image under a transformation.
3.2.c	Perform or describe the effect of a single transformation on two- and three-dimensional geometric shapes (reflections across lines of symmetry, rotations, translations, and dilations).
3.2.d	Identify transformations, combinations, or subdivisions of shapes that preserve the area of two-dimensional figures or the volume of three-dimensional figures.
3.2.e	Justify relationships of congruence and similarity and apply these relationships using scaling and proportional reasoning.
3.2.g	Perform or describe the effects of successive transformations.
3.3	Relationships between geometric figures
3.3.b	Apply geometric properties and relationships to solve problems in two and three dimensions.
3.3.c	Represent problem situations with geometric models to solve mathematical or real-world problems.
3.3.d	Use the Pythagorean theorem to solve problems in two- or three-dimensional situations.
3.3.e	Recall and interpret definitions and basic properties of congruent and similar triangles, circles, quadrilaterals, polygons, parallel, perpendicular and intersecting lines, and associated angle relationships.
3.3.f	Analyze properties or relationships of triangles, quadrilaterals, and other polygonal plane figures.
3.3.g	Analyze properties and relationships of parallel, perpendicular, or intersecting lines including the angle relationships that arise in these cases.
3.3.h	Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, and chords).
3.4	Position, direction, and coordinate geometry
3.4.a	Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines.
3.4.b	Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space.
3.4.c	Describe or identify conic sections and other cross sections of solids.
3.4.d	Represent two-dimensional figures algebraically using coordinates and/or equations.
3.4.e	* Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically.
3.4.f	Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.
3.4.g	* Graph ellipses and hyperbolas whose axes are parallel to the coordinate axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.
3.4.h	* Represent situations and solve problems involving polar coordinates.
3.5	Mathematical reasoning in geometry

Level	Description
3.5.a	Make, test, and validate geometric conjectures using a variety of methods including deductive reasoning and counterexamples.
3.5.b	Determine the role of hypotheses, logical implications, and conclusion in proofs of geometric theorems.
3.5.c	Analyze or explain a geometric argument by contradiction.
3.5.d	Analyze or explain a geometric proof of the Pythagorean theorem.
3.5.e	Prove basic theorems about congruent and similar triangles and circles.
<b>4</b>	<b>Data analysis, statistics, and probability</b>
4.1	Data representation
4.1.a	Read or interpret graphical or tabular representations of data.
4.1.b	For a given set of data, complete a graph and solve a problem using the data in the graph (histograms, scatterplots, and line graphs).
4.1.c	Solve problems involving univariate or bivariate data.
4.1.d	Given a graphical or tabular representation of a set of data, determine whether information is represented effectively and appropriately.
4.1.e	Compare and contrast different graphical representations of univariate and bivariate data.
4.1.f	Organize and display data in a spreadsheet in order to recognize patterns and solve problems.
4.2	Characteristics of data sets
4.2.a	Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, and standard deviation).
4.2.b	Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.
4.2.c	Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation.
4.2.d	Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.
4.2.e	Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line and use the line or equation to make predictions.
4.2.f	Recognize that the correlation coefficient is a number from -1 to +1 that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.
4.2.g	Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).
4.3	Experiments and samples
4.3.a	Identify possible sources of bias in sample surveys and describe how such bias can be controlled and reduced.
4.3.b	Recognize and describe a method to select a simple random sample.
4.3.c	* Draw inferences from samples, such as estimates of proportions in a population, estimates of population means, or decisions about differences in means for two “treatments.”
4.3.d	Identify or evaluate the characteristics of a good survey or of a well-designed experiment.
4.3.e	* Recognize the differences in design and in conclusions between randomized experiments and observational studies.

Level	Description
4.4	Probability
4.4.a	Recognize whether two events are independent or dependent.
4.4.b	Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.
4.4.c	Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.
4.4.d	Use theoretical probability to evaluate or predict experimental outcomes.
4.4.e	Determine the number of ways an event can occur using tree diagrams, formulas for combinations and permutations, or other counting techniques.
4.4.h	Determine the probability of independent and dependent events.
4.4.i	Determine conditional probability using two-way tables.
4.4.j	Interpret and apply probability concepts to practical situations.
4.4.k	* Use the binomial theorem to solve problems.
4.5	Mathematical reasoning with data
4.5.a	Identify misleading uses of data in real-world settings and critique different ways of presenting and using information.
4.5.b	Distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations.
4.5.c	* Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.
4.5.d	Recognize when arguments based on data confuse correlation with causation.
4.5.e	* Recognize and explain the potential errors caused by extrapolating from data.
5	<b>Algebra</b>
5.1	Patterns, relations, and functions
5.1.a	Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions.
5.1.b	Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.
5.1.e	Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or * trigonometric functions from tables, graphs, or equations.
5.1.g	Determine whether a relation, given in verbal, symbolic, tabular, or graphical form, is a function.
5.1.h	Recognize and analyze the general forms of linear, quadratic, rational, exponential, or * trigonometric functions.
5.1.i	Determine the domain and range of functions given in various forms and contexts.
5.1.j	* Given a function, determine its inverse if it exists and explain the contextual meaning of the inverse for a given situation.
5.2	Algebraic representations
5.2.a	Create and translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.
5.2.b	Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams (including Venn diagrams), or written descriptions and evaluate the relative advantages or disadvantages of different representations to answer specific questions.

Level	Description
5.2.d	Perform or interpret transformations on the graphs of linear, quadratic, exponential, and * trigonometric functions.
5.2.e	Make inferences or predictions using an algebraic model of a situation.
5.2.f	Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or * trigonometric function fits the situation.
5.2.g	Solve problems involving exponential growth and decay.
5.2.h	* Analyze properties of exponential, logarithmic, and rational functions.
5.3	Variables, expressions, and operations
5.3.b	Write algebraic expressions, equations, or inequalities to represent a situation.
5.3.c	Perform basic operations, using appropriate tools, on algebraic expressions including polynomial and rational expressions.
5.3.d	Write equivalent forms of algebraic expressions, equations, or inequalities to represent and explain mathematical relationships.
5.3.e	Evaluate algebraic expressions including polynomials and rational expressions.
5.3.f	Use function notation to evaluate a function at a specified point in its domain and combine functions by addition, subtraction, multiplication, division, and composition.
5.3.g	* Determine the sum of finite and infinite arithmetic and geometric series.
5.3.h	Use basic properties of exponents and *logarithms to solve problems.
5.4	Equations and inequalities
5.4.a	Solve linear, rational, or quadratic equations or inequalities, including those involving absolute value.
5.4.c	Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.
5.4.d	Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.
5.4.e	Solve problems involving special formulas such as: $A = P(1 + r)^t$ , $A = Pe^{rt}$ .
5.4.f	Solve an equation or formula involving several variables for one variable in terms of the others.
5.4.g	Solve quadratic equations with complex roots.
5.5	Mathematical reasoning in algebra
5.5.a	Use algebraic properties to develop a valid mathematical argument.
5.5.b	Determine the role of hypotheses, logical implications, and conclusions in algebraic argument.
5.5.c	Explain the use of relational conjunctions (and, or) in algebraic arguments.

## READING

**Table F2. 2009 NAEP Grade-12 Reading Framework: Organization for Alignment Studies**

Level	Description
I	<b>Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension</b>
I.1	Locate or recall textually explicit information and make simple inferences within and across both literary and informational texts
I.1.a	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics
I.2	Locate or recall textually explicit information and make simple inferences within and across literary texts
I.2.a	Locate or recall character traits
I.2.b	Locate or recall sequence of events or actions
I.2.c	Locate or recall setting
I.2.d	Locate or recall figurative language
I.2.e	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction
I.3	Locate or recall textually explicit information and make simple inferences within and across informational texts
I.3.a	Locate or recall the topic sentence or main idea
I.3.b	Locate or recall the author's purpose
I.3.c	Locate or recall causal relations
I.3.d	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.
2	<b>Integrate/Interpret: Make complex inferences within and across texts</b>
2.1	Integrate/Interpret: Make complex inferences within and across both literary and informational texts
2.1.a	Describe problem and solution, or cause and effect
2.1.b	Compare or connect ideas, perspectives, problems, or situations
2.1.c	Determine unstated assumptions in an argument
2.1.d	Describe or analyze how an author uses literary devices or text features to convey meaning
2.1.e	Describe or analyze how an author uses organizing structures to convey meaning
2.1.f	Describe or analyze author's purpose
2.2	Integrate/Interpret: Make complex inferences within and across texts literary texts
2.2.a	Interpret mood, tone, or voice
2.2.b	Integrate ideas to determine theme
2.2.c	Interpret a character's conflicts, motivations, and decisions
2.2.d	Examine relations between or among theme, setting, plot, or characters
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning

**Table F2. 2009 NAEP Grade-12 Reading Framework: Organization for Alignment Studies**

Level	Description
2.3	Integrate/Interpret: Make complex inferences within and across texts informational texts
2.3.a	Summarize major ideas
2.3.b	Draw conclusions and provide supporting information
2.3.c	Find evidence in support of an argument
2.3.d	Distinguish facts from opinions
2.3.e	Determine the importance of information within and across texts
2.4	Integrate/Interpret: Apply understanding of vocabulary to comprehension of both literary and informational texts
2.4.a	Determine word meaning as used in context
3	Critique/Evaluate: Consider text(s) critically
3.1	Critique/Evaluate: Consider both literary and informational texts critically
3.1.a	Judge the author's craft and technique
3.1.b	Analyze, critique, or evaluate the author's perspective or point of view
3.1.c	Take different perspectives in relation to a text
3.2	Critique/Evaluate: Consider literary text critically
3.2.a	Evaluate the role of literary devices in conveying meaning
3.2.b	Determine the degree to which literary devices enhance a literary work
3.3	Critique/Evaluate: Consider informational text critically
3.3.a	Evaluate the way the author selects language to influence readers
3.3.b	Evaluate the strength and quality of evidence used by the author to support his or her position
3.3.c	Determine the quality of counterarguments within and across texts
3.3.d	Judge the coherence or logic of an argument

# APPENDIX G

## NAEP Advisory Panel Meeting Agendas

### MATHEMATICS NAEP EXPERT ADVISORY PANEL AGENDA

#### College Course Content Analysis For The National Assessment Of Educational Progress (NAEP) Grade 12 Preparedness Research

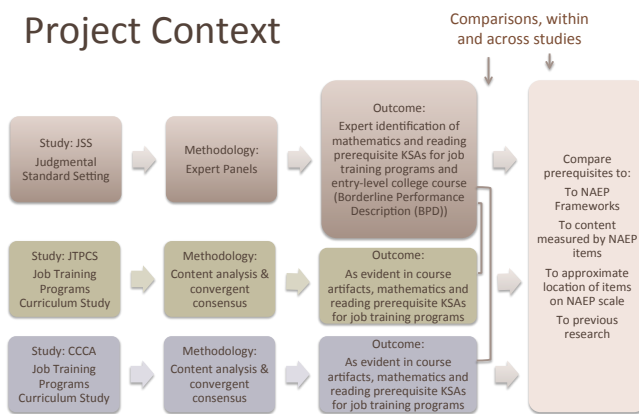
NAEP Advisory Panel Meeting

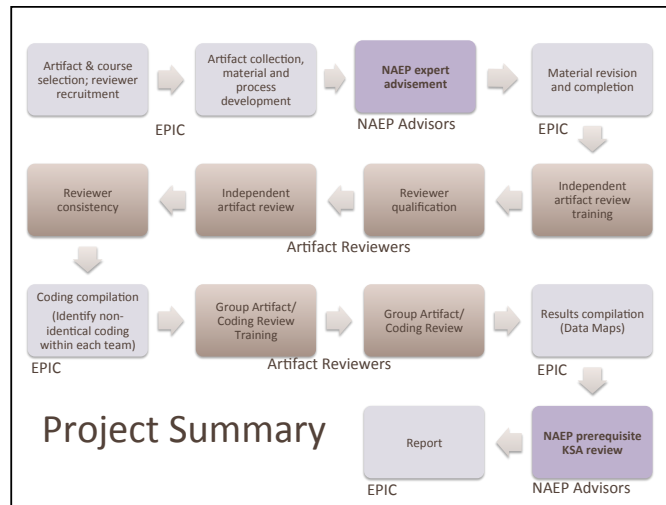
June 19-21, 2013

Portland, OR



#### Project Context





## Research Questions

- 1 What are the prerequisite knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?
- 2 How do these prerequisite KSAs compare with the 2009 and 2013 NAEP reading and mathematics frameworks and item pools?
- 3 How do these prerequisite KSAs compare with previous NAEP preparedness research, "i.e., the descriptions of minimal academic preparedness requirements produced in the JSS research?"
- 4 How can these prerequisites inform future NAEP preparedness research, i.e., planning and analysis efforts relative to the 2013 grade 12 NAEP reading and mathematics assessments?

## NAEP Expert Role

Today

### 1. Advisement

- Decisions rules
- Scoring criteria
- Reference sheet
- Training
- Coding

July/August

### 2. Observation & Representation

- Approve any additional decision rules
- Support NAEP Interpretation
- Aid in evidence location

September

### 3. Interpretation

- Discuss, interpret and summarize prerequisite KSA
- Compare to NAEP items and item pools
- Compare to previous study results
- Inform NAEP

## (Suggested) 3-day Process

### Day 1: Review training materials

- Coding scheme
- Definitions
- Training objectives and key elements

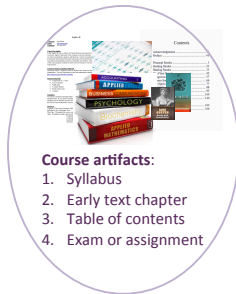
### Day 1-3: Begin coding and iteratively:

- Note decision rules as they emerge
- Identify where additional clarifications are needed
- Identify exclusions, additions and NAEP objectives evident in artifacts
- Identify anticipated artifact reviewer misunderstandings, errors, and mistakes
- Identify guidance needed for artifact coders
- Establish "passing score" criteria for each packet

### Day 3: Complete Coding, finalize, & debrief

- Decision rules, cheat sheet (definitions, guidance for interpreting and identifying NAEP objectives in course artifacts), scoring criteria, additional emphases of training
- Other advice? Suggestions? Concerns? Questions?

## Definitions: Course Artifacts



### Course artifacts:

1. Syllabus
2. Early text chapter
3. Table of contents
4. Exam or assignment

**Course:** Selected to be representative of the mathematics skills required of entering college students.

**Course Title:** Finite Math, College Algebra, Calculus/Pre Calculus, Statistics.

**Decision Rules:** Rules to guide, simplify, or consistently routinize the identification of prerequisites in course artifacts.

**Course packet:** Collection of required artifacts for general education, entry-level, non-remedial, credit bearing college courses.

## Definitions: Prerequisites

**(Pre-NAEP) Prerequisite KSAs:** Prerequisite knowledge, skills, and abilities that are evident in the course artifacts (without attention to NAEP objectives).

**NAEP objectives (KSAs):** Evident prerequisite that correspond to NAEP objectives.

**Exclusions.** Part of a NAEP framework objective that is not a prerequisite when the rest of the objective is. For example,

*Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.*

**Evident KSAs -> NAEP objectives – Exclusions = Prerequisite KSAs**

**Prerequisite KSAs:** knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements

## Coding Scheme

### Applicability and Importance (NAEP Objectives)

For all NAEP framework objective KSAs, please indicate whether each is a prerequisite for this course, is taught in this course, or is neither a prerequisite or taught.

*A KSA is prerequisite if a minimally prepared student is either expected or required to have experience with the content prior to entry into the course. A prerequisite KSA may be reviewed, but not taught in depth, during the course.*

Knowledge and skills that are *prerequisites but are also reviewed* in this course should be coded as prerequisite. For each prerequisite KSA, please select the option that best describes the importance of this KSA for student success in this course.

- 1—KSA is Not applicable to this course
- 2—KSA is NEW content taught in this course
- 3—KSA is PREREQUISITE for this course and is NOT IMPORTANT. Although a prerequisite, possessing this KSA will make little difference on course outcomes.
- 4—KSA is PREREQUISITE for this course and is MINIMALLY IMPORTANT. This KSA is a prerequisite, which if possessed, is likely to result in better course outcomes.
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- 6—KSA is PREREQUISITE for this course and is VERY IMPORTANT. Without this KSA students are not prepared for and will be unlikely to complete this course.

## Coding Scheme

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Many times, part(s) of a framework objective KSA are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

For example, an exclusion might look like this:

*Locate or ~~recall~~ organizing structures of texts, such as comparison/contrast, problem/solution, ~~enumeration~~, etc.*

And would be recorded like this:

*Recall, enumeration*

## Coding Scheme

### Source(s) of Evidence (NAEP Objectives)

For each prerequisite KSA evident in a course artifact, please identify in which artifact the evidence was found. Please select all that apply.

- 1—Syllabus
- 2—Textbook Table of Contents
- 3—Assignment
- 4—Textbook Excerpt
- 5—Exam
- 6—Other

## Coding Scheme

### Applicability and Importance (Non-NAEP Prerequisites)

For all additional (non-NAEP) prerequisite KSAs, please select the option that best describes the importance of this KSA for student success in this course. A KSA is prerequisite if a minimally prepared student is either expected or required to have experience with the content prior to entry into the course.

Knowledge and skills that are prerequisites but are also reviewed in this course should be coded as prerequisite.

- 3—KSA is PREREQUISITE for this course and is NOT IMPORTANT. Although a prerequisite, possessing this KSA will make little difference on course outcomes.
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## Decision Rules

- Global content area decision rules
- Decision rules to guide identification or interpretation of NAEP objectives in course artifacts
- Decision rules to guide the identification of prerequisites in course artifacts
- Examples from JTPCS
  - If we see evidence of a skill being taught/reviewed in the course, and evident as prerequisite, then rate as "little important." Prerequisite because students need the basic ability to infer...
  - Case studies may be interpreted as "causal relation".

## Reminders

Annotate as you go!

- You will be discussing differences in ratings with members of your group so you want to make yourself any reminders that may be needed to discuss the evidence used to identify prerequisites

Remember!

- You are not searching for NAEP objectives in the materials, you want to identify all prerequisites and then see how--and if--they map onto NAEP objectives

## Review Tasks

- Bring annotated course materials with you
- Pay attention during training, due to questions raised during individual review, some details of coding may change
- Break out into teams
- Review results of individual ratings, discuss, and reach a group decision on evident prerequisite KSA, NAEP objectives, and exclusions and the importance of each
- Code course packets, a few from each course type
- EPIC scribe will note borderline judgments, common questions and areas of confusion that arise, decisions and challenges, and
- You may ask questions about NAEP framework objectives (definition, application, extension, intent, etc.). Please record them and hold them until a NAEP expert comes to your room.
- Complete by end of session

## Reminders (Points of emphasis)

### Keep an eye on the clock!

- Work efficiently as a group, there are lots of decisions to be made in a relatively short time
  - Tips: thumbs up, thumbs down; number of fingers

### Prioritize time in conversation!

- Don't discuss everything, spend time on important discussions with an **eye for general rules that make sense across multiple similar differences**

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## Questions

## Next Steps

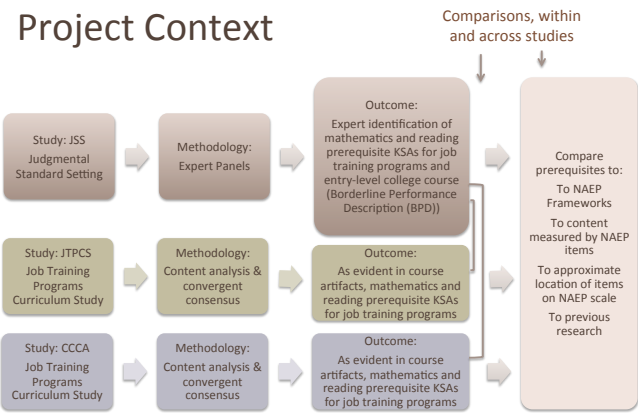
1. Provide feedback on training
2. Help us refine prerequisite, importance, coding scheme
3. Code 12 course packets, to:
  - Identify and document decision rules (For mathematics overall, for individual frameworks (as needed), and for specific sources of evidence, course type, or artifact type
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  - The “correct score” or key prerequisite KSA and exclusions for each packet that when identified by content reviewers, will indicate task understanding sufficient to accurately identify prerequisite KSAs in course artifacts
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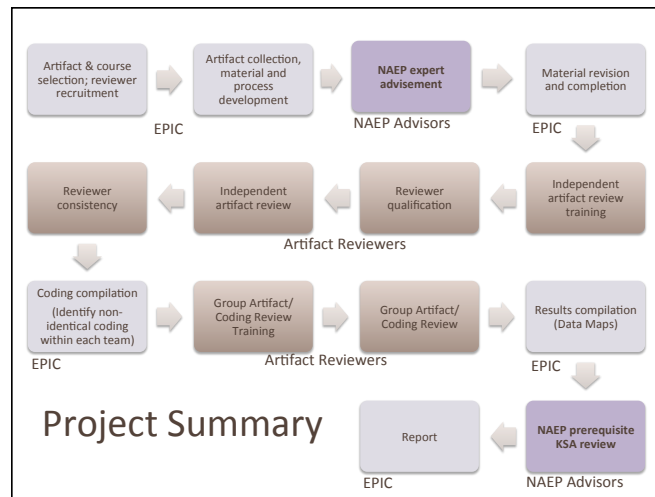
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# APPENDIX H

## Implemented Changes From NAEP Advisory Panel

The NAEP advisory panel meetings were included in the design document with the expectation that the NAEP experts would recommend enhancements to the methodology. As a result of the meetings, some features of the training were changed to enhance the training approach. The changes made did not materially change the approach documented in the design document.

Below is a summary of the NAEP expert guidance and implemented changes.

NAEP Expert Guidance	Implemented Change
<b>Train content reviewers in two sessions.</b> The first session will focus on a holistic review of the packet where the reviewer will develop, and submit, a list of KSAs without reference to the NAEP frameworks. The second training session will introduce the NAEP frameworks and the coding instrument.	The holistic review session provided the content reviewers an opportunity to review all the packets, to develop capacity for identifying evidence and KSAs, to practice using the survey tool, the Basecamp project management system and work with EPIC staff.
<b>Train in small groups</b> rather than one large group to facilitate training on packets using examples.	Eight 1.5-2 hour sessions of holistic review training were conducted, 4 for reading and 4 for mathematics. Four 1.5-2 hour sessions of independent review training were conducted, 2 for reading and 2 for mathematics. Small groups of 4 content reviewers worked together to code their training packets and become familiar with the content review concepts in a group setting.
<b>Train scribes and facilitators in the same sessions</b> to familiarize them with the content, the packets and the NAEP frameworks.	Facilitator and scribe trainings were implemented shortly before the group reviews.
<b>Integrate NAEP experts into the training process.</b> Examples are including NAEP experts in the NAEP training sessions, securing assistance in answering questions during the independent review, and throughout the study.	NAEP experts were contracted to answer specific questions during the training process. A NAEP expert was scheduled attend the group review meetings.
Capture additional information that is not necessarily a KSA but is important such as <b>whether a course is delivered online or required use of a calculator in a math class.</b>	Additional information was added to the course packet information for analysis during the NAEP expert reviews.
<b>Use guidance on the sufficiency of packets</b> to both develop packet contents and ensure that each review group receives a balanced set of packets to review following a distribution chart.	The sufficiency guidelines suggested by NAEP advisory panels were implemented to the extent possible. Course packets were distributed selected based on course packet type (operational, validity) as required by the design document. In addition, operational packets were distributed based on institutional characteristics as required by the design document.
Use NAEP guidance on the aspects of a packet to support training on the <b>wide variation among the packets.</b>	Training packets were chosen based on the recommendations of the NAEP experts. In addition, recommended exemplars identified in the NAEP advisory panel meetings were provided to illustrate specific points.

NAEP Expert Guidance	Implemented Change
<b>Simplify the coding schema</b> from 5 points (i.e., categories) to 3 points. The five-point scale was time consuming to use and did not provide additional useful information. The three-point scale wording will be different for math and reading. The essential information will be 1) no evidence of prerequisite, 2) some evidence of prerequisite or 3) evidence of prerequisite and important.	Three point scales were implemented for both math and reading. The coding instrument was updated to reflect that change.
<b>Realign the NAEP reading objectives</b> in the coding instrument to reflect the recommended approach to coding.	The coding instrument was updated to reflect that change.
<b>Sources of evidence should be collected at the packet level not at the individual artifact level.</b> Collecting at the artifact level (e.g. was the syllabi useful) is not particularly useful. However, it is useful to know if a particular packet was sufficient for identifying evidence of KSAs and the artifacts that were used to identify evidence in the packet.	The coding instrument was updated to reflect that change.
<b>Decision Rules Update</b> – overall and specific <ul style="list-style-type: none"> <li>At the group reviews, if disagree, majority rules</li> <li>One piece of evidence is sufficient</li> <li>Consistent rules for addressing exclusions</li> <li>Consistent rules for adding KSAs</li> <li>Suggested “path” for reviewing a packet such as looking for the learning objectives in the syllabus first</li> <li>Suggested methods of annotating packets for use in the group reviews</li> <li>Specific mathematics and reading rules</li> <li>Update definitions with NAEP references</li> </ul>	The decision rules were revised and updated to reflect the changes suggested by the NAEP advisory panels. The entire NAEP frameworks were provided as part of the training.
<b>Reference sheet update</b> <ul style="list-style-type: none"> <li>Emphasize the goal of identifying all the prerequisite KSAs, not just those in the NAEP frameworks.</li> <li>Emphasize focus on evidence in the packets and follow decision rules for reliance on inference.</li> </ul>	The reference sheets were updated to reflect additional information.

# APPENDIX I

## Holistic Review Orientation and Independent Review Training

### MATHEMATICS HOLISTIC REVIEW ORIENTATION

#### Overview

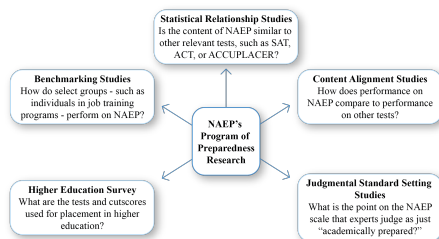
##### Introductions

- Project Staff
- Content Reviewers

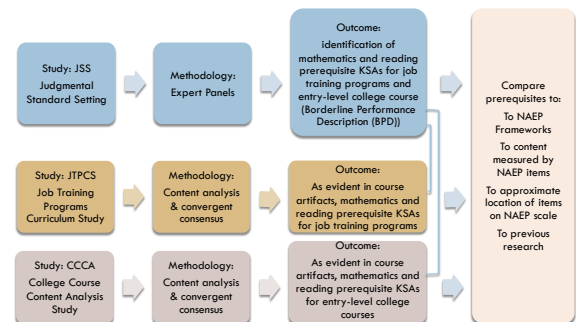
##### College Course Content Analysis Study (CCCA)

- Background
- Process
- Research Questions

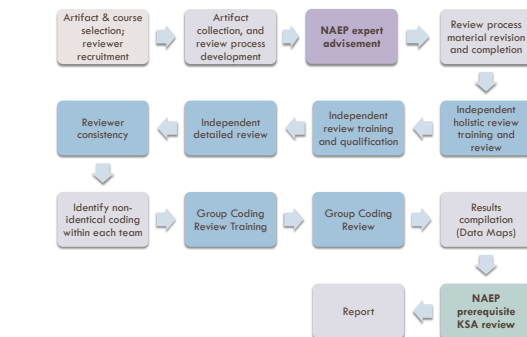
#### College Course Content Analysis (CCCA)



## CCCA Study – JSS Studies



## CCCA Study Progress



## CCCA Study Research Questions

- 1 **What are the prerequisite knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?**
- 2 How do these prerequisite KSAs compare with the 2009 and 2013 NAEP reading and mathematics frameworks and item pools?
- 3 How do these prerequisite KSAs compare with previous NAEP preparedness research, " i.e., the descriptions of minimal academic preparedness requirements produced in the JSS research?"
- 4 How can these prerequisites inform future NAEP preparedness research, i.e., planning and analysis efforts relative to the 2013 grade 12 NAEP reading and mathematics assessments?

## Holistic Review Training

Role of Content Reviewer  
Holistic Review Process – Review, Annotate, Record  
Definitions  
Decision Rules  
How to Review, Annotate, Record

## Role of Content Reviewer

- Answer the first research question
  - ▣ What are the “prerequisite KSAs” in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?
- How?
  - ▣ Conduct an independent review of course packets
  - ▣ Participate in a group review to determine a group coding for the same course packets.

## Role of Content Reviewer

- All reviews will be conducted *online*.
  - ▣ Requires a stable, high-speed internet service to effectively access and engage with the review materials.
- Important to work *independently*.
  - ▣ It is your individual expertise that we require for this aspect of the study.
- It is critical that you *annotate your evidence*.
  - ▣ Be sure to note evidence of each prerequisite KSA you identify for reference during the group review.

## Holistic Review Process

- **Review** the packet to get general understanding about the course from the packet.
  - ▢ What are students expected to do at the beginning of the course? What are students expected to be able to do when they enter this course?
  - ▢ Don't get too detailed. This is a holistic scoring.
- **Annotate** the evidence of prerequisite KSA within the course packet.
  - ▢ Looking for the major prerequisite KSA. Keep the notion of 4-10 KSA in mind as you review and annotate.
- **Record** the 4-10 prerequisite KSAs evidenced in the given course in online survey.

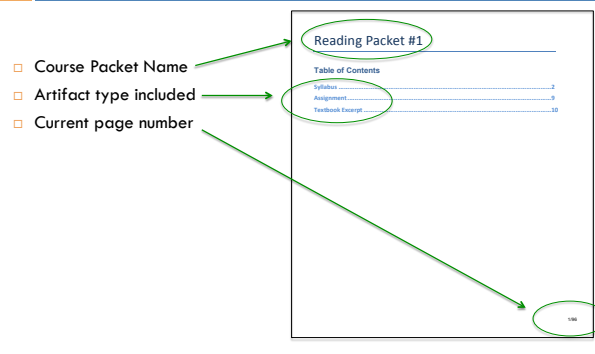
## CCCA Definition of Course Packet

- A set of artifacts from the same course in a single institution.
  - ▢ Represent institutions across the United States
  - ▢ Meet a set of representativeness characteristics agreed upon with the NAGB – size, location, public/private, 2-yr/4yr
- These course packets provide the evidence for identifying the list of prerequisite KSA.
- A course packet contains only a sample of artifacts from a course.
- The artifacts represent the early part of the course addressing mathematics or reading KSA

## Course Packet

- A content reviewer will review 28 course packets for evidence of prerequisite KSAs during the independent reviews and the group review.
- A course packet contains the following artifacts:
  - ▣ a syllabus
  - ▣ at least one non-textbook based assignment/assessment
  - ▣ a textbook excerpt, including a table of contents

## Course Packet: Cover Page



**Sleep and Dreaming**

**Title**

**Course Packet Name**

**Current page number**

**Page No.**

**Page No.**

[illegible]

### CCCA Definition of a KSA

- What a student needs to know or be able to do when they enter the course in order to engage with the material.
- A baseline attribute required of a student to perform the tasks in the course.

### CCCA Definition of Prerequisite

- A KSA is *prerequisite* if a minimally prepared student is either expected or required to possess this knowledge, skill, or ability to enter into the course.
- A prerequisite KSA may be reviewed, but not taught in depth or for the first time, during the course.

## Decision Rules: Syllabus

- Look for course outcomes and goals stated in different ways; as essential questions, purpose, goals, objectives, outcomes, course descriptions, etc.
- “Lofty” goals can be evidence, even if not substantiated in other packet artifacts.

## Decision Rules: Assignment/ Assessment

- When multiple optional assignments are described, review and consider only the lowest cognitively demanding assignment. It better represents course prerequisites.
- If it cannot be determined that assignments are optional, then review all.

### Decision Rules: Text Excerpt

- Exclude activities, assignments, or other actions in textbook unless referenced in syllabus and/or assignments.
- To use chapter for evidence, it is helpful, but not necessary, to have a related assessment included in packet,

### How to Review Course Packet (Holistically)

- Review packet first, annotate evidence, and keep 4-10 notion as a guide as you review
  - ▣ Look at what is not a prerequisite – what is being newly taught in the course cannot be prerequisite
- Suggest review of the following to familiarize yourselves with each packet: level of complexity, organization/structure, presence or absence of text features (e.g., charts, graphs, text boxes)

### How to Review Course Packet (Holistically)

- Consider the **course packet as a whole**. Course packet comprised of a sample of artifacts, not complete course.
  - ▣ Get holistic understanding about what students will be expected to know or be able to do when they enter this course.
  - ▣ Avoid diving too deeply into each packet. Don't get too detailed (i.e. read the entire textbook excerpt).
- **Focus on the evidence** contained in the packet. Resist *assuming* that an instructor is teaching the prerequisite.

### How to Identify Evidence of Prerequisite KSA

- Not content specific prerequisites (not history knowledge but reading skills)
- Potential sources of evidence
  - ▣ Syllabus learning objectives/course outcomes
  - ▣ Syllabus list of prerequisites
  - ▣ Syllabus course chronology
  - ▣ Syllabus- other
  - ▣ Assessment
  - ▣ Assignment
  - ▣ Reading/Math text sample
  - ▣ Reading/Math text sample table of contents
  - ▣ Other (additional materials included in packet not listed above)

## How to Annotate Evidence of Prerequisite KSA

- For each prerequisite KSA identified, highlight, circle, underline, add arrow, for a statement of evidence within the text.
- Use any .pdf reader
  - <http://get.adobe.com/reader/>

## How to Record KSA

- Do not spend time word-smithing.
  - Get the idea down – does not need to be perfect the statement
  - Training 2 will address terminology
  - Will have opportunity to re-address these identified prerequisite during Detailed Independent Review and Group Review
- KSA statement format may be different for different course packets. Not looking for a consistency.
  - Larger grain size - Use specific topics
    - Graphic linear equations
    - Literary nonfiction
  - Finer grain size - Include action words
    - Evaluate expressions involving absolute value and exponents
    - Read and comprehend literature, including stories, dramas, and poems
- "And" in a list of items means all items in list are evident.
- "Or" in a list of items means that not all items are evident.
- Lists containing "such as" are not a closed universe; use for examples.

## Content Review Technology

Basecamp

### Basecamp

#### □ Online hub used to assign and manage tasks

##### □ Site organization

- ▣ Overview
- ▣ Messages: review document source
- ▣ To-do lists
- ▣ Project calendar
- ▣ Writeboards: community discussion
- ▣ Files

##### □ Minimal requirements

- ▣ Download course packets
- ▣ Download reference materials
- ▣ Communication
  - With EPIC staff
- ▣ Troubleshooting
  - Questions
  - Common problems

## Basecamp

Login

- Email prompting sign in from 37 Signals

<https://epiconline.basecampHQ.com>

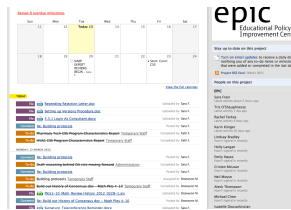


The login form for the epic Educational Policy Improvement Center. It features the epic logo at the top, followed by fields for Username and Password. Below the password field is a checkbox for "Remember me on this computer" and a "Sign In" button. At the bottom, there is a link for "Help: I forgot my username or password".

## Basecamp

Overview

- Snapshot of all project happenings



## Basecamp

### Messages

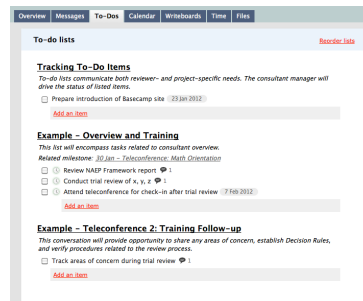
- Location of course packets and survey links
- Communicate with project staff



## Basecamp

### To-Dos


- Identifies task for completing contractual obligations



## Holistic Review Survey

- These two icons will allow you to navigate within Fluid Survey

- At the top-center of the screen, this icon allows for movement between pages

Jump to page: Page 2  Go

- At the right-center of the screen, this icon tells you much of the survey is left

4% 

## Holistic Review Survey

- Navigation Guidelines
  - You may toggle between pages to edit responses or move to specific sections
  - You are ABLE to save responses and return
  - Click "Submit" on last page to ensure responses are recorded.

*Note: Get in the habit of saving your surveys periodically*

## Next Steps

## Timeline

- Holistic Review
  - ▣ 28 packets released on Basecamp – July 12
  - ▣ 28 packets reviewed and prerequisite KSA evidence annotated and 28 surveys submitted – July 21

## Timeline

- Training 2 (July 22-24)
  - ▣ Availability request – July 11 or 12
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- Independent reviews
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- Annotate evidence for each prerequisite KSA identified within a course packet.
  - All notes should be understandable and quickly accessible during the onsite group meeting (mid-late September)
- Adhere to decision rules
  - Alert project staff of question/concerns as they arise
- Complete surveys for both the holistic review and detailed review for each course packet

## Questions?

- EPIC Project Staff available
  - Basecamp
  - [cccstudy@epiconline.org](mailto:cccstudy@epiconline.org)
  - Toll-free 877.766.2279

## College Course Content Analysis Study

Content Reviewer Training  
Independent Review - *Holistic Review*



July 9-11, 2013

### Agenda

Overview

Holistic  
Review  
Training

CCCA  
Technical  
Training

## Overview

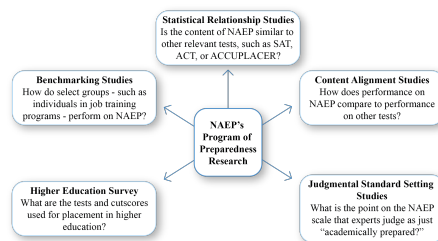
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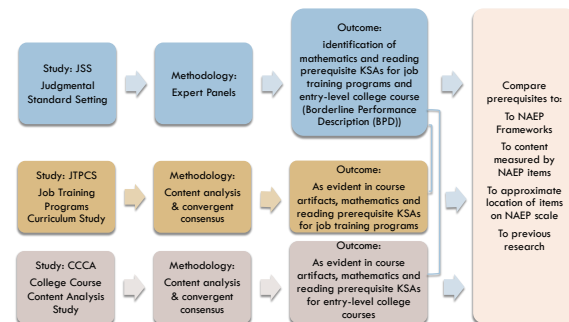
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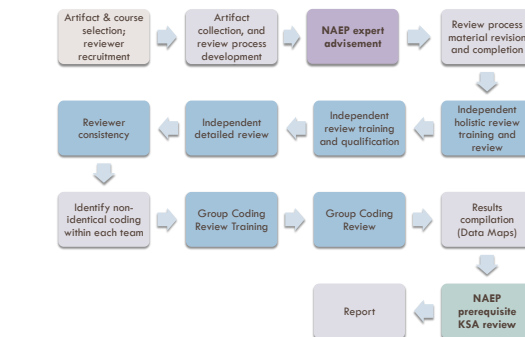
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  - ▣ Be sure to note evidence of each prerequisite KSA you identify for reference during the group review.

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- **Review** the packet to get general understanding about the course from the packet.
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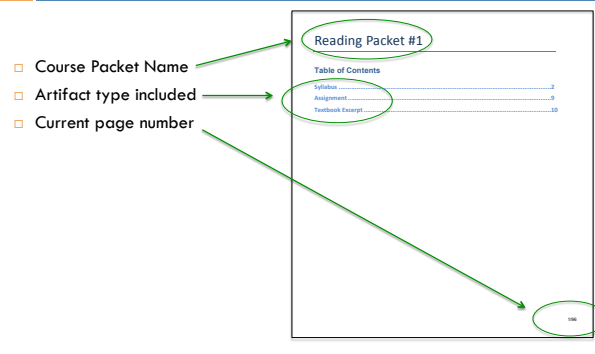
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## Course Packet: Cover Page



[illegible]

# Course Packet: Textbook Excerpt

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## Decision Rules: Text Excerpt

- Exclude activities, assignments, or other actions in textbook unless referenced in syllabus and/or assignments.
- To use chapter for evidence, it is helpful, but not necessary, to have a related assessment included in packet.
- Do not consider video/film- or auditory-based text when identifying prerequisites (e.g., don't apply reading KSA to watching movies about fairy tales, only to reading fairy tales).

## How to Review Course Packet (Holistically)

- Review packet first, annotate evidence, and keep 4-10 notion as a guide as you review
  - Start with learning goals (syllabus), onto assessment/assignment, and then textbook excerpt
  - Look at what is not a prerequisite – what is being newly taught in the course cannot be prerequisite
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Basecamp

### Basecamp

#### □ Online hub used to assign and manage tasks

##### □ Site organization

- ▣ Overview
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- ▣ Writeboards: community discussion
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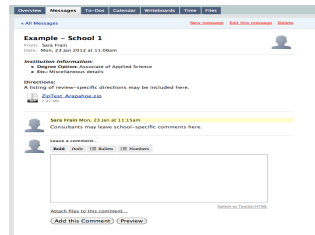
- ▣ Download course packets
- ▣ Download reference materials
- ▣ Communication
  - ▣ With EPIC staff
- ▣ Troubleshooting
  - ▣ Questions
  - ▣ Common problems



# Basecamp

## Messages

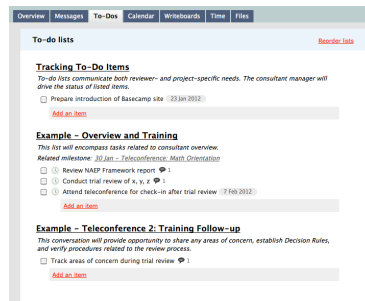
- Location of course packets and survey links
- Communicate with project staff



# Basecamp

## To-Dos

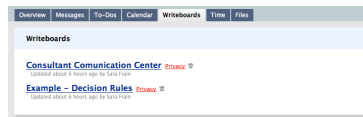
- Identifies task for completing contractual obligations



## Basecamp

### Writeboard

#### Training troubleshooting



## Holistic Review Survey

### Link in Basecamp will open a new window

Review each packet in its entirety to obtain a holistic understanding of the course. Note all prerequisite knowledge, skills and abilities, and annotate them clearly as you go. Remember that you will need to refer to your notes here when you meet with the group later on. The more clear and detailed your notes are, the more helpful they will be to you.

In your own words, describe 4-10 prerequisites to this course below.

[Back](#) [Save and continue later](#) [Next](#) Review responses: PDF Word

## Holistic Review Survey

- These two icons will allow you to navigate within Fluid Survey

- At the right-center of the screen, this icon tells you much of the survey is left



## Holistic Review Survey

- Navigation Guidelines
  - You may toggle between pages to edit responses or move to specific sections
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## Questions?

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  - Basecamp
  - [cccstudy@epiconline.org](mailto:cccstudy@epiconline.org)
  - Toll-free 877.766.2279

### College Course Content Analysis Study

Conducted by EPIC on behalf of the National Assessment Governing Board

*Independent Review Training*  
July 2013

EPIC Project Team  
David T. Conley, PhD  
Sylvia Gillpatrick, MBA  
Liz French, JD, MS  
Terri Ward, PhD  
Paul Beach, MA  
Emily Hayes, MA  
Debbie Wetherald, MPA  
Tris O'Shaughnessy, BA  
Stacey Anderson, BS



Technical Advisor to EPIC  
Mary Seburn, PhD

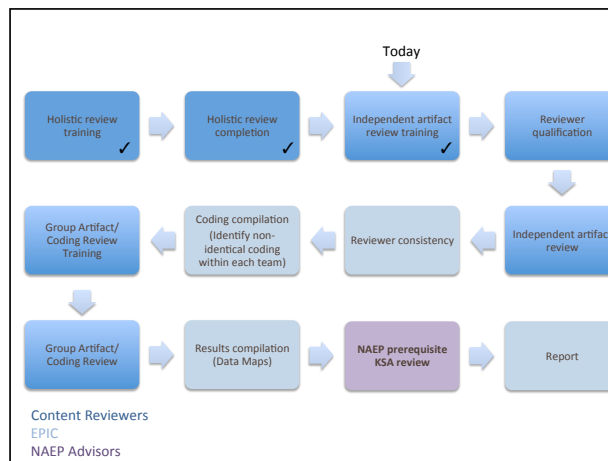
National Assessment Governing Board  
Project Officer  
Michelle Blair, MPA

### Today's Training

- Project and task summary
- Coding process and definitions
  - Review of instructions and coding scheme
  - Definitions
- NAEP frameworks
- Current revised decision rules
- Recommended approaches to completing this task
- Questions
- Walk-through of enhanced Fluid Survey data collection process

## Research Questions

- 1 What are the prerequisite knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?
- 2 How do these prerequisite KSAs compare with the 2009 and 2013 NAEP reading and mathematics frameworks and item pools?
- 3 How do these prerequisite KSAs compare with previous NAEP preparedness research, “ i.e., the descriptions of minimal academic preparedness requirements produced in the JSS research?”
- 4 How can these prerequisites inform future NAEP preparedness research, i.e., planning and analysis efforts relative to the 2013 grade 12 NAEP reading and mathematics assessments?



## Task Summary

### Independent review training and qualifying

- 1. Attend training
- 2. Familiarize yourself with NAEP framework objectives
- 3. Complete training packet(s). You may do so with others and we have the "correct answers" for these to help you resolve questions.
- 4. Once you are comfortable with the process, **complete and pass a qualifying course packet**, including additional and excluded KSA.

### Independent Artifact Review

- 1. Using your holistic prerequisites as a starting point, **re-review artifacts in packets**, noting the knowledge, skills, and abilities that are prerequisite for preparedness to enter the course.
- 2. **Identify which framework objectives describe the evident prerequisites**, noting in your annotated materials the source(s) of the evidence and the importance of the prerequisite to the course.
- 3. In Fluid Survey, **indicate the NAEP objectives** corresponding to these evident prerequisite KSAs and **describe any exclusions** that are necessary when part of an objective is prerequisite but another part is not.
- 4. Identify the **sources** and rate the **relative helpfulness** of each artifact for each course packet.
- 5. **Annotate everything** in your course materials packets, including location of evidence in packet, questions, borderline judgments, rationales for each as evident/not evident, exclusions, and challenges.
- 6. Please **note questions, coding challenges, things that didn't seem to "fit", clarifications and definitions needed** and submit after training packets and after review so we can address them for everyone during group review.

## Coding

### 1. Identify Prerequisites

For all NAEP framework objective KSAs, please indicate whether each is a prerequisite for this course or not, and if so, how important it is to preparedness for this course. **A KSA is prerequisite if a minimally prepared student is either expected or required to possess this knowledge, skill, or ability to prepared for entry into the course.** A prerequisite KSA may be reviewed, but not taught in depth or for the first time, during the course.

- 1—KSA is NOT A PREREQUISITE for this course. *There is no evidence that this is a prerequisite* (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. *Without this prerequisite, students may struggle in some areas of this course.*
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. *Without this prerequisite, students will not be prepared for this course and will struggle in this course.*

## What are Prerequisites?

### Prerequisites:

- Are not content specific (not *history knowledge* but *reading skills*)
- Describe what a student needs to know or be able to do when they enter the course in order to engage with the material.
  - A baseline attribute required of a student to perform the tasks in the course.
- Represent knowledge, skills, or abilities that a minimally prepared student is expected or required to possess this to enter into the course.
- May be reviewed in the course, but not taught in depth or for the first time, during the course.

### Tips for finding evidence of prerequisites:

- May, and should, include prerequisite knowledge, skills, and abilities that are not in the NAEP objectives. **We want them all, not just those in NAEP.**
- If there is a review section, look at the topics, prefaces, chapter text. **These are very important** to identifying prerequisite KSAs.
- When an entire section or project is devoted to one topic, you may assume the topic is taught in the course and not prerequisite to the course.
- Please do not make decisions based on inferences or assumptions—only on evidence.
  - The one exception is for reading. Some of the reading framework objectives require an inference.
- Decision rules to guide identification or interpretation of NAEP objectives in course artifacts
- Decision rules to guide the identification of prerequisites in course artifacts

## What is Evidence?

Keep in mind that this is an **evidence-based project**, you are looking for evidence of prerequisites. If there is no evidence of a prerequisite, then you cannot identify it as a prerequisite.

### Evidence:

- Is more likely found in the beginning of the course than the end of the course (e.g., consider beginning of TOC rather than end of TOC).
  - Give less weight to assessments, readings, or projects occurring later in the course, these are more indicative of what was learned in the course and not what was prerequisite to the course.
- Includes “lofty” goals. Syllabi may describe lofty course objectives. These objectives that seem high when compared to the selection of artifacts included in the packet. Even “lofty” goals falling near the beginning of the course **may be** used as evidence of what KSA are prerequisites.
- **Remember-If it is not in the materials, it is not evident.**

## 2. Coding Identify Exclusions

Many times, part(s) of a framework objective KSA are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

An exclusion might look like this when organizing structures only need be located, but not recalled, and these structures include comparison/contrast and problem/solution but not enumeration:

*Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.*

And would be recorded like this:

*Recall, enumeration*

If any part of an entire objective statement is prerequisite, while other parts are not, **list the parts that do not apply in the text box.**

## Why Exclusions?

- They are very Important!
- Identifying what is prerequisite is only half the story, we also need to know what is not prerequisite.
- List them in the order they occur in the objective statement.

## Coding

### Describe Additional KSA

To help us include Additional KSAs, please identify any KSAs that appear to be prerequisite to this course that were not listed in the Foundational KSA/NAEP Objective Statements. For each additional KSA, please list the sources of evidence for that KSA and indicate its importance relative to the course.

Additional  
KSA:

- 1—KSA is NOT A PREREQUISITE for this course. *There is no evidence that this is a prerequisite* (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. *Without this prerequisite, students may struggle in some areas of this course.*
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. *Without this prerequisite, students will not be prepared for this course and will struggle in this course.*

Evidence of KSA: Please identify the source(s) of evidence for this additional KSA:

- Syllabus
- Syllabus learning objectives/course outcomes
- Syllabus course chronology
- Assessment
- Assignment
- Reading text sample
- Reading text sample table of contents
- Other (additional materials included in packet not listed above)

## What are Additional Prerequisites?

To help us identify non-NAEP KSAs, please identify any that appear to be prerequisite to this course but are not described by the NAEP frameworks.

- We will collect the same information about these as we do for the NAEP objectives
- Examples from holistic review:
  - Math: notation, logic (if/then and if and only if), communication (able to explain and write about mathematics), reading

## Coding-Helpfulness & Source

### Evidence of KSA

Please identify the sources of evidence used for answering the questions above.

- Syllabus
- Syllabus learning objectives/course outcomes
- Syllabus course chronology
- Assessment
- Assignment
- Reading text sample
- Reading text sample table of contents
- Other (additional materials included in packet not listed above)

### Artifact Helpfulness

"Which course artifacts were most helpful for providing evidence of KSAs in this course packet?" (4-point multiple choice grid: Not Helpful, Limited Helpfulness, Helpful, Very Helpful)

- Syllabus
- Assignment
- Assessment
- Text Excerpt
- (and a list of the 3 most common "other")

## NAEP Frameworks

Structure of NAEP frameworks:

### (Learning) Domain

#### Standard

#### Objective

- Math follows an organizing structure where each lower level is grouped, but not defined by, the level above.

### Example

#### 4. Data Analysis, Statistics, and Probability

- 4.1. Data representation
  - 4.1.a. Read or interpret graphical or tabular representations of data

- There is no limit to the number of exceptions you may identify for a particular Domain/Standard/Objective statement.
- Use exceptions as necessary to reduce a framework statement down to the specific KSAs that are evident in the packet.

## Example-Math Frameworks

Level	Description
1	Number properties and operations
1.1	Number sense
1.1.d	Represent, interpret, or compare expressions for real numbers, including expressions using exponents and logarithms.
1.1.f	Represent or interpret expressions involving very large or very small numbers in scientific notation.
1.1.g	Represent, interpret, or compare expressions or problem situations involving absolute values.
1.1.i	Order or compare real numbers, including very large and very small real numbers.
1.2	Estimation
1.2.b	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.
1.2.c	Verify solutions or determine the reasonableness of results in a variety of situations.
1.2.d	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.
1.3	Number operations
1.3.a	Find integral or simple fractional powers of real numbers.
1.3.b	Perform arithmetic operations with real numbers, including common irrational numbers.
1.3.c	Perform arithmetic operations with expressions involving absolute value.
1.3.d	Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.
1.3.f	Solve application problems involving numbers, including rational and common irrationals.
1.4	Ratios and proportional reasoning
1.4.c	Use proportions to solve problems (including rates of change).
1.4.d	Solve multistep problems involving percentages, including compound percentages.

## Interpreting NAEP Frameworks

- Interpret the objective in the context of its standard and domain.
  - More necessary in reading than in mathematics
- If any part of the “domain + standard + objective” is not prerequisite but other parts are, then identify the parts that are not as exclusions.
- If you aren’t sure how to interpret a word in the frameworks:
  - **Look in frameworks document** (glossary (for reading) and in text)
  - Look in the updated reference sheet for guidance
  - Let us know

## Global Decision Rules

### Lists occurring in NAEP Frameworks

- "And" in a list of items means all items in list must be evident.
- "Or" in a list of items means that not all items must be evident.
- Lists containing "such as" are not a closed universe; treat as examples. Don't need exclusions for "such as".

### Artifacts

- Exclude **activities, assignments, or other actions in textbook** unless referenced in syllabus and/or assignments.
- When multiple **optional** assignments are described, review and consider only the **lowest cognitively demanding assignment**. It better represents course prerequisites.
  - If it cannot be determined that multiple assignments are optional, review and code all.

### Identifying prerequisites and defining "evidence"

- Look for the math and reading skills, not content-specific skills. Instructors expect students to be able to have and do the prerequisite math or reading KSAs, only content is taught in the course.
  - College level courses don't tend to teach reading skills or basic mathematics knowledge.
  - e.g., if you can't identify an argument you shouldn't be in the course.
- You may **not** create or apply additional decision rules or include any other materials in your review.
  - Please provide any suggestions to us and we will review all and:
    - Include them in the revised rules to use for independent review.
    - Compile all that arise and provide a final set to use for the group meeting.
- "Lofty" goals can be evidence, even if not substantiated in other packet artifacts.

## Decision Rules for NAEP Framework Math (Examples, see decision rules for comprehensive list)

- In Calculus: If there is a whole section taught on something, consider that it may be a prerequisite to the course (it could be reviewed content). Don't assume it is new content. Look at density—is this new knowledge or reviewing content students should know?
- One "piece" of evidence is sufficient in textbook to identify a prerequisite as long as it is representative of the course content and not just a KSA embedded within a single problem or example.
- The presence of graphs alone is insufficient evidence of data analysis or statistics prerequisites
- Statistics:
  - If ratio is a prerequisite then so is 1.4.c
  - If percent is a prerequisite then so is 1.4.d
- 5.3.b is prerequisite if students must be able to translate a word problem into an expression or equation.
- 5.3.a is prerequisite when students must be able to go between one representation and another representation.
- 5.4.a is prerequisite if students must be able to solve non-contextual equations.
- 5.4.c. is prerequisite if students must be able to complete problem solving of contextualized problems.
- 1.3.b. is prerequisite if students must be able to perform operations and decimals with real numbers.
  - If for a subset, include whole (real, real->rational, 1.3.b).
  - If factoring in algebra is prerequisite then so is 1.5.c.

## Materials Review

You should have your holistic reviews and annotations.

Today, you will be provided with the NAEP Frameworks.

- Glossaries
- Definitions (e.g., different types of text, text structures and features, “locate/recall”, “critique/evaluate”)
- (Learning) Domains, Standards, Objectives

After training, you will be provided with the following:

- Updated Decision Rules
- Updated Reference Sheet
- Prerequisite course descriptions (math only)

## General Approach

Guidance provided by NAEP framework and item developers who completed this same task:

1. Review NAEP frameworks, NAEP objectives, decision rules, and reference sheet.
2. Look at prerequisites already noted, keeping NAEP objectives in mind.
3. Look for course outcomes and goals stated in different ways; as essential questions, purpose, goals, objectives, outcomes, course descriptions, etc.
4. Remember, even this task is an holistic approach that uses a sample of institutions, a sample of courses, a sample of artifacts, a sample of assignments, assessments, textbook chapters, etc.
  1. Don't get stuck on "If only I had this..."
  2. Don't get stuck on what "should be there."
5. This step is evidence-based. Focus on the evidence contained in the packet, don't assume anything.
  - a) **If there isn't much evidence in a packet, that's ok.** Do the best with what is there.
    - i. Remember all institutions, courses, packets, and artifacts are samples.
  - b) Don't get stuck looking for or debating details.
  - c) Only look at what is there. This is an evidence-based task.
6. It may be helpful to return to your first few packets after you have coded all packets.

## Annotate, Annotate, Annotate!

- There is no right or wrong answer.
- During review of each training packet:
  - Note borderline decisions where it is difficult to decide if a KSA is prerequisite or not and note why, and what you decided, and why.
  - Note prerequisites in artifacts so you can easily find them again in a month or two.
  - Note questions you encountered.
  - Note clarifications that would be helpful.
  - Note anything that we may want to clarify or refine for the group meetings.
- We may update support materials prior to qualification.
- We may update support materials prior to group review.
- During group review you will be expected to **quickly** identify sources of evidence and to explain/justify your coding.
  - Discussion time for each prerequisite will be limited.
  - Teams need to discuss and reach a team decision on the prerequisites, additional KSA, and exclusions for each packet.
  - Annotate anything that will help you remember and explain why you made the decisions that you did.

## Next Steps

- Review NAEP Framework objectives (word document)
- Review NAEP Framework document, skim, looking for concepts, definitions, and explanations for what you see in the objectives to make sure you understand NAEP definitions used in the frameworks.
- Review updated decision rules and reference sheet
- Connect with your team to walk through first training packet
  - Let us know what questions you may have
  - Submit completed training packets to us
  - Repeat
- Ask to be qualified when ready.
  - Qualify
  - Begin review
- Annotate, bring annotations to aid group discussion.
  - Identify evidence of each objective and where you found it
  - Consensus may require compromise, we want you to be able to quickly reference necessary materials and notes to help you evaluate compromises and justify your decision
- Timeline
  - Independent reviews complete by August 16
  - More detailed timeline to be posted on Basecamp

## Approach-Math

Guidance provided by NAEP framework and item developers who completed this same task:

1. Review NAEP frameworks, NAEP objectives, decision rules, and reference sheet.
2. Look at prerequisites already noted, keeping NAEP objectives in mind.
3. Review syllabus and TOC first. Save text for last.
  - a. Be alert to clues about prerequisites (diagnostic test, Preface, Back of the syllabus, Review appendix)
4. It is important to look at what is not a prerequisite
  - a. e.g., Finite Math
  - b. Realize that topics don't build on each other, it is important to attend to which topics are covered and which are not.
5. NAEP Objectives
  - a. Look at Prerequisites, then compare to NAEP objectives, then identify sources of evidence, using holistic prerequisite sources as a guide.
6. You may find that the way the course grade is weighted is helpful to identifying prerequisite, esp. non-content prerequisites.
7. If there is a review section, look at the topics, prefaces, chapter text, and when there is a whole section on something, assume it is taught in the course and not prerequisite to the course.
8. Do not make any implicit decisions. Respond only based on evidence.

## Remember to...

- Identify all prerequisite knowledge, skills, and abilities, not just those identified by the NAEP objectives.
  - This is not a matching exercise where we look for NAEP objectives in the artifacts.
  - Look for prerequisites in the artifacts, and then map them on to the NAEP frameworks to the extent that they correspond.
- Remember to use all artifacts in packet except as noted.
- Do whatever you need to do to annotate so you may quickly find sources of evidence and annotations in artifacts during group review.
- Don't use the holistic reference review sheet again-you will be provided with a new one to use with the NAEP review.
- (For Math) If there is no review chapter, you may have trouble deciding what is prerequisite. This will be challenging. Pay attention. In this case, some inferences may be necessary.
- (For Math) Pay attention to when calculators are used and when they are not. Impact skills applied.

## How can you ask questions?

- New Basecamp Q&A page:
  - post questions as comments here and we will monitor and provide responses.
- Q&A session “Office hours” next week, times to be posted on Basecamp.
- Note and submit questions upon completion of, or during:
  - Training.
  - Training packets.
  - Independent review.

We can address questions before qualification begins and again prior to the in-person team reviews.

### College Course Content Analysis Study

Conducted by EPIC on behalf of the National Assessment Governing Board

*Independent Review Training*  
July 2013

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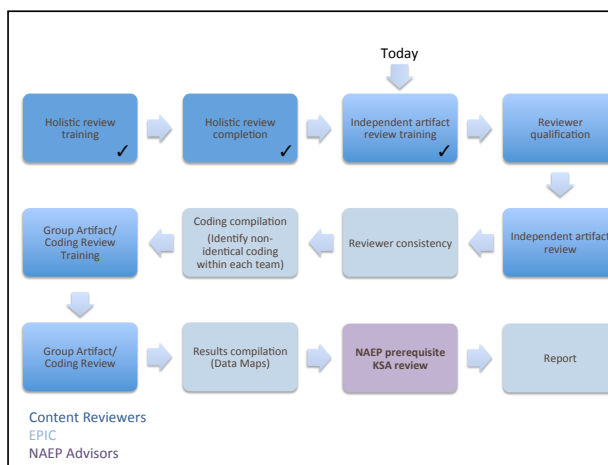
National Assessment Governing Board  
Project Officer  
Michelle Blair, MPA

### Today's Training

- Project and task summary
- Coding process and definitions
  - Review of instructions and coding scheme
  - Definitions
- NAEP frameworks
- Current revised decision rules
- Recommended approaches to completing this task
- Questions
- Walk-through of enhanced Fluid Survey data collection process

## Research Questions

- 1 What are the prerequisite knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?
- 2 How do these prerequisite KSAs compare with the 2009 and 2013 NAEP reading and mathematics frameworks and item pools?
- 3 How do these prerequisite KSAs compare with previous NAEP preparedness research, “i.e., the descriptions of minimal academic preparedness requirements produced in the JSS research?”
- 4 How can these prerequisites inform future NAEP preparedness research, i.e., planning and analysis efforts relative to the 2013 grade 12 NAEP reading and mathematics assessments?



## Task Summary

### Independent review training and qualifying

- 1. Attend training
- 2. Familiarize yourself with NAEP framework objectives
- 3. Complete training packet(s). You may do so with others and we have the "correct answers" for these to help you resolve questions.
- 4. Once you are comfortable with the process, **complete and pass a qualifying course packet**, including additional and excluded KSA.

### Independent Artifact Review

- 1. Using your holistic prerequisites as a starting point, **re-review artifacts in packets**, noting the knowledge, skills, and abilities that are prerequisite for preparedness to enter the course.
- 2. **Identify which framework objectives describe the evident prerequisites**, noting in your annotated materials the source(s) of the evidence and the importance of the prerequisite to the course.
- 3. In Fluid Survey, **indicate the NAEP objectives** corresponding to these evident prerequisite KSAs and **describe any exclusions** that are necessary when part of an objective is prerequisite but another part is not.
- 4. Identify the **sources** and rate the **relative helpfulness** of each artifact for each course packet.
- 5. **Annotate everything** in your course materials packets, including location of evidence in packet, questions, borderline judgments, rationales for each as evident/not evident, exclusions, and challenges.
- 6. Please **note questions, coding challenges, things that didn't seem to "fit", clarifications and definitions needed** and submit after training packets and after review so we can address them for everyone during group review.

## Coding

### 1. Identify Prerequisites

For all NAEP framework objective KSAs, please indicate whether each is a prerequisite for this course or not, and if so, how important it is to preparedness for this course. **A KSA is prerequisite if a minimally prepared student is either expected or required to possess this knowledge, skill, or ability to prepared for entry into the course.** A prerequisite KSA may be reviewed, but not taught in depth or for the first time, during the course.

- 1—KSA is NOT A PREREQUISITE for this course. *There is no evidence that this is a prerequisite* (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. *Without this prerequisite, students may struggle in some areas of this course.*
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. *Without this prerequisite, students will not be prepared for this course and will struggle in this course.*

## What are Prerequisites?

### Prerequisites:

- Are not content specific (not *history knowledge* but *reading skills*)
- Describe what a student needs to know or be able to do when they enter the course in order to engage with the material.
  - A baseline attribute required of a student to perform the tasks in the course.
- Represent knowledge, skills, or abilities that a minimally prepared student is expected or required to possess this to enter into the course.
- May be reviewed in the course, but not taught in depth or for the first time, during the course.

### Tips for finding evidence of prerequisites:

- May, and should, include prerequisite knowledge, skills, and abilities that are not in the NAEP objectives. **We want them all, not just those in NAEP.**
- If there is a review section, look at the topics, prefaces, chapter text. **These are very important** to identifying prerequisite KSAs.
- When an entire section or project is devoted to one topic, you may assume the topic is taught in the course and not prerequisite to the course.
- Please do not make decisions based on inferences or assumptions—only on evidence.
  - The one exception is for reading. Some of the reading framework objectives require an inference.
- Decision rules to guide identification or interpretation of NAEP objectives in course artifacts
- Decision rules to guide the identification of prerequisites in course artifacts

## What is Evidence?

Keep in mind that this is an **evidence-based project**, you are looking for evidence of prerequisites. If there is no evidence of a prerequisite, then you cannot identify it as a prerequisite.

### Evidence:

- Is more likely found in the beginning of the course than the end of the course (e.g., consider beginning of TOC rather than end of TOC).
  - Give less weight to assessments, readings, or projects occurring later in the course, these are more indicative of what was learned in the course and not what was prerequisite to the course.
- Includes “lofty” goals. Syllabi may describe lofty course objectives. These objectives that seem high when compared to the selection of artifacts included in the packet. Even “lofty” goals falling near the beginning of the course **may be** used as evidence of what KSA are prerequisites.
- **Remember-If it is not in the materials, it is not evident.**

## 2. Coding Identify Exclusions

Many times, part(s) of a framework objective KSA are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

An exclusion might look like this when organizing structures only need be located, but not recalled, and these structures include comparison/contrast and problem/solution but not enumeration:

*Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.*

And would be recorded like this:

*Recall, enumeration*

If any part of an entire objective statement is prerequisite, while other parts are not, **list the parts that do not apply in the text box.**

## Why Exclusions?

- They are very Important!
- Identifying what is prerequisite is only half the story, we also need to know what is not prerequisite.
- List them in the order they occur in the objective statement.

## Coding-Helpfulness & Source

### Evidence of KSA

Please identify the sources of evidence used for answering the questions above.

- Syllabus
- Syllabus learning objectives/course outcomes
- Syllabus course chronology
- Assessment
- Assignment
- Reading text sample
- Reading text sample table of contents
- Other (additional materials included in packet not listed above)

### Artifact Helpfulness

"Which course artifacts were most helpful for providing evidence of KSAs in this course packet?" (4-point multiple choice grid: Not Helpful, Limited Helpfulness, Helpful, Very Helpful)

- Syllabus
- Assignment
- Assessment
- Text Excerpt
- (and a list of the 3 most common "other")

## NAEP Frameworks

### Structure of NAEP frameworks:

#### (Learning) Domain

#### Standard

#### Objective

- Reading follows an embedded structure where each lower level requires the level above as part of its definition.

- There is no limit to the number of exceptions you may identify for a particular Learning Domain/Standard/Objective statement.
- Use exceptions as necessary to reduce a framework statement down to the specific KSAs that are evident in the packet.

### Example

**1. Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension**

1.1. Locate or recall textually explicit information and make simple inferences within and across *both literary and informational texts*

1.1.a Locate or recall specific information such as definitions, facts, and supporting details in text or graphics

## Coding

### Describe Additional KSA

To help us include Additional KSAs, please identify any KSAs that appear to be prerequisite to this course that were not listed in the Foundational KSA/NAEP Objective Statements. For each additional KSA, please list the sources of evidence for that KSA and indicate its importance relative to the course.

Additional  
KSA:

- 1—KSA is NOT A PREREQUISITE for this course. *There is no evidence that this is a prerequisite* (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. *Without this prerequisite, students may struggle in some areas of this course.*
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. *Without this prerequisite, students will not be prepared for this course and will struggle in this course.*

Evidence of KSA: Please identify the source(s) of evidence for this additional KSA:

- Syllabus
- Syllabus learning objectives/course outcomes
- Syllabus course chronology
- Assessment
- Assignment
- Reading text sample
- Reading text sample table of contents
- Other (additional materials included in packet not listed above)

## What are Additional Prerequisites?

To help us identify non-NAEP KSAs, please identify any that appear to be prerequisite to this course but are not described by the NAEP frameworks.

- We will collect the same information about these as we do for the NAEP objectives

## Example-Reading Frameworks

Level	Description
1	Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension
1.1	Locate or recall textually explicit information and make simple inferences within and across <i>both literary and informational texts</i>
1.1.a	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics
1.2	Locate or recall textually explicit information and make simple inferences within and across <i>literary texts</i>
1.2.a	Locate or recall character traits
1.2.b	Locate or recall sequence of events or actions
1.2.c	Locate or recall setting
1.2.d	Locate or recall figurative language
1.2.e	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction
1.3	Locate or recall textually explicit information and make simple inferences within and across <i>informational texts</i>
1.3.a	Locate or recall the topic sentence or main idea
1.3.b	Locate or recall the author's purpose
1.3.c	Locate or recall causal relations
1.3.d	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.
2	Integrate/Interpret: Make complex inferences within and across texts
2.1	Integrate/Interpret: Make complex inferences within and across <i>both literary and informational texts</i>
2.1.a	Describe problem and solution, or cause and effect
2.1.b	Compare or connect ideas, perspectives, problems, or situations
2.1.c	Determine unstated assumptions in an argument
2.1.d	Describe or analyze how an author uses literary devices or text features to convey meaning
2.1.e	Describe or analyze how an author uses organizing structures to convey meaning
2.1.f	Describe or analyze author's purpose
2.2	Integrate/Interpret: Make complex inferences within and across texts <i>literary texts</i>
2.2.a	Interpret mood, tone, or voice
2.2.b	Integrate ideas to determine theme
2.2.c	Interpret a character's conflicts, motivations, and decisions
2.2.d	Examine relations between or among theme, setting, plot, or characters
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning

## Interpreting NAEP Frameworks

- Interpret the objective in the context of its standard and domain.
  - More necessary in reading than in mathematics
- If any part of the “domain + standard + objective” is not prerequisite but other parts are, then identify the parts that are not as exclusions.
- If you aren't sure how to interpret a word in the frameworks:
  - **Look in frameworks document** (glossary (for reading) and in text)
  - Look in the updated reference sheet for guidance
  - Let us know

## Additional Decision Rules-Reading

(Examples, see decision rules for comprehensive list)

### Importance

- Importance is determined by evidence that a KSA is **prerequisite** and is referenced in one place (learning goals or outcomes, assignments or assessments, text sample) in the course packet. If evidence is found in more than one place, then it is an **important prerequisite**.

### Artifacts

- Ignore student work samples that are not accompanied by a scoring rubric and a score
- Exclude activities, assignments, or other actions in textbook unless referenced in syllabus and/or assignments.
- Use text samples to identify prerequisite KSAs when 1) the text is identified as **required reading** (as identified in reading list), or when no reading list is provided. If a reading list is provided and the text sample is not listed, **ignore** the text sample.
- Do not consider visual or auditory text when identifying prerequisites (e.g., don't apply reading KSA to watching movies about fairy tales, only to reading fairy tales). Identify prerequisites for printed text.

### Text types/Definitions

- "Both literary and informational texts"—if partial agreement (evidence of KSA for literary or informational text, but not both), select 1-prerequisite. Make sure to identify which part is not applicable in the KSA exclusion textbox.
- "Organizing structures" can be interpreted as:
  - Referring to organizing structures that are **explicitly identified** in texts, through such indicators as the author's use of enumeration ("first, second, third," etc.) or explicit references to a problem and its solution (i.e., "The problem is . . ."), etc.
  - Referring to the organizational structures such as comparison, chronology, cause/effect, description, problem/solution, etc.
  - May also be interpreted as referring to an author's organization of a larger unit of text (i.e., a paragraph or whole passage), **not** to the relationship between two sentences. Referring to the organizational structures such as comparison, chronology, cause/effect, description, problem/solution, etc.
- The terms "literary devices or text features" will be interpreted broadly as including all aspects of author's craft and "text features."
- "Author's purpose" will be interpreted as referring to **explicit** statements of the author's purpose within or across texts.
- "Major ideas" will be interpreted as including important ideas within a paragraph or portion of a text as well as ideas central to a passage as a whole.

## Materials Review

You should have your holistic reviews and annotations.

Today, you will be provided with the NAEP Frameworks.

- Glossaries
- Definitions (e.g., different types of text, text structures and features, "locate/recall", "critique/evaluate")
- (Learning) Domains, Standards, Objectives

After training, you will be provided with the following:

- Updated Decision Rules
- Updated Reference Sheet

## Global Decision Rules

### Lists occurring in NAEP Frameworks

- "And" in a list of items means all items in list must be evident.
- "Or" in a list of items means that not all items must be evident.
- Lists containing "such as" are not a closed universe; treat as examples. Don't need exclusions for "such as".

### Artifacts

- Exclude **activities, assignments, or other actions in textbook** unless referenced in syllabus and/or assignments.
- When multiple **optional** assignments are described, review and consider only the **lowest cognitively demanding assignment**. It better represents course prerequisites.
  - If it cannot be determined that multiple assignments are optional, review and code all.

### Identifying prerequisites and defining "evidence"

- Look for the math and reading skills, not content-specific skills. Instructors expect students to be able to have and do the prerequisite math or reading KSAs, only content is taught in the course.
  - College level courses don't tend to teach reading skills or basic mathematics knowledge.
  - e.g., if you can't identify an argument you shouldn't be in the course.
- You may **not** create or apply additional decision rules or include any other materials in your review.
  - Please provide any suggestions to us and we will review all and:
    - Include them in the revised rules to use for independent review.
    - Compile all that arise and provide a final set to use for the group meeting.
- "Lofty" goals can be evidence, even if not substantiated in other packet artifacts.

## Decision Rules for NAEP Framework Reading

(Examples, see decision rules for comprehensive list)

- Objective-specific guidance:
  - Skills will not always be explicit, make inferences as appropriate to identify the prerequisite KSAs.
    - e.g., argument can be a skill necessary for persuasion.
    - 1.3.b. locate or call the authors' purpose ("Author's purpose" is unlikely to be stated explicitly).
      - 2.1.f. is like 1.3.b.
    - 2.1.c. You can't evaluate an argument without looking at/making/understanding unstated assumptions.
    - 2.3.d. distinguishing fact from opinion is implicit.
    - 3.1.a. Can you judge the author's argument without considering the author's technique in informational text?
      - 3.3.a. Evaluating the effectiveness of an argument requires evaluating the language used by the author.
- "Across text" requires "within text."

## General Approach

Guidance provided by NAEP framework and item developers who completed this same task:

1. Review NAEP frameworks, NAEP objectives, decision rules, and reference sheet.
2. Look at prerequisites already noted, keeping NAEP objectives in mind.
3. Look for course outcomes and goals stated in different ways; as essential questions, purpose, goals, objectives, outcomes, course descriptions, etc.
4. Remember, even this task is an holistic approach that uses a sample of institutions, a sample of courses, a sample of artifacts, a sample of assignments, assessments, textbook chapters, etc.
  1. Don't get stuck on "If only I had this..."
  2. Don't get stuck on what "should be there."
5. This step is evidence-based. Focus on the evidence contained in the packet, don't assume anything.
  - a) If there isn't much evidence in a packet, that's ok. Do the best with what is there.
    1. Remember all institutions, courses, packets, and artifacts are samples.
  - b) Don't get stuck looking for or debating details.
  - c) Only look at what is there. This is an evidence-based task.
6. It may be helpful to return to your first few packets after you have coded all packets.

## Approach-Reading

Guidance provided by NAEP framework and item developers who completed this same task:

- They suggest review of the following to familiarize yourselves with each packet: level of complexity, organization/structure, presence or absence of text features (e.g., charts, graphs, text boxes).
  - Review packet first, annotate evidence, with objectives in mind.
  - Start with learning goals, assessment/assignment, and then text.
- How should content reviewers use the learning objectives/goals?
  - Skills, processes—look for verbs that denote a cognitive dimension.
  - Do NOT use the course grade weights of assignments, exams, readings to determine importance.
- Although the focus of this task is on explicit evidence, some NAEP objectives are based on implicit evidence.
  - Necessary for author's purpose, unstated assumptions (persuasion).
  - Locate or recall-no way for these to happen without implicit decisions.
  - Instructors wanted students to detect bias? (Note as additional KSA).
  - We will provide you with guidance concerning objectives that require implicit decisions.

## Remember...

- Identify all prerequisite knowledge, skills, and abilities, not just those identified by the NAEP objectives.
  - This is not a matching exercise where you look for NAEP objectives in the artifacts.
  - Look for prerequisites in the artifacts, and then map them on to the NAEP frameworks to the extent that they correspond.
- Interpret each objective in the context of its standard and domain. If any part of the “domain + standard + objective” is not prerequisite but other parts are, then identify the parts that are not as exclusions.
- Remember to use all artifacts in packet except as noted.
- Do whatever you need to do to annotate so you may quickly find sources of evidence and annotations in artifacts during group review.
- Don't use the holistic reference review sheet again-you will be provided with a new one to use with the this independent NAEP review.
- We are not looking for content specific prerequisites (not *history knowledge* but *reading skills*) necessary for each course.

## Annotate, Annotate, Annotate!

- There is no right or wrong answer.
- During review of each training packet:
  - Note borderline decisions where it is difficult to decide if a KSA is prerequisite or not and note why, and what you decided, and why.
  - Note prerequisites in artifacts so you can easily find them again in a month or two.
  - Note questions you encountered.
  - Note clarifications that would be helpful.
  - Note anything that we may want to clarify or refine for the group meetings.
- We may update support materials prior to qualification.
- We may update support materials prior to group review.
- During group review you will be expected to **quickly** identify sources of evidence and to explain/justify your coding.
  - Discussion time for each prerequisite will be limited.
  - Teams need to discuss and reach a team decision on the prerequisites, additional KSA, and exclusions for each packet.
  - Annotate anything that will help you remember and explain why you made the decisions that you did.

## Next Steps

- Review NAEP Framework objectives (MS Word document).
- Review NAEP Framework document, skim, looking for concepts, definitions, and explanations for what you see in the objectives to make sure you understand NAEP definitions used in the frameworks.
- Review updated decision rules and reference sheet.
- Connect with your team to walk through first training packet.
  - Let us know what questions you may have.
  - Submit completed training packets to us.
  - Repeat.
- Ask to be qualified when ready.
  - Qualify.
  - Begin review.
- Annotate, bring annotations to aid group discussion.
  - Identify evidence of each objective and where you found it.
  - Consensus may require compromise, we want you to be able to quickly reference necessary materials and notes to help you evaluate compromises and justify your decision.
- Timeline:
  - Independent reviews must be completed by August 23.
  - More detailed timeline to be posted on Basecamp.

## How can you ask questions?

- New Basecamp Q&A page:
  - post questions as comments here and we will monitor and provide responses.
- Q&A session “Office hours” next week, times to be posted on Basecamp.
- Note and submit questions upon completion of, or during:
  - Training.
  - Training packets.
  - Independent review.

We can address questions before qualification begins and again prior to the in-person team reviews.

# APPENDIX J

## Holistic Review Online Data Collection Instrument

Below is the online instrument used to facilitate the collection of KSAs identified during holistic review.

**Review each packet in its entirety to obtain a holistic understanding of the course. Note all prerequisite knowledge, skills and abilities, and annotate them clearly as you go. Remember that you will need to refer to your notes here when you meet with the group later on. The more clear and detailed your notes are, the more helpful they will be to you.**

In your own words, describe 4-10 prerequisites to this course below.

[Back](#) [Save and continue later](#) [Next](#) Review responses: [PDF](#) [Word](#)

# APPENDIX K

## Independent Review Online Data Collection Instrument

Below is a sample of the online data collection instrument used by content reviewers during independent review. The rating instructions were displayed the same in both the mathematics and reading online instruments.

### RATING INSTRUCTIONS AS DISPLAYED IN ONLINE INSTRUMENT

The rating instructions were displayed the same in both the mathematics and reading online instruments.

#### Rating Instructions

For all NAEP framework objective KSAs, please indicate whether each is a prerequisite for this course or not, and if so, how important it is to preparedness for this course. **A KSA is prerequisite if a minimally prepared student is either expected or required to possess this knowledge, skill, or ability to be prepared for entry into the course.** A prerequisite KSA may be reviewed, but not taught in depth or for the first time, during the course.

- 1—KSA is NOT A PREREQUISITE for this course. ***There is no evidence that this is a prerequisite*** (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. ***Without this prerequisite, students may struggle in some areas of this course.***
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. ***Without this prerequisite, students will not be prepared for this course and will struggle in this course.***

Many times, part(s) of a framework objective KSA is/are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

For example, an exclusion might look like this when organizing structures only need be located, but not recalled, and these structures include comparison/contrast and problem/solution, but not enumeration:

*Locate ~~or recall~~ organizing structures of texts, such as comparison/contrast, problem/solution, ~~enumeration~~, etc.*

And would be recorded like this:

*Recall, enumeration*

If any part of an entire objective statement is prerequisite, while other parts are not, **list the parts that do not apply in the text box.**

## SAMPLE MATHEMATICS OBJECTIVE AS DISPLAYED IN ONLINE INSTRUMENT

### (1) Number properties and operations

#### (1.1) Number sense

##### (1.1.d) Represent, interpret, or compare expressions for real numbers, including expressions using exponents and logarithms.

Please select the option that best describes the prerequisite nature of the KSAs in this NAEP objective to this course.

☐ KSA is not a PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course and is IMPORTANT.

Please identify and list any exclusions for each prerequisite NAEP objective. These must include any and all exclusions that are necessary for your rating to accurately describe the KSAs evident in the artifact.

## SAMPLE READING OBJECTIVE AS DISPLAYED IN ONLINE INSTRUMENT

### 1.1.a

(1) Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension; (1.1) Locate or recall textually explicit information and make simple inferences within and across both literary and informational texts.; **(1.1.a) Locate or recall specific information such as definitions, facts, and supporting details in text or graphics.**

Please select the option that best describes the prerequisite nature of the KSAs in this NAEP objective to this course.

☐ KSA is not a PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course and is IMPORTANT.

If any part of an entire objective statement is prerequisite, while other parts are not, list the parts that do not apply in the text box.

## ADDITIONAL PREREQUISITE KSA INSTRUCTIONS AS DISPLAYED IN ONLINE INSTRUMENT

The additional prerequisite KSA pages were displayed the same in both the mathematics and reading online instruments. Reviewers were allowed to add up to ten additional prerequisite KSAs for each course packet review.

**Please list any additional prerequisites that you did not identify in your initial listing of prerequisites and were not contained in the NAEP objectives.**

For each additional prerequisite knowledge, skill, or ability evident in this course package, please identify in which artifact the evidence was found. Please select all that apply.

### Additional KSA

### Evidence of KSA

Please identify the sources of evidence used for answering the question above.

- ☐ Syllabus
- ☐ Assignment
- ☐ Assessment
- ☐ Text Excerpt
- ☐ Study guide/review
- ☐ Instructor comments
- ☐ List of homework assignments/readings
- ☐ Other (additional materials included in packet not listed above)

# COURSE ARTIFACT HELPFULNESS RATINGS AS DISPLAYED IN ONLINE INSTRUMENT

The course artifact helpfulness pages were displayed the same in both the mathematics and reading online instruments.

Course Artifact Helpfulness

Which course artifacts were most helpful for providing evidence of KSAs in this course packet?

Please select **Not Applicable** for those artifacts not included in the course packet.

	Not Applicable	Not Helpful	Limited Helpfulness	Helpful	Very Helpful
Syllabus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Text Excerpt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Study guide/review	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructor comments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
List of homework assignments/readings	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (additional materials included in packet not listed above)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Back

Save and continue later

Next

Review responses: PDF Word

☐ List of homework assignments/readings

☐ Other (additional materials included in packet not listed above)

# APPENDIX L

## Content Review Training and Qualification Results

Reviewers were required to do a review for one of the two training packets. They were encouraged to do both, but not required. For qualifying, reviewers were required to complete the review of packet 1 with an 80% threshold. If they did not meet the 80% threshold, they were required to complete a review for the second qualifying packet.

### MATHEMATICS

Reviewer	Training packet 1		Training packet 2		Qualifying packet 1		Qualifying packet 2	
	Match %	Over/ under	Match %	Over/ under	Match %	Over/ under	Match %	Over/ under
Group 1 Member 1	61	47 over	61	46 over	76	29 over	89	1 over
Group 1 Member 2	55	56 over	69	30 over	74	34 over	85	9 over
Group 1 Member 3	70	34 over	72	31 over	75	32 over	93	5 under
Group 2 Member 1	65	40 over	85	9 over	95	4 over	N/A	N/A
Group 2 Member 2	80	23 over	79	6 over	89	12 over	N/A	N/A
Group 2 Member 3	85	3 over	83	9 over	98	1 under	N/A	N/A
Group 3 Member 1	78	28 over	N/A	N/A	93	7 over	N/A	N/A
Group 3 Member 2	69	32 over	N/A	N/A	72	37 over	88	5 over
Group 3 Member 3	68	31 over	N/A	N/A	82	24 over	N/A	N/A
Group 4 Member 1	N/A	N/A	84	4 over	88	15 over	N/A	N/A
Group 4 Member 2	73	35 over	N/A	N/A	93	7 over	N/A	N/A
Group 4 Member 3	64	47 over	75	27 over	90	13 over	N/A	N/A
Alternate 1	N/A	N/A	72	29 over	37	82 over	92	6 under
Alternate 2	72	33 over	N/A	N/A	84	17 over	N/A	N/A
Alternate 3	51	62 over	72	30 over	88	14 over	N/A	N/A

## READING

Reviewer	Training packet 1		Training packet 2		Qualifying packet 1		Qualifying packet 2	
	Match %	Over/ under	Match %	Over/ under	Match %	Over/ under	Match %	Over/ under
Group 1 Member 1	78	5 under	N/A	N/A	73	6 under	81	7 over
Group 1 Member 2	92	2 over	N/A	N/A	46	20 under	84	6 under
Group 1 Member 3	58	0	78	6 under	73	6 under	100	0
Group 2 Member 1	N/A	N/A	89	4 under	76	9 under	97	1 over
Group 2 Member 2	61	9 over	86	1 under	89	2 over	N/A	N/A
Group 2 Member 3	86	5 over	92	4 under	78	8 under	97	1 over
Group 3 Member 1	83	5 under	78	8 under	95	2 under	N/A	N/A
Group 3 Member 2	N/A	N/A	73	10 under	86	1 under	N/A	N/A
Group 3 Member 3	89	1 under	86	5 under	100	0	N/A	N/A
Group 4 Member 1	N/A	N/A	49	7 under	54	15 under	81	16 under
Group 4 Member 2	81	5 under	N/A	N/A	86	5 under	N/A	N/A
Group 4 Member 3	75	5 under	N/A	N/A	73	6 under	95	2 over
Alternate 1	53	2 over	59	7 under	70	3 under	68	2 over
Alternate 2	58	6 over	97	1 under	78	8 under	97	1 over
Alternate 3	N/A	N/A	89	4 under	73	8 under	97	1 over

# APPENDIX M

## Reviewer Reference Sheet

Global Decision Rules
<p><b>Do not create or apply additional decision rules.</b></p> <ul style="list-style-type: none"> <li>• Send any suggestions to EPIC.</li> <li>• EPIC will review and possibly include in the final set of decision rules to use for independent review and/or group review.</li> </ul>
<p><b>A prerequisite KSA may be <i>reviewed</i> during the course, but not taught in depth or for the first time.</b></p>
<p><b>If there isn't much evidence in a packet, do your best with what is there.</b></p> <ul style="list-style-type: none"> <li>• Don't get stuck on "If I only had this..."</li> <li>• Don't get stuck on what "should be there"</li> <li>• Remember all institutions, courses, packets, and artifacts are samples.</li> <li>• Don't get stuck looking for or debating details.</li> </ul>
<p>Please identify only the prerequisite KSAs that you see evidence of in the artifacts. This is an evidence-centered study and we want you to <b>make as few assumptions and inferences as you possibly can (preferably none)</b>. However, <b>if there are rare cases where you feel an inference or assumption is necessary to accurately record the prerequisite KSA evidence that you find, we expect them to occur only in the most complex domains of Critique/Evaluate for reading</b>. Because your approach to identifying the prerequisites for each course is evidence-based, we expect that few, if any, inferences or assumptions will need be made.</p>
<p><b>If you aren't sure how to interpret a word in the frameworks:</b></p> <ul style="list-style-type: none"> <li>• Look in frameworks document (glossary (for reading) and in text)</li> <li>• Look in the updated reference sheet for guidance</li> <li>• Let EPIC know</li> </ul>
<p><b>A lofty goal can be, or contain, evidence of a prerequisite KSA even if not substantiated in other packet artifacts.</b></p>
<p><b>If it cannot be determined that multiple assignments are optional, review and code all.</b></p>
<p><b>Assume instructors expect students to enter the course with a set of knowledge, skills, and abilities (KSA) that will not be taught in the course.</b> Your task is to identify those KSA that are prerequisite and applicable to the course.</p>
<p><b>If evidence of a KSA is referenced in one place in the course packet it (learning goals or outcomes, assignments or assessments, text sample), the KSA is prerequisite. If evidence is found in more than once place, then the KSA is prerequisite and important.</b></p> <ul style="list-style-type: none"> <li>• Do NOT use course grade weights of assignments, exams, or readings to determine importance.</li> </ul>
<p><b>When multiple optional assignments are described, review and consider only the lowest cognitively demanding assignment.</b> It better represents course prerequisites.</p>

Mathematics-Specific Decision Rules	
Pay attention to when calculators are used and when they are not.	
One “piece” of evidence is sufficient in textbook to identify a prerequisite KSA as long as it is representative of the course content and not just a KSA embedded within a single problem or example. (For example, the presence of graphs alone is insufficient evidence of data analysis or statistics prerequisites.)	
For finite math, realize that topics don’t build on each other. Use the syllabus to determine which topics are covered and which are not.	
If there is a whole section taught on something, consider that it may contain prerequisite KSAs to the course (it could be reviewed content). Look at density – is this new knowledge or review content that students should know? Don’t assume it is new content.	
Consider additional mathematics prerequisite KSAs. Examples may include: <ul style="list-style-type: none"> <li>• Sets and unions</li> <li>• Symbolism</li> <li>• Potential (use of technology)</li> <li>• Logic (if/then, if and only if)</li> <li>• Notation</li> </ul>	
Consider additional possible non-mathematic prerequisite KSAs. Examples may include: <ul style="list-style-type: none"> <li>• Writing</li> <li>• Reading</li> <li>• Knowledge, understanding, application</li> <li>• Communication (be able to explain, write about mathematics)</li> </ul>	

NAEP Mathematics Domain, Standard, and Objective Specific Decision Rules	
Standard/ Objective	Decision Rule
1.3.b, 1.5.c	If students must be able to perform operations on real numbers with decimals, then 1.3.b is a prerequisite KSA. <ul style="list-style-type: none"> <li>• If for a subset, include whole (real, real-&gt;rational, 1.3.b)</li> <li>• If factoring in algebra is a prerequisite KSA then so is 1.5.c</li> </ul>
1.4.c	In Statistics, if ratio is a prerequisite KSA, then so is 1.4.c
5.2.a	When students must be able to go between one representation and another representation, then 5.2.a is a prerequisite KSA
5.3.b	If translating a word problem into an expression or equation, then 5.3.b is a prerequisite KSA.
5.4.a	If students must be able to solve non-contextual equations, then 5.4.a is a prerequisite KSA.
5.4.c	If students must be able to complete problem solving contextualized problems, then 5.4.c is a prerequisite KSA.

NAEP Mathematics Definitions		
Standard/ Objective	Term of Interest	Decision Rule
General	“And”	"And" in a list of items in a NAEP objective means all of the items in the list must be evident.
General	“Or”	"Or" in a list of items in a NAEP objective means that at least one of the items listed must be evident.
General	“Such as”	Lists containing “such as” are not a “closed universe” and they should be treated as examples. For lists containing “such as” you don’t need to treat the parts of the KSA that are not applicable as KSA exclusions.
1.1	“Number sense”	Comfort in dealing with numbers effectively is called number sense. It includes firm intuitions about what numbers tell us; an understanding of the ways to represent them symbolically (including facility with converting between different representations); ability to calculate, either exactly or approximately, and by several means (mentally, with paper and pencil, or with calculator, as appropriate); and skill in estimation. Ability to deal with proportion (including percent) is another important part of number sense. By 12th grade, students should be comfortable dealing with all types of real numbers and various representations such as exponents or logarithms. Students at the 12th-grade level should be familiar with complex numbers and be able to establish the validity of numerical properties using mathematical arguments.
1.1.i	“Order”	Reflect intuitions about the relative size of quantities and provides a basis for making sensible estimates.
2.2.e	“Problem situations”	Contextual information includes problem scenarios, explanations, more thorough directions, and background text. Using contextual information judiciously can place mathematical concepts in fuller, often more realistic, conditions, measure a students’ ability to apply mathematical concepts, and provide necessary background information.
General	“Computation”	It is important to note that certain aspects of mathematics occur in all content areas. The best example of this is computation, or the skill of performing operations on numbers. This skill should not be confused with the Number Properties and Operations content area, which encompasses a wide range of concepts about our numeration system. Computation is also critical in Measurement and Geometry in calculating the perimeter of a rectangle, estimating the height of a building, or finding the hypotenuse of a right triangle, for example. Data Analysis often involves computation in calculating a mean or the range of a set of data, for example. Probability often entails work with rational numbers. Solving algebraic equations also usually involves numerical computation. Computation, therefore, is a foundational skill in every content area.

Reading-Specific Decision Rules
<b>Decision Rule on Making Inferences: Please identify only the prerequisite KSAs that you see evidence of in the artifacts. This is an evidence-centered study and we want you to make as few assumptions and inferences as you possibly can (preferably none).</b> However, if there are rare cases where you feel an inference or assumption is necessary to accurately record the prerequisite KSA evidence that you find, we expect them to occur only in the most complex domain of Critique/Evaluate for reading. Because your approach to identifying the prerequisites for each course is evidence-based, we expect that few, if any, inferences or assumptions will need be made.
<b>Exclude activities, assignments, or other actions in textbook unless referenced in syllabus and/or assignments.</b>
<b>Use text samples to identify prerequisite KSAs when the text is identified as required reading (as identified in reading list), or when no reading list is provided.</b> If a reading list is provided and the text sample is not listed, ignore the text sample.
<b>Identify prerequisites for printed text.</b> Do not consider video or auditory text when identifying prerequisite KSAs (e.g., don’t apply reading KSA to watching movies about fairy tales, only to reading fairy tales).
<b>The literary nonfiction objectives are not applicable if the reading sample is <i>informational text</i> and the only reference to <i>literary nonfiction</i> is made in syllabi reading list but there is no literary text sample.</b>
Skills will not always be explicit. <b>Make inferences (based on evidence) as appropriate to identify the prerequisite KSAs</b> (e.g., argument can be a skill necessary for persuasion).

NAEP Reading Definitions		
Standard/ Objective	Term of Interest	Decision Rule
General	“And”	"And" in a list of items in a NAEP objective means all of the items in the list must be evident.
General	“Or”	"Or" in a list of items in a NAEP objective means that at least one of the items listed must be evident.
General	“Such as”	Lists containing “such as” are not a “closed universe” and they should be treated as examples. For lists containing “such as” you don’t need to treat the parts of the KSA that are not applicable as KSA exclusions.
1	“Within and across”	“Across text” requires “within text”.
1	“Simple inferences”	“Simple inferences” and their associated objectives will be interpreted as including the understanding of close paraphrase of “explicit information” within or across texts.
1.1	“Both literary and informational texts”	If partial agreement (evidence of KSA for literary or informational text, but not both), select “KSA is prerequisite for this course”. Make sure to identify which part is not applicable in the KSA exclusion textbox.
1.3.b	“Author’s purpose”	Skills will not always be explicit, make inferences as appropriate to identify the prerequisite KSAs. Author’s purpose doesn’t need to be explicit. Will be interpreted as referring to explicit statements of the author’s purpose within or across texts.
1.3.d	“Organizing structures”	<p>“Organizing structures” will be interpreted as:</p> <ul style="list-style-type: none"> <li>Referring to organizing structures that are <b>explicitly identified</b> in texts, through such indicators as the author’s use of enumeration (“first, second, third,” etc.) or explicit references to a problem and its solution (i.e., “The problem is . . .”), etc.</li> <li>Referring to the organizational structures such as comparison, chronology, cause/effect, description, problem/solution, etc.</li> </ul> <p>May also be interpreted as referring to an author’s organization of a larger unit of text (i.e., a paragraph or whole passage), not to the relationship between two sentences.</p>
2.1.c	“Unstated assumptions”	Can’t evaluate an argument without looking at/making/understanding unstated assumptions.
2.1.d	“Literary devices or text features”	The terms “literary devices or text features” will be interpreted broadly as including all aspects of author’s craft and “text features.”
2.1.e	“Organizing structures”	<p>“Organizing structures” will be interpreted as:</p> <ul style="list-style-type: none"> <li>Referring to the organizational structures such as comparison, chronology, cause/effect, description, problem/solution, etc.</li> </ul> <p>May also be interpreted as referring to an author’s organization of a larger unit of text (i.e., a paragraph or whole passage), not to the relationship between two sentences.</p>
2.1.f	“Author’s purpose”	Skills will not always be explicit, make inferences as appropriate to identify the prerequisite KSAs. Author’s purpose doesn’t need to be explicit. Will be interpreted as referring to explicit statements of the author’s purpose within or across texts.
2.3.a	“Major ideas”	“Major ideas” will be interpreted as including important ideas within a paragraph or portion of a text as well as ideas central to a passage as a whole.
2.3.d	“Opinion”	Distinguish fact from opinion is implicit.
3.3.a	“Way the author selects language to influence the reader”	Evaluating the effectiveness of an argument requires evaluating the language used by the author.

NAEP Reading Definitions	
Term of Interest	Definition
“Within Text”	“Within Text” is within the same text or document. Different chapters by the same person, in the same text are within, same document.
“Across Text”	“Across Text” is across to different types of text, for example, a chart, table, margin annotations, maps, text boxes, author notes within a text, a comic strip inserted into text, and a graph and graph within the same text.
“Critique”	As a component of “critique/evaluate” this requires the reader to stand back from what they read and view the text objectively to assess the text from numerous perspectives and synthesizing it with other texts and experiences.
“Complex inference”	Can involve inferring across sentences.
“Text”	The term reflects the breadth of components in typical reading materials. There are two types of texts: literary and informational.
“Literary text”	Literary texts are items such as stories, dramas, essays, or poetry are frequently read for pleasure or for new perspectives on time, place, human nature of feelings; they are often read from beginning to end.
“Informational text”	Informational text are items such as exposition, argumentation and persuasive text, and procedural text that do not typically have an identifiable structure but can often be thought of as follows: description, sequence, causation, problem/solution, comparison.
“Author’s craft”	Specific techniques that an author uses to relay an intended message.

# APPENDIX N

## Non-NAEP Additional KSAs Discussed at Group Review

### MATHEMATICS

Each group reviewed course packets across the four course titles (college algebra, finite mathematics, precalculus/introductory calculus, and introduction to statistics). Within each group, the Non-NAEP Additional KSAs were compiled across course titles to address duplication. At group review, each group reviewed their list against each of their 28 course packets.

Mathematics non-NAEP Additional KSAs discussed at Group Review	
Group 1 Non-NAEP Additional KSAs	Basic computer skills
	Using a Graphing Utility
	Basic Internet skills
	Basic calculator skills
	Critical thinking skills
	Mathematical modeling
	Tabular interpretation
	Problem solving skills
	Using a graphing calculator
	Proper use of technology
	Basic probabilistic thinking
	Basic numerical literacy
	Internet and Calculator skills
	Sense Making
	Computer and Internet skills
	Quantitative Literacy
	Use of a spreadsheet
	Basic Technological abilities
	Basic computer application and calculator skills
	Computer literacy
	Use of calculator and spreadsheet
	Basic Mathematical Technology
Group 2 Non-NAEP Additional KSAs	Computer skills
	Find the domain of rational expressions
	Set properties and operations
	Use and understand basic set notation

## Mathematics non-NAEP Additional KSAs discussed at Group Review

Basic set notation and operations  
 Sets and their properties and operations on them  
 They should know about trig functions not necessarily solving problems.  
 Know the Cartesian coordinate system  
 Students need to know basic geometric formulas.  
 Students need to know how to use a basic calculator.  
 They need to know what percentage is.  
 Know the different uses of numbers, ordinal, cardinal, measurement, identification  
 Read a flow chart  
 Being able to read carefully

Ability to use graphing calculator and/or computer software  
 Use of technology  
 Ability to use graphing calculator  
 Translating English phrases and sentences into mathematical expressions and describing how one quantity depends on another  
 Using and understanding interval notation  
 Knowledge of the real number system  
 Communicating mathematics in written form  
 Knowledge of algebraic expressions, mathematical models real numbers  
 Knowledge of algebra  
 Knowledge of polynomials  
 Knowledge of basic algebra  
 Knowledge of intermediate algebra  
 Knowledge from 2 years high school algebra  
 Ability to work in groups  
 Ability to use a scientific calculator  
 Ability to work in collaborative groups  
 Ability to use MS Excel  
 Ability to work with numbers in various forms (counts, tables, charts, graphs)  
 Ability to use statistical calculators

### Group 3 Non-NAEP Additional KSAs

### Group 4 Non-NAEP Additional KSAs

Facility in use of computers, including loading software, submitting homework, taking quizzes online, and manipulating charts.  
 Use set notation, including symbols for: element of, not an element of, subset of, and not a subset of.  
 Facility with graphing calculators.  
 Computer skill necessary to access and use a math tutorial site and a designated class site.  
 Use interval notation.  
 Writing ability sufficient to prepare a brief report and a reflection paper.

## Mathematics non-NAEP Additional KSAs discussed at Group Review

Basic properties of the coordinate plane including graphing sets of points.

Use the Cartesian coordinate system.

Communicate math concepts and solutions in complete sentences.

Communicate mathematically in writing.

Computer familiarity sufficient to do online homework and learn a math computational program.

Ability to work with computers so as to post assignments and do online homework and use mathematical computation software (Maple).

Calculating derivatives.

Differentiate functions.

Given points, determine the equation of a line. Given a point and slope, determine the equation of a line. Given an equation and a point, determine the equation of a line parallel and perpendicular to the given equation.

Reading comprehension sufficient to convert sentences to mathematical expressions.

Ability to work together in small groups.

Use of scientific calculator.

Use good written communication.

Use a statistical or a graphing calculator.

Use of spreadsheets, specifically Excel.

Ability to communicate quantitative concepts and reasoning in written sentences.

Use computer spreadsheet software and statistical packages.

Basic calculator skills.

Ability to use statistical software packages and install software and navigate course website.

Reading comprehension sufficient to analyze data.

Use a computer to navigate the course website, to access the online text, to take online tests, and to enter homework in a specific format.

Facility in use of computers, including loading software, submitting homework, taking quizzes online, and manipulating charts.

## READING

Each group reviewed course packets across the four course titles (English literature, introduction to psychology, U.S. government, and U.S. history). Within each group, the Non-NAEP Additional KSAs were compiled across course titles to address duplication. At Group Review, each group reviewed their list against each of their 28 course packets.

Reading non-NAEP Additional KSAs discussed at Group Review	
Group 1 Non-NAEP Additional KSAs	<p>The student has to have some knowledge of interacting with reading/text in an online environment.</p> <p>The ability of the student to read and process research materials.</p>
Group 2 Non-NAEP Additional KSAs	<p>Electronic literacy: Students are required to access and read some course materials online.</p> <p>Electronic Literacy: Students are required to access some materials online, and to print them for reading and for class discussion.</p> <p>Reading texts aloud: Students are required to read texts aloud in class to engage in the class discussion and interpretation.</p> <p>Electronic literacy: students are required to access and read some materials on a class website.</p> <p>Discern credibility of source.</p> <p>Electronic Literacy: Students are expected to access and read some course texts online, through a class Blackboard site.</p> <p>Read to locate primary source materials, and to distinguish them from secondary source materials.</p> <p>Distinguish between primary and secondary sources.</p> <p>Locate or recall specific information found in electronic documents on a course website. ("Electronic Literacy")</p> <p>Reading Electronic Texts Online. Read and locate textually explicit information through a course website and other websites.</p> <p>Locate or recall specific information through an online, textbook-sponsored website.</p> <p>Applicative Reading: Use reading and analysis of course material to think critically about the world.</p>
Group 3 non-NAEP Additional KSAs	<p>Analyze the levels of meaning in a complex literary text.</p> <p>Critique/evaluate the significance of the historical and cultural context of a text. (Add to NAEP as 3.1.d)</p> <p>Add as 1.1.b: Locate and recall the meaning of unfamiliar words.</p> <p>Understand the historical and social contexts of literary texts.</p> <p>Determine personal (own, unique) analysis of literature based on text evidence.</p> <p>Analyze how the cultural background of an author impacts a literary text.</p> <p>Recognize the historical and philosophical contexts of literary texts.</p> <p>Analyze the historical, religious and social contexts of literary texts.</p> <p>Recognize complexities of the underlying traditions in a literary text (both cultural and literary).</p> <p>Analyze both factual and theoretical information in informational text.</p> <p>Critique/evaluate the arguments in two or more texts on similar topics or themes. Add as 3.1.e.</p> <p>1.3.? Defining and explaining concepts related to text.</p>

## Reading non-NAEP Additional KSAs discussed at Group Review

Understand the table of contents of a text and how it can be an aid to reading (i.e. utilize glossaries, key terms, key ideas or issues that are highlighted, discussion and analysis).

Analyze informational text and come to independent conclusions supported by evidence and logical reasoning.

1.3.? Locate/recall various theoretical models.

Analyze pro and con arguments across or within informational texts.

Analyze varied, complex informational text (difficult vocabulary, unfamiliar time/place).

Determine thesis of an argument within and across informational texts.

Distinguish between primary text sources and secondary text sources. Add as 2.3.f.

1.3.? Identify key persons, places, and events.

Analyze, interpret and connect a variety of complex informational texts (both primary and secondary sources).

2.1.? Describe and use defined methodologies.

Determine the audience for informational text.

Able to come to conclusions about informational text and integrate those conclusions imaginatively (i.e. write a slave autobiography).

Determine patterns and compare and contrast across readings, from different perspectives (i.e. gender, ethnicity, class).

Utilize text features and online links as an aid to reading (i.e. online study center, chronology chart, technology and culture section).

2.3.f Create narratives based on sequence of events.

Use varied strategies to learn new vocabulary (dictionary, context).

1.1.b "identify" textually explicit information and simple inferences.

Apply informational text to personal life.

Apply concepts from informational reading to history and daily experience.

Apply concepts and theory from informational text to personal life.

Apply knowledge from informational text to other issues (i.e. relevant social issues).

Apply informational text to own life.

Apply conclusions/understandings of informational text to "real-world" situations.

### Group 4 Non-NAEP Additional KSAs

Students must be able to main ideas in texts that are potentially informational (students are required to use academic journal articles).

Students must be able to read an average of 125 pages/week.

Identify how themes in the informational and literary sections of the text connect to historical and current events.

Connect and apply themes and ideas in literary texts to central questions and themes in the course.

Apply information from literary texts to contemporary cultures and issues.

Understand the big picture of a text well enough to create an argument; identify what type of evidence would support the argument.

Apply central themes of text to themes not necessarily connected to the text.

Analyze and interpret nontraditional readings such as graphs, charts, etc.

### Reading non-NAEP Additional KSAs discussed at Group Review

Connect themes and main ideas across texts and to current events.

Be adept at reading newspapers.

Apply information from readings to contemporary issues and real life.

Interpret and analyze both primary and secondary academic readings.

Understand how themes and ideas in the readings shape and connect to contemporary issues.

Analyze and interpret visuals as text.

Apply information in text to contemporary issues connected to central themes of the class.

Must be able to read English well.

Comprehend materials well enough to make connections to class lectures.

Understand what lens to use when reading primary source documents.

Be able to find answers to questions without direct guidance from the professor.

Graphic analysis

Because the course covers so much information, students must be able to read, take good notes, and identify information that is most important to track and retain.

Locate information through nontextual sources, such as graphs, charts, etc.

Apply concepts from readings to real life.

Be able to keep up with class readings and retain information prior to class discussion or teacher instruction.

Read and understand nontraditional texts, such as graphs, charts, etc.

Students must know how to access language and terminology used in research papers and methodologies.

Apply information in readings to the self and society.

# APPENDIX O

## Group Review Meeting Agenda

### GROUP REVIEW MEETING AGENDA: WEEKEND I

#### **College Course Content Analysis Study Content Review Group Meeting**

Portland, OR

September 26<sup>th</sup>, 2013 – September 29<sup>th</sup>, 2013

#### **Meeting Objective**

Group Review Meetings consist of four content review teams (two reading and two mathematics). The meeting objective is for each content review team to discuss the independent review knowledge skills and abilities (KSA) codings of 28 course packets with the purpose of identifying a content review team, or group, coding of KSAs for each of the 28 packets.

#### **Schedule Overview**

##### **Thursday, September 26<sup>th</sup>, 2013**

1:00 pm – 3:00 pm Orientation  
3:00 pm – 3:30 pm Break  
3:30 pm – 5:00 pm CRT Group Work Session #1  
5:30 pm – 6:30 pm Staff debrief

##### **Friday, September 27<sup>th</sup>, 2013**

7:45 am – 8:15 am Coffee and Brief Check-in  
8:20 am – 12:00 pm CRT Group Work Session #2  
1:00 pm – 5:00 pm CRT Group Work Session #3  
5:30 pm – 6:30 pm Staff debrief

##### **Saturday, September 28<sup>th</sup>, 2013**

7:45 am – 8:00 am Coffee and Brief Check-in  
8:00 am – 12:00 pm CRT Group Work Session #4  
1:00 pm – 5:00 pm CRT Group Work Session #5  
5:30 pm – 6:30 pm Staff debrief

##### **Sunday, September 29<sup>th</sup>, 2013**

7:45 am – 8:15 am Coffee and Brief Check-in  
8:20 am – 11:00 am CRT Group Work Session #6  
1:00 pm – 5:00 pm CRT Group Work Session #7  
5:30 pm – 6:30 pm Staff debrief

#### **EPIC Project Staff**

Sylvia Gillpatrick, Project Director

Kristine Chadwick, Principal Research Scientist

Liz French, Assistant Research Scientist

Tris O'Shaughnessy, Project Manager

Debbie Wetherald, Event Manager

#### **Observers**

Michelle Blair, Contracting Officer Representative, NAGB

Mary Livingston, Mathematics Expert, NAGB

Charles Peters, Reading Expert, NAGB

#### **Content Review Teams (CRT)**

##### *Mathematics Group 1*

Jerry Marshall, Content Reviewer

Bruce Stephan, Content Reviewer

Susan Wygant, Content Reviewer

Holly Langan, Facilitator

Stacey Anderson, Scribe

##### *Mathematics Group 2*

Tuncay Aktosun, Content Reviewer

David Hartz, Content Reviewer

Kathie Hledik, Content Reviewer

Sara Frain, Facilitator

Michelle Liebhardt, Scribe

##### *Reading Group 2*

Brad Benz, Content Reviewer

Jim Bond, Content Reviewer

Carson Medley, Content Reviewer

Terri Ward, Facilitator

Paul Beach, Scribe

##### *Reading Group 4*

Annie Rose Stathes, Content Reviewer

Dane Spencer, Content Reviewer

PK Weston, Content Reviewer

Tris O'Shaughnessy, Facilitator

Tracey Bousselot, Scribe

## GROUP REVIEW MEETING AGENDA: WEEKEND 2

### College Course Content Analysis Study

#### Content Review Group Meeting

Vancouver, WA

October 3<sup>rd</sup>, 2013 – October 6<sup>th</sup>, 2013

#### Meeting Objective

Group Review Meetings consist of four content review teams (two reading and two mathematics). The meeting objective is for each content review team to discuss the independent review knowledge skills and abilities (KSA) codings of 28 course packets with the purpose of identifying a content review team, or group, coding of KSAs for each of the 28 packets.

#### Schedule Overview

##### Thursday, October 3<sup>rd</sup>, 2013

1:00 pm – 3:00 pm Orientation

3:00 pm – 3:30 pm Break

3:30 pm – 5:00 pm CRT Group Work Session #1

##### Friday, October 4<sup>th</sup>, 2013

8:00 am – 8:30 am Check-in

8:45 am – 12:00 pm CRT Group Work Session #2

1:00 pm – 5:00 pm CRT Group Work Session #3

##### Saturday, October 5<sup>th</sup>, 2013

8:00 am – 12:00 pm CRT Group Work Session #4

1:00 pm – 5:00 pm CRT Group Work Session #5

##### Sunday, October 6<sup>th</sup>, 2013

8:00 am – 12:00 am CRT Group Work Session #6

1:00 pm – 5:00 pm CRT Group Work Session #7

#### EPIC Project Staff

Sylvia Gillpatrick, Project Director

Kristine Chadwick, Principal Research Scientist

Liz French, Assistant Research Scientist

Tris O'Shaughnessy, Project Manager

#### Observers

Michelle Blair, Contracting Officer Representative, NAGB

Jeremy Kilpatrick, Math Expert, NAGB

Jan Dole Reading Expert, NAGB

#### Content Review Teams (CRT)

##### Mathematics Group 3

Gerry Reynolds, Content Reviewer

Douglas Mallenby, Content Reviewer

Thomas Smotzer, Content Reviewer

Holly Langan, Facilitator

Stacey Anderson, Scribe

##### Mathematics Group 2

Cindy Parker, Content Reviewer

Phillip Miller, Content Reviewer

Michel Malleby, Content Reviewer

Colin Starr, Facilitator

Michelle Liebhardt, Scribe

##### Reading Group 1

Betty Brown, Content Reviewer

Valerie Goodwin, Content Reviewer

Priscilla Eng, Content Reviewer

Terri Ward, Facilitator

Paul Beach, Scribe

##### Reading Group 3

Leslie Skelton, Content Reviewer

Lynne Rhodes, Content Reviewer

Richard Schneider, Content Reviewer

### College Course Content Analysis Study

Conducted by EPIC on behalf of the National Assessment Governing Board

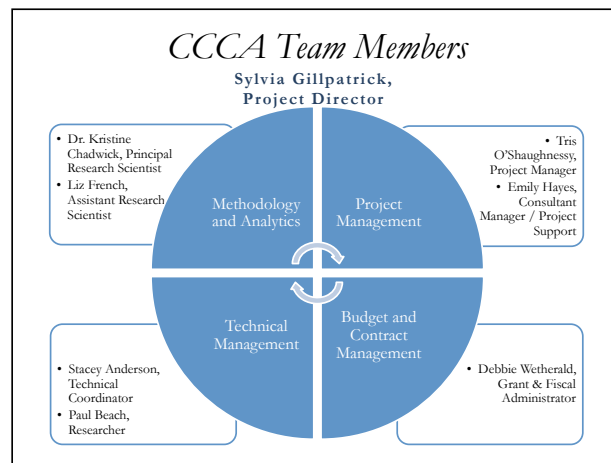
*Group Meeting Orientation*  
*September-October 2013*

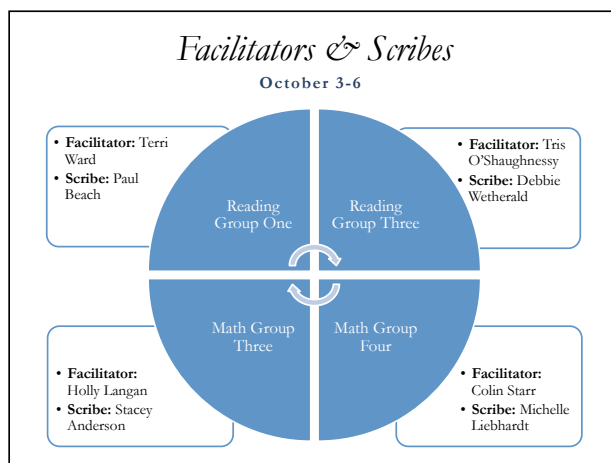
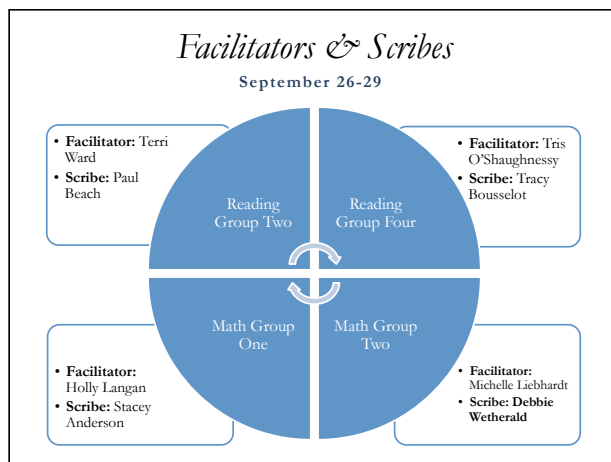


### *Today's Orientation*

- Introductions (15 minutes – Windsor C)
- Overview of Project (15 minutes)
- Orientation to Process & Materials (30 minutes)
- Questions (30 minutes)
- Practice Review Session (30 minutes-Breakout Rooms)
- **Break 3:00 – 3:30pm**
- Debrief and Next Steps (30 minutes-Windsor C)
- Review Session (60 minutes-Breakout Rooms)

## INTRODUCTIONS





## ADMINISTRATIVE DETAILS & LOGISTICS

### *Meeting Schedule*

#### Updated Agenda and Schedule

Days	Times
Thursday	1 – 5 pm
Friday	8 am – 5 pm
Saturday	8 am – 5 pm
Sunday	8 am – 5 pm*

### *General Logistics*

- Per diem covers meals, tips, sundries
  - If we get behind, we may offer to bring lunch into the meeting
  - Keep receipts for transportation, etc.
- Looking for something to do, concierge and hotel staff very helpful
  - If interested, may make trip into Portland Friday or Saturday night
- Begin Friday Morning in Pine Room
  - 7:45am coffee and break service ready, 8am begin work
  - Move to breakout rooms at 9am

## **PROJECT OVERVIEW**

## Impetus for NAEP Preparedness Research

- Improving participation rates
- Increasing the relevance of grade 12 NAEP
- Providing a public service
  - NAEP is the only nationally representative indicator of students as they complete secondary education

## Guiding Definition for Research

A working definition for preparedness was established with some core principles in mind:

- Preparedness is **not intended to represent success** in postsecondary education and training.
- Preparedness in the NAEP context must be **limited to academic qualifications** for postsecondary education and workplace training.

The working definition with respect to college:

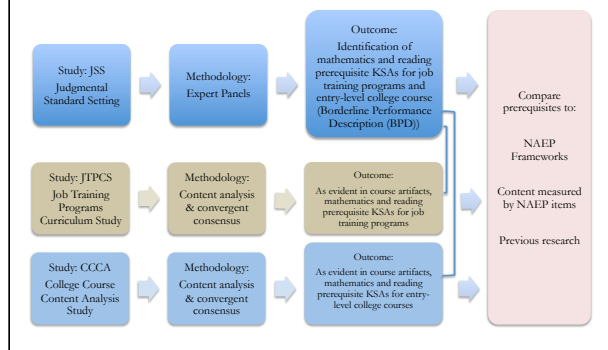
Preparedness for college refers to the reading and mathematics **knowledge and skills necessary to qualify for placement into entry level** college credit courses that meet the general education requirements without the need for remedial coursework in mathematics or reading.

## The Board's Research Program

Types of research includes:

- Content Alignment
- Statistical Relationship
  - To other relevant assessments
  - To postsecondary outcomes
- Judgmental (Criterion-Referenced) Standard Setting
- Survey
- Benchmarking (with reference groups, e.g., job training program entrants)

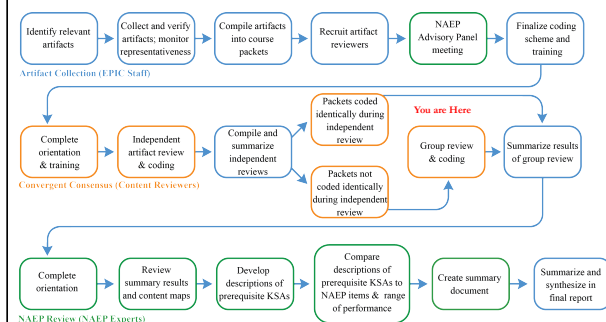
## CCCA Study and JSS Studies



## Research Questions

1. What are the prerequisite knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?
2. How do these prerequisite KSAs compare with the 2009 and 2013 NAEP reading and mathematics frameworks and item pools?
3. How do these prerequisite KSAs compare with previous NAEP preparedness research, i.e., the descriptions of minimal academic preparedness requirements produced in the JSS research?”
4. How can these prerequisites inform future NAEP preparedness research, i.e., planning and analysis efforts relative to the 2013 grade 12 NAEP reading and mathematics assessments?

## CCCA Project Overview



## GROUP REVIEW

### *Group Review Objectives*

- Provide one data point on how well the knowledge, skills, and abilities (KSA) described in the NAEP Framework align with the KSA evident in course materials.
- All three members of the Review Team have coded course packets for *evidence* of mathematics or reading KSAs.
  - Judgment based on *evidence*, not what *should* be in a course
- Review Team will discuss and reach consensus on:
  - Discrepant Applicability and Importance Ratings
  - KSA Exclusions
  - Additional KSA

## *Reviewers*

- Reviewers STRIVE TO REACH CONSENSUS
  - Consensus (noun): An opinion or position reached by a group as a whole.
  - The group has reached consensus when all the responses are neutral or supporting, meaning everyone can **live with it**.
  - In this process consensus does **not** mean “majority rule;” we are looking for a **unanimous** group decision. If the group cannot agree, there is no consensus.
- Reviewers ADHERE TO DECISION RULES
  - Follow the decision rules used in independent review: **NO** new decision rules will be created during this process.
  - Facilitators are familiar with decision rules and will remind the group to adhere to them.
  - Rarely a reviewer's understanding or application of a decision rule will change during group review and we have a plan in place if so.
- Reviewers FOLLOW GROUP NORMS
  - Group members are your *colleagues*, treat one another with professional courtesy
  - Be mindful of who has the floor; if you tend to be a “talker” ensure that others can talk, too. If you tend to keep silent, ensure that you speak up and make yourself heard.
  - Consensus doesn't mean “winning” or “being right” it means you can live with it.
    - Sometimes this means you'll change your mind.
    - Other times you will not be able to “live with it” and your group will not be able to reach consensus.
- Reviewers PROVIDE FEEDBACK THROUGH SURVEYS
  - The focus of this weekend is getting work done. Use the “parking lot” for broader issues.
  - If something occurring in the group prevents you from getting the work done, let your facilitator know.

## *Facilitators*

- Facilitators MAKE THINGS EASIER
  - To facilitate, is to help something (usually a process) move along. The word derives from “facile” which is French for “easy.”
  - Facilitate does not mean “solving a problem” or “doing it for someone.” It means doing something that makes a process run a little better. When a situation is too difficult, a facilitator is there to help.
- Facilitators provide LEADERSHIP
  - A skilled facilitator knows that he/she does not have to agree with or like the group's decision.
  - The role of the facilitator is to ensure that the group is able to make relevant decisions in a way that involves all group members, and makes them feel valued and heard in the process.
- Facilitators help with DECISION MAKING
  - Group Coding: We will be using consensus building to guide discussions and decisions. Encourage all participants to offer their expertise toward a shared outcome (group coding).
  - Guidance: Ensure a smooth transition between each stage of group development and teamwork, leading the team through the decision-making process.

## *Scribes*

- Scribes DOCUMENT
  - To “scribe” means “to write.”
  - Scribes are record keepers, they provide documentation.
- Scribes record DATA
  - The scribe survey standardizes data collected in this meeting, it must be used to record the outcome of every discussion.
  - If the response options in the survey don't fit the situation, record what occurred in your own words using text boxes in survey.
- Scribes help with CONSISTENCY
  - The consensus documentation protocol will provide decision rules for both the content and process facilitators when working through points of discrepancy.
  - Includes how to proceed when consensus cannot be reached.

## *Materials*

- Electronic versions of your annotated packets, used to reference the evidence of the KSA found in each packet
- Workbooks containing the results of independent review for each group containing:
  - Bar charts of the applicability/importance ratings for each KSA
  - KSA exclusions for each KSA
  - Additional KSA
- Facilitator's master data file for each group to be used if reviewers want to know “who said what.” This contains all of the reviewer responses for each packet including:
  - Applicability/Importance ratings for each KSA
  - KSA exclusions
  - Additional KSA
- Scribes' data collection survey

*For each KSA, the group will answer the following questions:*

1. Was consensus reached for this KSA during independent review?
  - Group will look at their workbooks and determine:
    - Were your independent codings the same for both the coding **and the identified exclusion** (yes/no)?
    - If yes, does the group wish to revisit the KSA in group review?
    - If the independent codings were the same and the group does not wish to revisit, will move to next KSA.
2. Which portions of the KSA were **excluded** by the group, if any?
  - Does the group agree with this KSA exclusion? *i.e.* is there no evidence of that portion of the KSA in this packet?
  - If so, does this exclusion affect your original coding?
  - What portion of the KSA does the group exclude?

### *KSA Exclusions*

Many times, part(s) of a framework objective KSA are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

An exclusion might look like this when organizing structures only need be located, but not recalled, and these structures include comparison/contrast and problem/solution but not enumeration:

*Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.*

And would be recorded like this:

*Recall, enumeration*

If any part of an entire objective statement is prerequisite, while other parts are not, the parts that are not are the KSA Exclusions.

**The group must reach consensus on the KSA exclusions and determine if the exclusion affects their coding.**

## *What are Prerequisites?*

### **Prerequisites:**

- Are not content specific (*not history knowledge but reading skills*)
- Describe what a student needs to know or be able to do when they enter the course in order to engage with the material.
  - A baseline attribute required of a student to perform the tasks in the course.
- Represent knowledge, skills, or abilities that a minimally prepared student is expected or required to possess this to enter into the course.
- May be reviewed in the course, but not taught in depth or for the first time, during the course.

### **Tips for finding evidence of prerequisites:**

- May, and should, include prerequisite knowledge, skills, and abilities that are not in the NAEP objectives. **We want them all, not just those in NAEP.**
- If there is a review section, look at the topics, prefaces, chapter text. **These are very important** to identifying prerequisite KSAs.
- When an entire section or project is devoted to one topic, you may assume the topic is taught in the course and not prerequisite to the course.
- Please do not make decisions based on inferences or assumptions—only on evidence.
  - The one exception is for reading. Some of the reading framework objectives require an inference.
- Decision rules to guide identification or interpretation of NAEP objectives in course artifacts
- Decision rules to guide the identification of prerequisites in course artifacts

## *Can your group reach consensus on the applicability & importance of this KSA in this packet?*

- If the group reaches consensus, help the scribe document:
  - Your group's final rating:
    - » KSA is NOT A PREREQUISITE for this course. There is no evidence that this is a prerequisite (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
    - » KSA is PREREQUISITE for this course. Without this prerequisite, students may struggle in some areas of this course.
    - » KSA is PREREQUISITE for this course and is IMPORTANT. Without this prerequisite, students will not be prepared for this course and will struggle in this course.
  - KSA Exclusions
  - Who in the group, if anyone, changed their mind? Why did Member One/Two/Three change his/her mind?
    1. New shared understanding of the objective
    2. Other group member(s) made convincing argument
    3. Other group member(s) disputed evidence
    4. Evidence not seen before or changed understanding of evidence
    5. Changed understanding of terminology
    6. Technical error with survey tool
    7. **Changed understanding of application of decision rule**
    8. Other:

*Does this new understanding of the application require recoding the previous packets?*

- This question applies if a group member changed his/her mind due to a **“changed understanding of application of decision rule.”**
- In that case, determine if the new application of the decision rule means the group would like to recode packets that have been previously coded during group review.
- If this occurs, determine if this new application of the decision rule is going to apply to this KSA in *all* packets or if it is *packet-specific*. Remember: this is an evidence based process, most decisions are packet-specific.
  - If it is a packet-specific recoding, we will schedule follow-up teleconferences to recode previous packets as a group.
  - If the recoding is not packet specific, we will work with the group to determine how to best proceed.

*Can your group reach consensus on the applicability & importance of this KSA in this packet?*

- If the group cannot reach consensus, help the scribe document *“why?”*
  - Member One was not persuaded by other two
  - Member Two was not persuaded by other two
  - Member Three was not persuaded by other two
  - All three members had different codings and were not persuaded by one another
- Remember: The group has reached consensus when all the responses are neutral or supporting, meaning everyone **can live with it**.
  - In this process consensus does not mean “majority rule,” we are looking for a unanimous group decision. If the group cannot agree on the codings and the KSA exclusion, there is no consensus.

### *Additional KSA*

- For each additional KSA identified for your group, determine if there is evidence in each packet and apply the coding scheme:
  - » KSA is NOT A PREREQUISITE for this course. There is no evidence that this is a prerequisite (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
  - » KSA is PREREQUISITE for this course. Without this prerequisite, students may struggle in some areas of this course.
  - » KSA is PREREQUISITE for this course and is IMPORTANT. Without this prerequisite, students will not be prepared for this course and will struggle in this course.
- No KSA exclusions are necessary, just adapt the additional KSA to remove that portion.
  - Don't spend time wordsmithing the additional KSA: **can you live with it?**

### *Questions?*

### *Practice*

- Break into your groups and introduce yourselves
- Start to code the first packet
  - Math: Cal\_1\_441
  - Reading: Eng\_1\_611
- When finished coding, break time 2:00-2:30pm
- Return at 3:30pm to Windsor C for debrief

### *Debrief*

- Questions about the process?
- Questions about the materials?

### *Next Steps*

- Code one more packet together tonight (finish coding first packet if need be)
- Return in the morning to Windsor C for brief check-in and then move into Breakout Groups to code packets (see Agenda for room assignments)
- Be mindful of the time and the number of discussion points in each packet
  - Each group has different packets and different numbers of discussion points, we have provided the number of discussion points for each packet in your workbooks to help you gauge your timing.
  - We scheduled the packets with the most discussion points earlier in the weekend and the packets with fewer discussion points are placed later in the weekend to accommodate fatigue.
  - The first packets will take you more time to get through as you establish the rhythm of your group.

# APPENDIX P

## Facilitator and Scribe Training

### FACILITATOR AND SCRIBE TRAINING PART I

#### College Course Content Analysis Study

Conducted by EPIC on behalf of the National Assessment Governing Board

*Facilitator and Scribe Training #1: Group Meeting Overview and Materials*  
September 2013



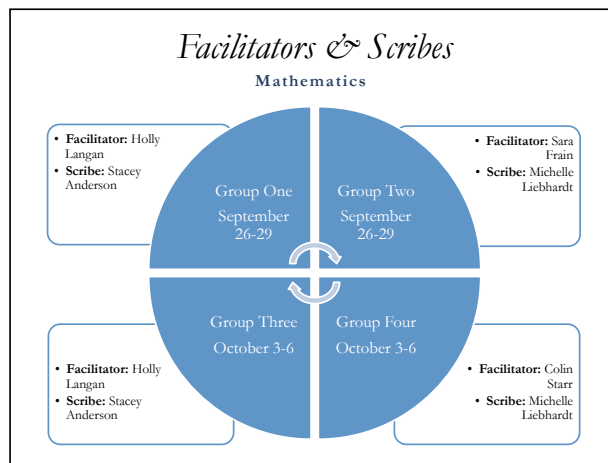
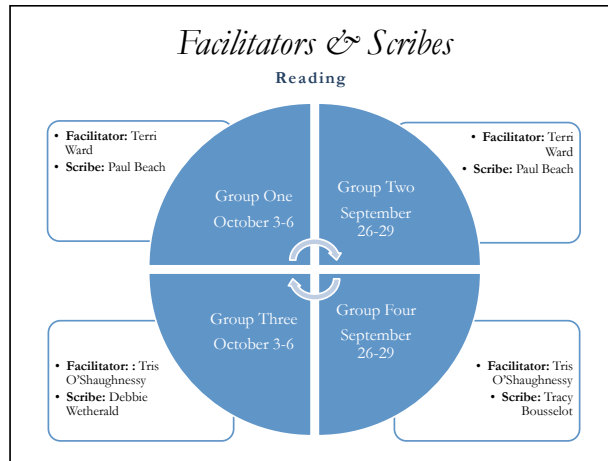
#### *Today's Training*

- Introductions (5 minutes)
- Administrative Details (10 minutes)
- Project Context & Overview (15 minutes)
- Independent Review Materials & Outcomes (30 minutes)
- Group Review and Materials (45 minutes)
- Questions and Next Steps (15 minutes)

ADMINISTRATIVE DETAILS

Meeting Schedule

	September 26-29	October 3-6
Day 1 (Thursday)	12 noon – 6 pm	12 noon – 6 pm
Day 2 (Friday)	7:30 am – 6:30 pm	7:30 am – 6:30 pm
Day 3 (Saturday)	7:30 am – 6:30 pm	7:30 am – 6:30 pm
Day 4 (Sunday)	7:30 am – 6:30 pm	7:30 am – 6:30 pm

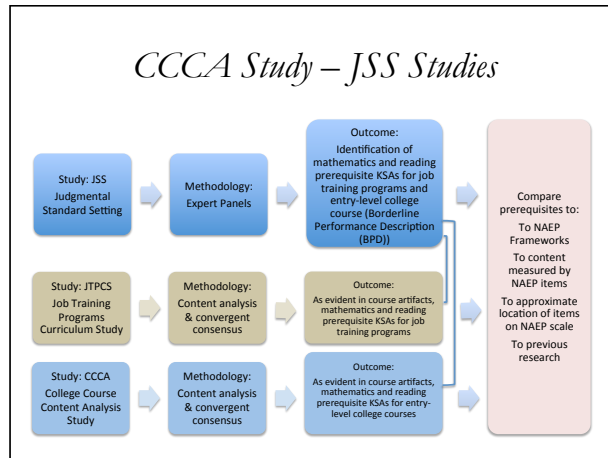


### *Administration*

- Payroll
- Contracts
- Travel

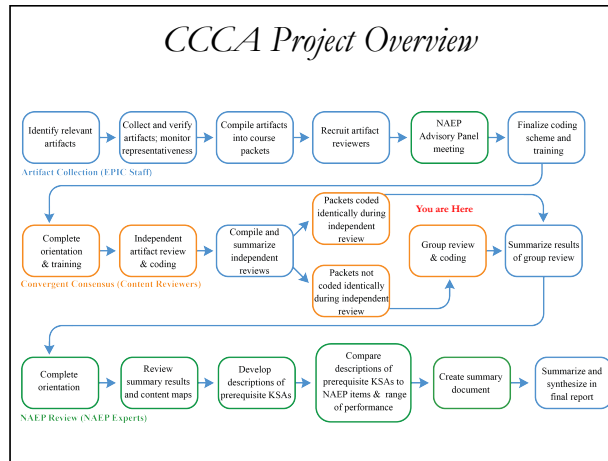
## **PROJECT OVERVIEW**

## *CCCA Study – JSS Studies*



## *Research Questions*

1. What are the prerequisite knowledge, skills, and abilities (hereafter referred to as “prerequisite KSAs”) in reading and mathematics to qualify for entry-level credit-bearing courses that satisfy general education requirements?
2. How do these prerequisite KSAs compare with the 2009 and 2013 NAEP reading and mathematics frameworks and item pools?
3. How do these prerequisite KSAs compare with previous NAEP preparedness research, “i.e., the descriptions of minimal academic preparedness requirements produced in the JSS research?”
4. How can these prerequisites inform future NAEP preparedness research, i.e., planning and analysis efforts relative to the 2013 grade 12 NAEP reading and mathematics assessments?



## INDEPENDENT REVIEW

### *Independent Review*

1. Identify Prerequisite Knowledge Skills and Abilities (KSA) *Holistically*
2. Identify & Code Prerequisite NAEP Framework KSA
3. Identify KSA Exclusions
4. Code Artifact Helpfulness
5. Identify Additional KSA

### *Coding Scheme*

- 1—KSA is NOT A PREREQUISITE for this course. *There is no evidence that this is a prerequisite* (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. *Without this prerequisite, students may struggle in some areas of this course.*
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. *Without this prerequisite, students will not be prepared for this course and will struggle in this course.*

## *What are Prerequisites?*

### **Prerequisites:**

- Are not content specific (*not history knowledge but reading skills*)
- Describe what a student needs to know or be able to do when they enter the course in order to engage with the material.
  - A baseline attribute required of a student to perform the tasks in the course.
- Represent knowledge, skills, or abilities that a minimally prepared student is expected or required to possess this to enter into the course.
- May be reviewed in the course, but not taught in depth or for the first time, during the course.

### **Tips for finding evidence of prerequisites:**

- May, and should, include prerequisite knowledge, skills, and abilities that are not in the NAEP objectives. **We want them all, not just those in NAEP.**
- If there is a review section, look at the topics, prefaces, chapter text. **These are very important** to identifying prerequisite KSAs.
- When an entire section or project is devoted to one topic, you may assume the topic is taught in the course and not prerequisite to the course.
- Please do not make decisions based on inferences or assumptions—only on evidence.
  - The one exception is for reading. Some of the reading framework objectives require an inference.
- Decision rules to guide identification or interpretation of NAEP objectives in course artifacts
- Decision rules to guide the identification of prerequisites in course artifacts

## *What is Evidence?*

Keep in mind that this is an **evidence-based project**, you are looking for evidence of prerequisites. If there is no evidence of a prerequisite, then you cannot identify it as a prerequisite.

### **Evidence:**

- Is more likely found in the beginning of the course than the end of the course (e.g., consider beginning of TOC rather than end of TOC).
  - Give less weight to assessments, readings, or projects occurring later in the course, these are more indicative of what was learned in the course and not what was prerequisite to the course.
- Includes “lofty” goals. Syllabi may describe lofty course objectives. These objectives that seem high when compared to the selection of artifacts included in the packet. Even “lofty” goals falling near the beginning of the course **may be** used as evidence of what KSA are prerequisites.
- *Remember-If it is not in the materials, it is not evident.*
- **Reviewers will bring annotated packets to use as references for evidence of KSA identified through independent review. Reviewers should use these in discussions.**

### *Why Identify Exclusions?*

Many times, part(s) of a framework objective KSA are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

An exclusion might look like this when organizing structures only need be located, but not recalled, and these structures include comparison/contrast and problem/solution but not enumeration:

*Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.*

And would be recorded like this:

*Recall, enumeration*

If any part of an entire objective statement is prerequisite, while other parts are not, **list the parts that do not apply in the text box.**

### *What are Additional KSAs?*

To help us identify non-NAEP KSAs, please identify any that appear to be prerequisite to this course but are not described by the NAEP frameworks.

- We will collect the same information about these as we do for the NAEP objectives
- Examples from holistic review:
  - Math: notation, logic (if/then and if and only if), communication (able to explain and write about mathematics), reading

## *Interpreting NAEP Frameworks*

- Interpret the objective in the context of its standard and domain.
  - More necessary in reading than in mathematics
- If any part of the “domain + standard + objective” is not prerequisite but other parts are, then identify the parts that are not as exclusions.
- If you aren’t sure how to interpret a word in the frameworks:
  - **Look in frameworks document** (glossary (for reading) and in text)
  - Look in the updated reference sheet for guidance
  - Let us know

## *NAEP Frameworks: Reading*

### Structure of NAEP frameworks:

#### **(Learning) Domain Standard Objective**

- Reading follows an embedded structure where each lower level requires the level above as part of its definition.

- There is no limit to the number of exceptions you may identify for a particular Learning Domain/Standard/Objective statement.
- Use exceptions as necessary to reduce a framework statement down to the specific KSAs that are evident in the packet.

### Example

**1. Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension**

1.1. Locate or recall textually explicit information and make simple inferences within and across *both literary and informational texts*

1.1.a Locate or recall specific information such as definitions, facts, and supporting details in text or graphics

## Example-Math Frameworks

Level	Description
1	Number properties and operations
1.1	Number sense
1.1.d	Represent, interpret, or compare expressions for real numbers, including expressions using exponents and logarithms.
1.1.f	Represent or interpret expressions involving very large or very small numbers in scientific notation.
1.1.g	Represent, interpret, or compare expressions or problem situations involving absolute values.
1.1.i	Order or compare real numbers, including very large and very small real numbers.
1.2	Estimation
1.2.b	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.
1.2.c	Verify solutions or determine the reasonableness of results in a variety of situations.
1.2.d	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.
1.3	Number operations
1.3.a	Find integral or simple fractional powers of real numbers.
1.3.b	Perform arithmetic operations with real numbers, including common irrational numbers.
1.3.c	Perform arithmetic operations with expressions involving absolute value.
1.3.d	Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.
1.3.f	Solve application problems involving numbers, including rational and common irrationals.
1.4	Ratios and proportional reasoning
1.4.c	Use proportions to solve problems (including rates of change).
1.4.d	Solve multistep problems involving percentages, including compound percentages.

## Global Decision Rules

### Lists occurring in NAEP Frameworks

- "And" in a list of items means all items in list must be evident.
- "Or" in a list of items means that not all items must be evident.
- Lists containing "such as" are not a closed universe; treat as examples. Don't need exclusions for "such as".

### Artifacts

- Exclude **activities, assignments, or other actions in textbook** unless referenced in syllabus and/or assignments.
- When multiple **optional** assignments are described, review and consider only the **lowest cognitively demanding assignment**. It better represents course prerequisites.
  - If it cannot be determined that multiple assignments are optional, review and code all.

### Identifying prerequisites and defining "evidence"

- Look for the math and reading skills, not content-specific skills. Instructors expect students to be able to have and do the prerequisite math or reading KSAs, only content is taught in the course.
  - College level courses don't tend to teach reading skills or basic mathematics knowledge.
  - e.g., if you can't identify an argument you shouldn't be in the course.
- You may **not** create or apply additional decision rules or include any other materials in your review.
  - Please provide any suggestions to us and we will review all and:
    - Include them in the revised rules to use for independent review.
    - Compile all that arise and provide a final set to use for the group meeting.
- "Lofty" goals can be evidence, even if not substantiated in other packet artifacts.

## Example-Reading Frameworks

Level	Description
1	Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension
1.1	Locate or recall textually explicit information and make simple inferences within and across <i>both literary and informational texts</i>
1.1.a	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics
1.2	Locate or recall textually explicit information and make simple inferences within and across <i>literary texts</i>
1.2.a	Locate or recall character traits
1.2.b	Locate or recall sequence of events or actions
1.2.c	Locate or recall setting
1.2.d	Locate or recall figurative language
1.2.e	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction
1.3	Locate or recall textually explicit information and make simple inferences within and across <i>informational texts</i>
1.3.a	Locate or recall the topic sentence or main idea
1.3.b	Locate or recall the author's purpose
1.3.c	Locate or recall causal relations
1.3.d	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.
2	Integrate/Interpret: Make complex inferences within and across texts
2.1	Integrate/Interpret: Make complex inferences within and across <i>both literary and informational texts</i>
2.1.a	Describe problem and solution, or cause and effect
2.1.b	Compare or connect ideas, perspectives, problems, or situations
2.1.c	Determine unstated assumptions in an argument
2.1.d	Describe or analyze how an author uses literary devices or text features to convey meaning
2.1.e	Describe or analyze how an author uses organizing structures to convey meaning
2.1.f	Describe or analyze author's purpose
2.2	Integrate/Interpret: Make complex inferences within and across texts <i>literary texts</i>
2.2.a	Interpret mood, tone, or voice
2.2.b	Integrate ideas to determine theme
2.2.c	Interpret a character's conflicts, motivations, and decisions
2.2.d	Examine relations between or among theme, setting, plot, or characters
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning

## NAEP Frameworks: Math

Structure of NAEP frameworks:

### (Learning) Domain Standard Objective

- Math follows an organizing structure where each lower level is grouped, but not defined by, the level above.
- There is no limit to the number of exceptions you may identify for a particular Domain/Standard/Objective statement.
- Use exceptions as necessary to reduce a framework statement down to the specific KSAs that are evident in the packet.

### Example

#### 4. Data Analysis, Statistics, and Probability

- 4.1. Data representation
  - 4.1.a. Read or interpret graphical or tabular representations of data

## *Decision Rules for NAEP Framework Math*

*(Examples, see decision rules for comprehensive list)*

- In Calculus: If there is a whole section taught on something, consider that it may be a prerequisite to the course (it could be reviewed content). Don't assume it is new content. Look at density—is this new knowledge or reviewing content students should know?
- One “piece” of evidence is sufficient in textbook to identify a prerequisite as long as it is representative of the course content and not just a KSA embedded within a single problem or example.
- The presence of graphs alone is insufficient evidence of data analysis or statistics prerequisites
- Statistics:
  - If ratio is a prerequisite then so is 1.4.c
  - If percent is a prerequisite then so is 1.4.d
- 5.3.b is prerequisite if students must be able to translate a word problem into an expression or equation.
- 5.3.a is prerequisite when students must be able to go between one representation and another representation.
- 5.4.a is prerequisite if students must be able to solve non-contextual equations.
- 5.4.c is prerequisite if students must be able to complete problem solving of contextualized problems.
- 1.3.b is prerequisite if students must be able to perform operations and decimals with real numbers.
  - If for a subset, include whole (real, real->rational, 1.3.b).
  - If factoring in algebra is prerequisite then so is 1.5.c.

## *Decision Rule on Inference (Math)*

- This is an evidence-centered study and we want you to make as few assumptions and inferences as you possibly can (preferably none). However, *if there are rare cases where you feel an inference or assumption is necessary to accurately record the prerequisite KSA evidence that you find, we expect them to occur only in the Algebra in mathematics.* Because your approach to identifying the prerequisites for each course is evidence-based, we expect that few, if any, inferences or assumptions will need be made.

## Decision Rules for NAEP Framework Reading

(Examples, see decision rules for comprehensive list)

- Objective-specific guidance:
  - Skills will not always be explicit, make inferences as appropriate to identify the prerequisite KSAs.
    - e.g., argument can be a skill necessary for persuasion.
    - 1.3.b. locate or call the authors' purpose ("Author's purpose" is unlikely to be stated explicitly).
      - 2.1.f. is like 1.3.b.
    - 2.1.c. You can't evaluate an argument without looking at/making/understanding unstated assumptions.
    - 2.3.d. distinguishing fact from opinion is implicit.
    - 3.1.a. Can you judge the author's argument without considering the author's technique in informational text?
    - 3.3.a. Evaluating the effectiveness of an argument requires evaluating the language used by the author.
- "Across text" requires "within text."

## Additional Decision Rules-Reading

(Examples, see decision rules for comprehensive list)

### Importance

- Importance is determined by evidence that a KSA is **prerequisite** and is referenced in one place (learning goals or outcomes, assignments or assessments, text sample) in the course packet. If evidence is found in more than one place, then it is an **important prerequisite**.

### Artifacts

- Ignore student work samples that are not accompanied by a scoring rubric and a score
- Exclude activities, assignments, or other actions in textbook unless referenced in syllabus and/or assignments.
- Use text samples to identify prerequisite KSAs when 1) the text is identified as **required reading** (as identified in reading list), or when no reading list is provided. If a reading list is provided and the text sample is not listed, **ignore** the text sample.
- Do not consider visual or auditory text when identifying prerequisites (e.g., don't apply reading KSA to watching movies about fairy tales, only to reading fairy tales). Identify prerequisites for printed text.

### Text types/Definitions

- "Both literary and informational texts"—If partial agreement (evidence of KSA for literary or informational text, but not both), select 1-prerequisite. Make sure to identify which part is not applicable in the KSA exclusion textbox.
- "Organizing structures" can be interpreted as:
  - Referring to organizing structures that are **explicitly identified** in texts, through such indicators as the author's use of enumeration ("first, second, third," etc) or explicit references to a problem and its solution (i.e., "The problem is . . ."), etc.
  - Referring to the organizational structures such as comparison, chronology, cause/effect, description, problem/solution, etc.
  - May also be interpreted as referring to an author's organization of a larger unit of text (i.e., a paragraph or whole passage), **not** to the relationship between two sentences. Referring to the organizational structures such as comparison, chronology, cause/effect, description, problem/solution, etc.
- The terms "literary devices or text features" will be interpreted broadly as including all aspects of author's craft and "text features."
- "Author's purpose" will be interpreted as referring to **explicit** statements of the author's purpose within or across texts.
- "Major ideas" will be interpreted as including important ideas within a paragraph or portion of a text as well as ideas central to a passage as a whole.

### *Decision Rule on Inference (Reading)*

- This is an evidence-centered study and we want you to make as few assumptions and inferences as you possibly can (preferably none). *However, if there are rare cases where you feel an inference or assumption is necessary to accurately record the prerequisite KSA evidence that you find, we expect them to occur only in the most complex domains of Critique/Evaluate in reading.* Because your approach to identifying the prerequisites for each course is evidence-based, we expect that few, if any, inferences or assumptions will need be made.

### **GROUP REVIEW**

### *Group Review Objectives*

- Provide one data point on how well the KSA described in NAEP Framework aligns with the KSA evident in course materials
- All three members of the Review Team have coded course packets for *evidence* of mathematics or reading KSAs.
  - Judgment based on evidence, not what should be in a course
    - Remove subjective coding
- Review Team will discuss and reach consensus on:
  - Discrepant Applicability and Importance Ratings
  - KSA Exclusions
  - Additional KSA

### *Process & Tools*

- Facilitator leads consensus discussion around discrepant ratings
  - Leads discussion on each course packet rating in workbook
  - Ensures that Reviewers adhere to global and content-specific Decision Rules (no new rules will be created in Group Review)
  - Adheres to Facilitation Guidelines
  - Keeps group on schedule and focused on task
- Scribe captures final decisions in FluidSurvey
  - Facilitator has reference Excel spreadsheet with individual reviewers' ratings in case there is a question
- Reviewers
  - Strive to reach consensus
  - Adhere to Decision Rules
  - Follow group norms
  - Provide feedback through surveys
  - Use parking lot for broader issues

## *Facilitators*

- Facilitators MAKE THINGS EASIER
  - To facilitate, is to help something (usually a process) move along. The word derives from "facile" which is French for "easy".
  - Facilitate does not mean "solving a problem" or "doing it for someone." It means doing something that makes a process run a little better. When a situation is too difficult, a facilitator is there to help.
- Facilitators provide LEADERSHIP
  - A skilled facilitator knows that he/she does not have to agree with or like the group's decision.
  - The role of the facilitator is to ensure that the group is able to make relevant decisions in a way that involves all group members, and makes them feel valued and heard in the process.
- Facilitators help with DECISION MAKING
  - Group Coding: We will be using consensus building to guide discussions and decisions. Encourage all participants to offer their expertise toward a shared outcome (group coding).
  - Guidance: Ensure a smooth transition between each stage of group development and teamwork, leading the team through the decision-making process.

## *Scribes*

- Scribes DOCUMENT
  - To "scribe" means "to write."
  - Scribes are record keepers, they provide documentation.
- Scribes record DATA
  - The scribe survey standardizes data collected in this meeting, it must be used to record the outcome of every discussion.
  - If the response options in the survey don't fit the situation, record what occurred in your own words using text boxes in survey.
- Scribes help with CONSISTENCY
  - The consensus documentation protocol will provide decision rules for both the content and process facilitators when working through points of discrepancy.
  - Includes how to proceed when consensus cannot be reached.

## *Materials*

- Print outs or electronic versions of each packet (not annotated)
- Workbooks containing the results of independent review for each group and packet to be distributed to each reviewer electronically and displayed in group review. These workbooks contain:
  - Bar charts of the applicability/importance ratings for each KSA
  - KSA exclusions for each KSA
  - Additional KSA
  - Holistic review KSA
- Facilitator's master data file for each group to be used if reviewers want to know "who said what." This contains all of the reviewer responses for each packet including:
  - Applicability/Importance ratings for each KSA
  - KSA exclusions
  - Additional KSA
- Scribes' data collection survey

## *Packets*

- A set of artifacts from the same course in a single institution.
  - Represent institutions across the United States
  - Meet a set of representativeness characteristics agreed upon with the NAGB – size, location, public/private, 2-yr/4yr
- These course packets provide the evidence for identifying the list of prerequisite KSA.
- A course packet contains only a sample of artifacts from a course.
- The artifacts represent the early part of the course addressing mathematics or reading KSA
- A content reviewer will review 28 course packets for evidence of prerequisite KSAs during the independent reviews and the group review.
  - 20 Operational Packets
  - 8 Validity Packets
- A course packet contains the following artifacts:
  - a syllabus
  - at least one non-textbook based assignment/assessment
  - a textbook excerpt, including a table of contents

### *Workbooks*

- Workbooks containing the results of independent review for each group and packet to be distributed to each reviewer electronically and displayed in group review. These workbooks contain:
  - Bar charts of the applicability/importance ratings for each KSA
  - KSA exclusions for each KSA
  - Additional KSA

### *Facilitators' Master Data File*

- Facilitator's master data file for each group to be used if reviewers want to know "who said what." This contains all of the reviewer responses for each packet including:
  - Applicability/Importance ratings for each KSA
  - KSA exclusions
  - Additional KSA

*Answer Options, continued*

- Who in the group changed their mind?
  - Member One
  - Member Two
  - Member Three
  - None
- Why did Member One/Two/Three change his/her mind?
  - New shared understanding of the objective
  - Other group member(s) made convincing argument
  - Other group member(s) disputed evidence
  - Evidence not seen before or changed understanding of evidence
  - Changed understanding of terminology
  - Technical error with survey tool
  - Changed understanding of application of decision rule
  - Other:

*Answer Options, continued*

- Does this new understanding of the application require recoding the packets?
  - Yes
  - No
- Why wasn't consensus reached in group review?
  - Member One was not persuaded by other two
  - Member Two was not persuaded by other two
  - Member Three was not persuaded by other two
  - All three members had different codings and were not persuaded by one another
  - Other:

### *Scribes' Survey*

- For each KSA, the scribe will answer the following series of questions using Fluid Survey:
  - Was consensus reached for this KSA during independent review?
  - Was consensus reached for this KSA during group review?
  - What was the group's final rating for this KSA?
  - List the portions of the KSA excluded by the group, if any.
  - Who in the group changed their mind?
  - Why did Member One/Two/Three change his/her mind?
  - Does this new understanding of the decision rule application require recoding the packets?
  - Why wasn't consensus reached in group review?
- If a question is non-applicable based upon a previous selection, the question won't appear

### *Answer Options*

- Was consensus reached for this KSA during independent review?
  - Yes
  - No
  - Yes, but group revisited this KSA and changed coding
- Was consensus reached for this KSA during group review?
  - Yes
  - No
- What was the group's final rating for this KSA?
  - KSA is not a PREREQUISITE for this course.
  - KSA is PREREQUISITE for this course.
  - KSA is PREREQUISITE for this course and is IMPORTANT.
  - Final rating not established during group review
- List the portions of the KSA excluded by the group, if any.
  - Open-ended text

## Example

### 1.1.a

(1) Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension; (1.1) Locate or recall textually explicit information and make simple inferences within and across both literary and informational texts.; (1.1.a) **Locate or recall specific information such as definitions, facts, and supporting details in text or graphics.**

- Was consensus reached for this KSA during independent review? ☐ Yes  
☒ No  
☐ Yes, but group revisited this KSA and changed coding
- Was consensus reached for this KSA during group review? ☐ Yes  
☒ No
- What was the group's final rating for this KSA? ☐ KSA is not a PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course.  
☒ KSA is PREREQUISITE for this course and is IMPORTANT.  
☐ Final rating not established during group review.
- List the portions of the KSA excluded by the group, if any.

### Who in the group changed their mind?

- ☒ Member One  
☐ Member Two  
☐ Member Three  
☐ None

### Why did Member One change his/her mind?

- ☐ New shared understanding of the objective  
☐ Other group member(s) made convincing argument  
☐ Other group member(s) disputed evidence  
☐ Evidence not seen before or changed understanding of evidence  
☐ Changed understanding of terminology  
☐ Technical error with survey tool  
☒ Changed understanding of application of decision rule  
☐ Other:

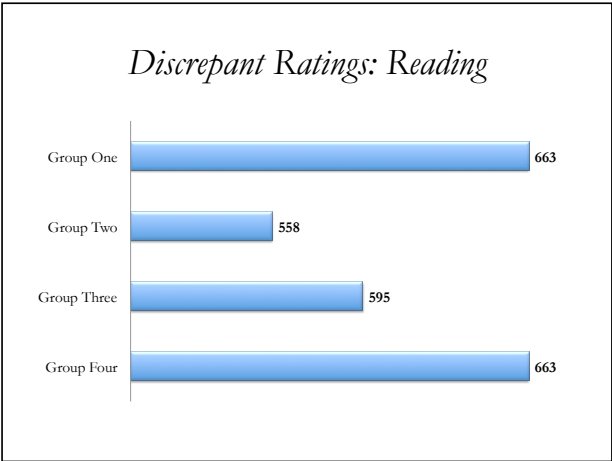
### Does this new understanding of the application require recoding the packets?

- ☐ Yes  
☒ No

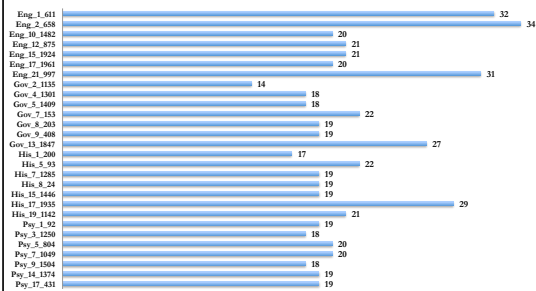
### Why wasn't consensus reached in group review?

- ☐ Member One was not persuaded by other two  
☒ Member Two was not persuaded by other two  
☐ Member Three was not persuaded by other two  
☐ All three members had different codings and were not persuaded by one another  
☐ Other:

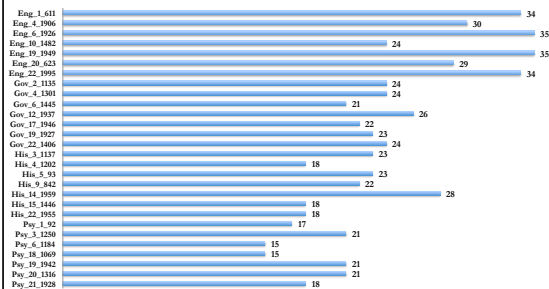
**CONSENSUS OUTLOOK**



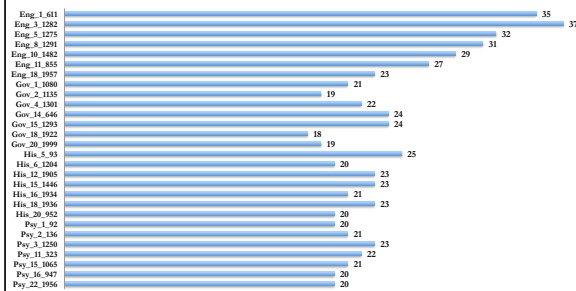
### Reading Group Three: 595 Discrepant Ratings



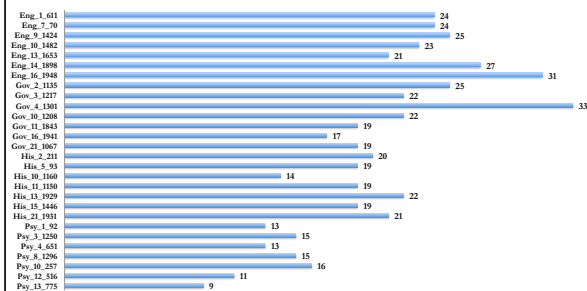
### Reading Group Four: 663 Discrepant Ratings



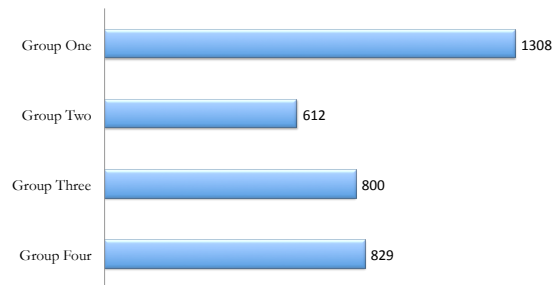
### Reading Group One: 663 Discrepant Ratings



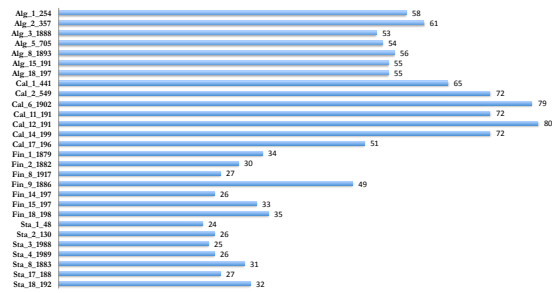
### Reading Group Two: 558 Discrepant Ratings



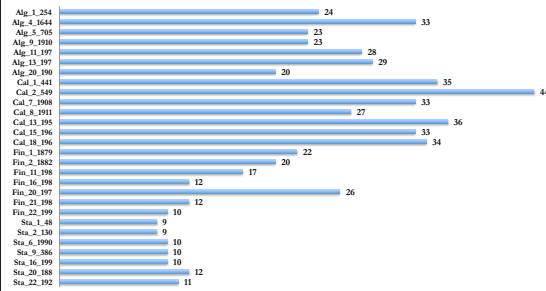
### Discrepant Ratings: Math



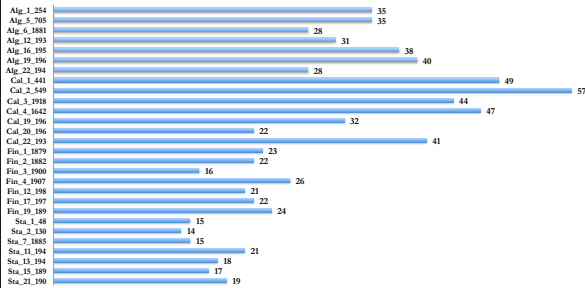
### Math Group One: 1308 Discrepant Ratings



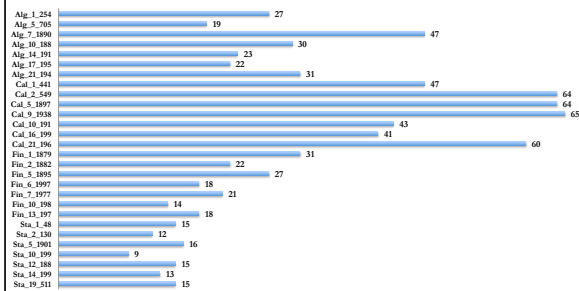
### Math Group Two: 612 Discrepant Ratings



### Math Group Three: 800 Discrepant Ratings



### Math Group Four: 829 Discrepant Ratings



**NEXT STEPS AND  
QUESTIONS**

### *Next Steps*

- Review this PowerPoint and other materials, bring questions to next training
  - Example Group Data Workbook
  - Training Packet
  - Math or Reading NAEP Frameworks
  - Reviewer Reference Sheets
  - Decision Rules
  - Facilitators: Master Data Sheet
  - Scribes: Scribe Survey
- Attend next training
  - Deeper dive into the process
  - Role playing exercise

### *Questions?*

### College Course Content Analysis Study

Conducted by EPIC on behalf of the National Assessment Governing Board

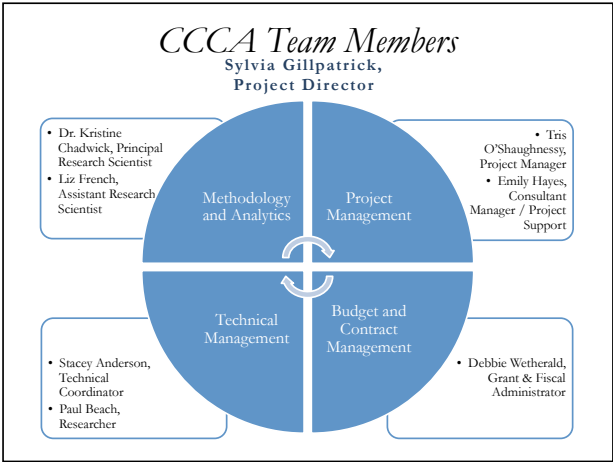
*Facilitator and Scribe Training #2: Group Meeting Overview and Materials*  
*September 2013*

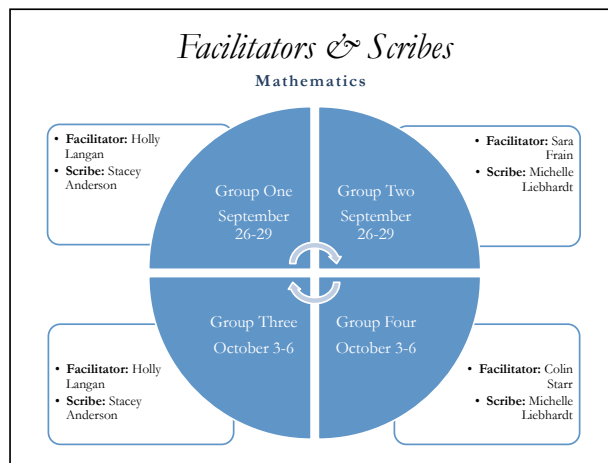
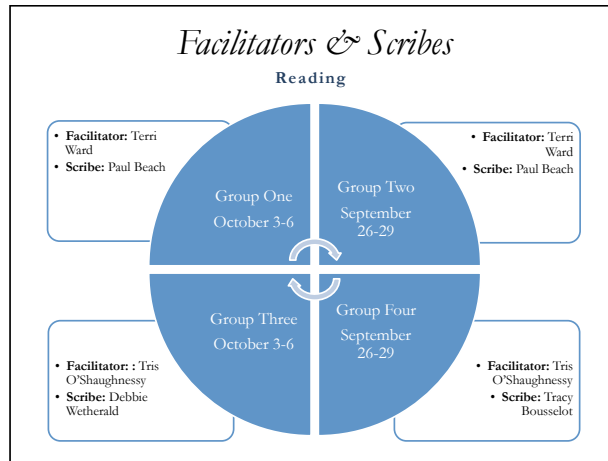


### *Today's Training*

- Introductions (5 minutes)
- Questions and Answers on Materials (15 minutes)
- Review of Process (15 minutes)
- Role Play (45 minutes)
- Questions and Answers on Process (15 minutes)
- Questions and Next Steps (15 minutes)

INTRODUCTIONS





## GROUP REVIEW

### *Group Review Objectives*

- Provide one data point on how well the KSA described in NAEP Framework aligns with the KSA evident in course materials
- All three members of the Review Team have coded course packets for *evidence* of mathematics or reading KSAs.
  - Judgment based on evidence, not what should be in a course
    - Remove subjective coding
- Review Team will discuss and reach consensus on:
  - Discrepant Applicability and Importance Ratings
  - KSA Exclusions
  - Additional KSA

## *Process & Tools*

- Facilitator leads consensus discussion around discrepant ratings
  - Leads discussion on each course packet rating in workbook
  - Ensures that Reviewers adhere to global and content-specific Decision Rules (no new rules will be created in Group Review)
  - Adheres to Facilitation Guidelines
  - Keeps group on schedule and focused on task
- Scribe captures final decisions in FluidSurvey
  - Facilitator has reference Excel spreadsheet with individual reviewers' ratings in case there is a question
- Reviewers
  - Strive to reach consensus
  - Adhere to Decision Rules
  - Follow group norms
  - Provide feedback through surveys
  - Use parking lot for broader issues

## *Materials*

- Electronic versions of each packet (annotated)
- Workbooks containing the results of independent review for each group and packet to be distributed to each reviewer electronically and displayed in group review. These workbooks contain:
  - Bar charts of the applicability/importance ratings for each KSA
  - KSA exclusions for each KSA
  - Additional KSA
  - Holistic review KSA
- Facilitator's master data file for each group to be used if reviewers want to know "who said what." This contains all of the reviewer responses for each packet including:
  - Applicability/Importance ratings for each KSA
  - KSA exclusions
  - Additional KSA
- Scribes' data collection survey

### *Packets*

- A set of artifacts from the same course in a single institution.
  - Represent institutions across the United States
  - Meet a set of representativeness characteristics agreed upon with the NAGB – size, location, public/private, 2-yr/4yr
- These course packets provide the evidence for identifying the list of prerequisite KSA.
- A course packet contains only a sample of artifacts from a course.
- The artifacts represent the early part of the course addressing mathematics or reading KSA
- A content reviewer will review 28 course packets for evidence of prerequisite KSAs during the independent reviews and the group review.
  - 20 Operational Packets
  - 8 Validity Packets
- A course packet contains the following artifacts:
  - a syllabus
  - at least one non-textbook based assignment/assessment
  - a textbook excerpt, including a table of contents

### *Workbooks*

- Workbooks containing the results of independent review for each group and packet to be distributed to each reviewer electronically and displayed in group review. These workbooks contain:
  - Bar charts of the applicability/importance ratings for each KSA
  - KSA exclusions for each KSA
  - Additional KSA

### *Facilitators' Master Data File*

- Facilitator's master data file for each group to be used if reviewers want to know "who said what." This contains all of the reviewer responses for each packet including:
  - Applicability/Importance ratings for each KSA
  - KSA exclusions
  - Additional KSA

### *Scribes' Survey*

- For each KSA, the scribe will answer the following series of questions using Fluid Survey:
  - Was consensus reached for this KSA during independent review?
  - Was consensus reached for this KSA during group review?
  - What was the group's final rating for this KSA?
  - List the portions of the KSA excluded by the group, if any.
  - Who in the group changed their mind?
  - Why did Member One/Two/Three change his/her mind?
  - Does this new understanding of the decision rule application require recoding the packets?
  - Why wasn't consensus reached in group review?
- If a question is non-applicable based upon a previous selection, the question won't appear

## *Questions on Materials?*

## *Facilitators*

- Facilitators MAKE THINGS EASIER
  - To facilitate, is to help something (usually a process) move along. The word derives from "facile" which is French for "easy".
  - Facilitate does not mean "solving a problem" or "doing it for someone." It means doing something that makes a process run a little better. When a situation is too difficult, a facilitator is there to help.
- Facilitators provide LEADERSHIP
  - A skilled facilitator knows that he/she does not have to agree with or like the group's decision.
  - The role of the facilitator is to ensure that the group is able to make relevant decisions in a way that involves all group members, and makes them feel valued and heard in the process.
- Facilitators help with DECISION MAKING
  - Group Coding: We will be using consensus building to guide discussions and decisions. Encourage all participants to offer their expertise toward a shared outcome (group coding).
  - Guidance: Ensure a smooth transition between each stage of group development and teamwork, leading the team through the decision-making process.

## *Scribes*

- Scribes DOCUMENT
  - To “scribe” means “to write.”
  - Scribes are record keepers, they provide documentation.
- Scribes record DATA
  - The scribe survey standardizes data collected in this meeting, it must be used to record the outcome of every discussion.
  - If the response options in the survey don't fit the situation, record what occurred in your own words using text boxes in survey.
- Scribes help with CONSISTENCY
  - The consensus documentation protocol will provide decision rules for both the content and process facilitators when working through points of discrepancy.
  - Includes how to proceed when consensus cannot be reached.

## *Role Play*

### *Questions & Answers on Process?*

### *Coding Scheme*

- 1—KSA is NOT A PREREQUISITE for this course. *There is no evidence that this is a prerequisite* (e.g., there is no evidence of the KSAs described by this objective in the packet or this is a new skill or ability that will be taught in this course.)
- 2—KSA is PREREQUISITE for this course. *Without this prerequisite, students may struggle in some areas of this course.*
- 3—KSA is PREREQUISITE for this course and is IMPORTANT. *Without this prerequisite, students will not be prepared for this course and will struggle in this course.*

1. Is KSA Prerequisite for this course?

*What is “Important”?*

**KSA Prerequisite** - Without this KSA, students may struggle in some areas of this course

**KSA Not Prerequisite** - There is no evidence that this is a prerequisite

**Minimal Academic Preparedness**

2. Is KSA an Important Prerequisite for this course?

**Exceptional Academic Preparedness**

**KSA Prerequisite** - Without this prerequisite, students may struggle in some areas of this course.

**Minimal Academic Preparedness**

**KSA Prerequisite Important** - Without this prerequisite, students will not be prepared for this course and will struggle in this course

## *How to Get Consensus on Exclusions?*

Many times, part(s) of a framework objective KSA are prerequisite to a course, while other parts are not prerequisite. For each framework objective KSA where only part of the objective is prerequisite, please list the parts that are not.

An exclusion might look like this when organizing structures only need be located, but not recalled, and these structures include comparison/contrast and problem/solution but not enumeration:

*Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.*

And would be recorded like this:  
*Recall, enumeration*

If any part of an entire objective statement is prerequisite, while other parts are not, **list the parts that do not apply in the text box.**

### *How to Get Consensus on Additional KSAs?*

To help us identify non-NAEP KSAs, please identify any that appear to be prerequisite to this course but are not described by the NAEP frameworks.

- We will collect the same information about these as we do for the NAEP objectives
- Examples from holistic review:
  - Math: notation, logic (if/then and if and only if), communication (able to explain and write about mathematics), reading

### *What is Inference?*

## *What are Prerequisites?*

### **Prerequisites:**

- Are not content specific (*not history knowledge but reading skills*)
- Describe what a student needs to know or be able to do when they enter the course in order to engage with the material.
  - A baseline attribute required of a student to perform the tasks in the course.
- Represent knowledge, skills, or abilities that a minimally prepared student is expected or required to possess this to enter into the course.
- May be reviewed in the course, but not taught in depth or for the first time, during the course.

### **Tips for finding evidence of prerequisites:**

- May, and should, include prerequisite knowledge, skills, and abilities that are not in the NAEP objectives. **We want them all, not just those in NAEP.**
- If there is a review section, look at the topics, prefaces, chapter text. **These are very important** to identifying prerequisite KSAs.
- When an entire section or project is devoted to one topic, you may assume the topic is taught in the course and not prerequisite to the course.
- Please do not make decisions based on inferences or assumptions—only on evidence.
  - The one exception is for reading. Some of the reading framework objectives require an inference.
- Decision rules to guide identification or interpretation of NAEP objectives in course artifacts
- Decision rules to guide the identification of prerequisites in course artifacts

## *What is Evidence?*

Keep in mind that this is an **evidence-based project**, you are looking for evidence of prerequisites. If there is no evidence of a prerequisite, then you cannot identify it as a prerequisite.

### **Evidence:**

- Is more likely found in the beginning of the course than the end of the course (e.g., consider beginning of TOC rather than end of TOC).
  - Give less weight to assessments, readings, or projects occurring later in the course, these are more indicative of what was learned in the course and not what was prerequisite to the course.
- Includes “lofty” goals. Syllabi may describe lofty course objectives. These objectives that seem high when compared to the selection of artifacts included in the packet. Even “lofty” goals falling near the beginning of the course **may be** used as evidence of what KSA are prerequisites.
- *Remember-If it is not in the materials, it is not evident.*
- **Reviewers will bring annotated packets to use as references for evidence of KSA identified through independent review. Reviewers should use these in discussions.**

### *How to Interpret NAEP Frameworks?*

- Interpret the objective in the context of its standard and domain.
  - More necessary in reading than in mathematics
- If any part of the “domain + standard + objective” is not prerequisite but other parts are, then identify the parts that are not as exclusions.
- If you aren't sure how to interpret a word in the frameworks:
  - **Look in frameworks document** (glossary (for reading) and in text)
  - Look in the updated reference sheet for guidance
  - Let us know

### **NEXT STEPS AND QUESTIONS**

## *Next Steps*

1. Review this PowerPoint and other materials, bring questions to next training
  - On Basecamp:
    - Example Group Data Workbook
    - Training Packet
    - Math or Reading NAEP Frameworks
    - Reviewer Reference Sheets
    - Decision Rules
    - Facilitators: Master Data Sheet
    - Scribes: Scribe Survey on Basecamp or:
      - <http://epic-fluidsurveys.com/s/ccca-math-group-review/offline>
      - <http://epic-fluidsurveys.com/s/ccca-reading-group-review/offline>
2. Attend next training
  - Deeper dive into the process
  - Role playing exercise
3. Attend Group Review Meetings

## *Questions?*

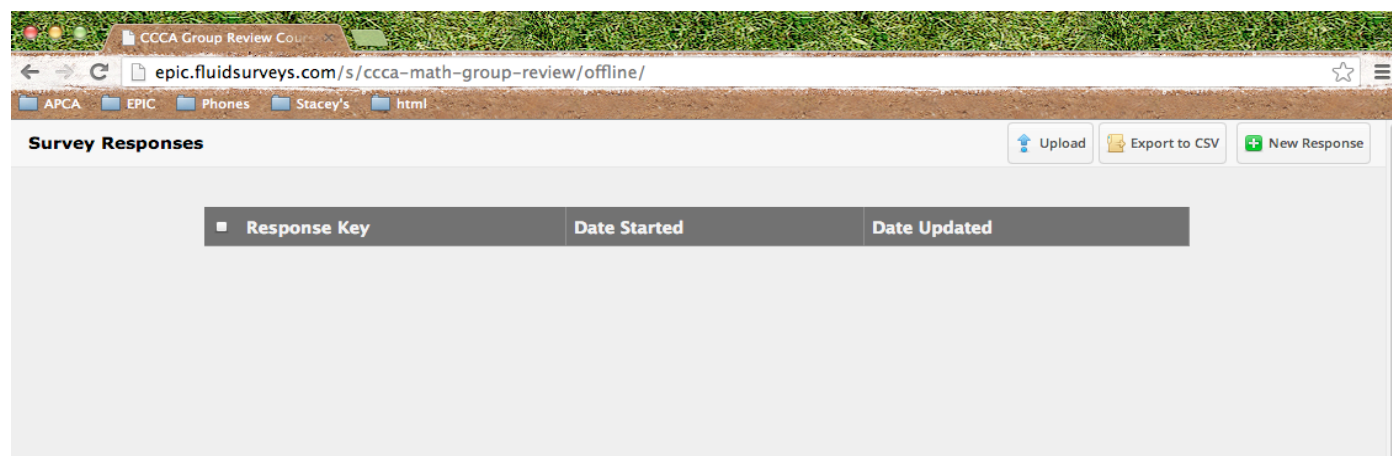
## SCRIBE GUIDANCE SHEET

### Survey breakdown and technical instructions for scribes.

#### *Technical instructions and guidelines.*

1. Open a Firefox or Chrome browser (Firefox preferred).
  - a. Safari is not specifically listed as supported by Fluid Surveys for the offline mode. As always, DO NOT USE Internet Explorer.
  - b. You'll want to be sure to have your browser allow cookies, and save the cookies even if you close your browser.
    - i. In Firefox, go to Firefox > Preferences > Privacy > Under History, set "Firefox will: Use custom settings for history" > Check "Accept cookies from sites," and set "Keep until: they expire"
2. Access the correct survey URL according to content area.
  - a. Math: <http://epic.fluidsveys.com/s/ccca-math-group-review/offline>
  - b. Reading: <http://epic.fluidsveys.com/s/ccca-reading-group-review/offline>

You won't be taken immediately to the survey. Instead, you'll be taken to this page:



1. To start the first survey, click "New Response"
2. Complete the survey according to guidelines provided during the scribe training. Guidelines are provided below the technical instructions.
  - a. The "Back" button returns you to the Offline survey management page.
  - b. You will be able to navigate around in the survey using the management bar across the top of the page (see image below).

and appropriately.

Was consensus reached for this KSA during independent review? ☒ Yes, no discussion required  
☐ Yes, but discussion required  
☐ No

What was the group's final rating for this KSA? ☒ KSA is not a PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course and is IMPORTANT.

**(4.1.e) Compare and contrast different graphical representations of univariate and bivariate data.**

Was consensus reached for this KSA during independent review? ☒ Yes, no discussion required  
☐ Yes, but discussion required  
☐ No

What was the group's final rating for this KSA? ☒ KSA is not a PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course.  
☐ KSA is PREREQUISITE for this course and is IMPORTANT.

- When you complete the survey, you'll be automatically navigated to the first page of a new survey (may take a few moments) where you can start the survey for the next packet.
- Use the "Back" button to navigate back to the offline management page. At that time, you'll see that there is an entry in the "Survey Responses" table. If you click on that survey, you can edit your responses if necessary.
- To complete subsequent surveys from the offline management page, click "New Response" again.

**Survey Responses**

Upload Export to CSV New Response

Response Key	Date Started	Date Updated
<input type="checkbox"/> Ai1v7dir8E	2013 Sep 06, 1:45pm	2013 Sep 06, 2:00pm

- As you progress through the survey, be sure to save frequently and do not close your browser. Either of these things could result in a loss of data.
- At the end of a day or session, return to the offline management page by clicking "Back."
- Click "Export to CSV" (do not lose this file!). Save this file, but leave the file type as csv.
- At the end of each meeting day, all of the scribes will briefly meet to get their responses properly uploaded. At the end of day re-group sessions, you will:

- a. Email the downloaded csv file to Stacey. There is no need to re-save the file as Excel.
- b. Click “Upload.” This will send all of your survey responses from your computer to Fluid Survey. You’ll no longer see or be able to edit the surveys you completed on the offline management page.
  - i. Please work with Stacey to get the proper username and password.
- c. Confirm with Stacey that uploading your responses worked.

**Survey breakdown and decision rules.** Except where specifically noted, a response to the question is required when it appears.

*Question: Please select your group.*

Answer options (only math will appear for math survey, only reading will appear for reading survey):

1. Math Group One
2. Math Group Two
3. Math Group Three
4. Math Group Four
5. Reading Group One
6. Reading Group Two
7. Reading Group Three
8. Reading Group Four

Be sure to select the group correctly. Your answer to this question will impact the Additional KSAs displayed at the end of the survey since each group will only provide a rating for the Additional KSAs identified by the group members during independent review.

*Question: Select the packet ID from the list below.*

Answer options include the name to all of the packets, alphanumerically listed. Due to Fluid Survey limitations, the list includes names of packets that may not have been reviewed by your group. You will confirm your selection below.

*Question: Was consensus reached for this KSA during independent review?*

Answer options:

1. Yes
2. No
3. Yes, but group revisited this KSA and changed coding

This question is required for every KSA. You will only select “Yes” for this question when all of the reviewers provided the same code AND exclusion for the KSA during independent review. Select “No” when there are different selections for the codes and/or exclusion statements. Selecting option 2 and 3 will trigger the same follow-up questions to appear. These follow-up questions are “Was consensus reached for this KSA during group review?” and “Who in the group changed their mind?” The third option will be used very rarely, but may be used when group understanding of decision rules change.

*Question: Was consensus reached for this KSA during group review?*

Answer options:

1. Yes
2. No

This question will only appear if you select “No” or “Yes, but...” to the independent consensus question. You will select “Yes” when the reviewers agree upon the final rating and exclusion for the KSA during group review. Selecting “No” triggers “Why was consensus not reached at group review?” to appear.

For this consensus meeting, all group members are required to agree upon a final rating (a rating that they can “live with”) in order for the answer for this question to be “Yes.” It is the responsibility of the facilitator and reviewers to limit non-consensus outcomes as much as possible.

*Question: What was the group's final rating for this KSA?*

Answer options:

1. KSA is not a PREREQUISITE for this course.
2. KSA is PREREQUISITE for this course.
3. KSA is PREREQUISITE for this course and is IMPORTANT.
4. Final rating not established during group review.

This question is required for every KSA, regardless of any previous answer selections. If you select “No” for the group consensus question, the only appropriate answer to this question is option 4. Selecting options 2 or 3 will allow you to add an exclusion statement for the KSA.

*Question: List the portions of the KSA excluded by the group, if any.*

Answer option: Open-ended text box.

This question appears when you select option 2 or 3 for the group’s final rating. This is the only question that appears that you are allowed to leave blank. If the group decides to mark any portion of the KSA as excluded,

please record the exclusion here. The exclusion statement will come directly from the KSA, so you will be able to copy-and-paste from the KSA text itself.

*Question: Who in the group changed their mind?*

Answer options:

1. Member One
2. Member Two
3. Member Three
4. None

This question appears if you answer “No” or “Yes, but...” to the independent review consensus question. You are allowed to select any or all of the group members. Selecting “None” clears all other selections. The “None” option exists for cases where consensus may not be reached during group review (however, when group consensus is not reached, a group member still may change his/her mind).

It is VERY important to consistently define Member One, Two and Three. These labels are provided for you in the table at the end of this document.

*Question: Why did Member 1 change his/her mind?*

Answer options:

1. New shared understanding of the objective
2. Other group member(s) made convincing argument
3. Other group member(s) disputed evidence
4. Evidence not seen before or changed understanding of evidence
5. Changed understanding of terminology
6. Technical error with survey tool
7. Changed understanding of application of decision rule
8. Other:

This question is displayed if you select Member One to “Who in the group changed their mind?” You can select all applicable reasons. You will select Option 1 when a reviewer has a changed understanding of the content of the KSA statement and its relationship to the evidence in the packet. Use option 2 sparingly. Option 3 is when the group member’s evidence was shown to be non-applicable to the KSA. Select Option 4 when a group member agrees with new evidence identified during the group review. Option 5 is when the reviewer comes to a new or revised understanding of terminology within the packet. Option 6 is available for the case when the reviewer selected the wrong option when they completed independent review. Option 7 is to be used sparingly

and only when the discussion makes the reviewer comes to a new understanding of the decision rule. Option 8 is used when no other options apply.

Some of these reasons may overlap. In these cases, please select all that apply. For example, if a group member's disputed evidence led him or her to a new understanding of the objective, you would select both of those options.

If your response to this question it is not obvious from discussion, it is the responsibility of the scribe to confirm this reason.

If you select option 8, you'll be required to type in the other reason. Selecting option 7 triggers a follow-up question to appear, "Does this new understanding of the application require recoding the packets?"

### *Question: Why did Member 2 change his/her mind?*

Answer options:

1. New shared understanding of the objective
2. Other group member(s) made convincing argument
3. Other group member(s) disputed evidence
4. Evidence not seen before or changed understanding of evidence
5. Changed understanding of terminology
6. Technical error with survey tool
7. Changed understanding of application of decision rule
8. Other:

This question is displayed if you select Member Two to "Who in the group changed their mind?" You can select all applicable reasons. See the definitions under Member One for brief descriptions of when you'll use each option.

If you select option 8, you'll be required to type in the other reason. Selecting option 7 triggers a follow-up question to appear, "Does this new understanding of the application require recoding the packets?" Option 7 will be used very rarely.

### *Question: Why did Member 3 change his/her mind?*

Answer options:

1. New shared understanding of the objective
2. Other group member(s) made convincing argument
3. Other group member(s) disputed evidence

4. Evidence not seen before or changed understanding of evidence
5. Changed understanding of terminology
6. Technical error with survey tool
7. Changed understanding of application of decision rule
8. Other:

This question is displayed if you select Member Three to “Who in the group changed their mind?” You can select all applicable reasons. See the definitions under Member One for brief descriptions of when you’ll use each option.

If you select option 8, you’ll be required to type in the other reason. Selecting option 7 triggers a follow-up question to appear, “Does this new understanding of the application require recoding the packets?”

*Question: Does this new understanding of the application require recoding the packets?*

Answer options:

1. Yes
2. No

This question only appears if you select option 7 for any of the group member questions. If you answer “Yes” to this question, this means the group would like to recode packets that have been previously coded during group review. The strategy we’ll use to recode the packets was reviewed in training and work with your facilitator on time management.

*Question: Why wasn't consensus reached in group review?*

Answer options:

1. Member One was not persuaded by other two
2. Member Two was not persuaded by other two
3. Member Three was not persuaded by other two
4. All three members had different codings and were not persuaded by one another
5. Other:

This question appears when you respond “No” to the group consensus question. You will only be allowed to select one of these options. If you select option 5, you’ll be required to type in clarification. This is the final question associated with each NAEP objective.

*Question: Please provide a rating for this KSA identified by your group during independent review.*

Answer options:

1. KSA is not a PREREQUISITE for this course.
2. KSA is PREREQUISITE for this course.
3. KSA is PREREQUISITE for this course and is IMPORTANT.
4. Final rating not established during group review.

On the Additional KSA page of the survey, you will see a list of additional KSAs identified by your group across all packets. There may be some duplicative KSAs listed here, since only obviously identical KSAs were combined into a single statement. You will only be required to provide a final rating for the KSA, and no additional questions will be triggered from your response here.

*Question: Confirm the packet ID in the space below (e.g. Psy\_5\_804) and click Submit to finalize the group review responses.*

Answer option: Open-ended text box

This is a confirmation of the packet name you before you submit your responses. Please only include the packet name, without the word “Packet” or any file type (e.g., “.pdf”) added. This is the last question of the survey.

When using the Offline mode, you’ll automatically be routed back to the first page of a new survey. Please be patient with this since it may take a few moments to route you to another survey.

### **Tips, tricks, and reminders.**

- Be sure you are using either Firefox or Chrome with cookies enabled and saved (rather than deleted when you close your browser)
- Do not close your browser until you send Stacey your csv file
- Be sure to send Stacey the downloaded csv file at the end of each day
- If you need to go back to a survey you previously completed, you can do so on the Offline Management Page (accessed by clicking the Back button in the upper left-hand of the screen)
- Be consistent, across all packets, coding who is Member One, Two, and Three
- The system will alert you when you miss answering a question when you click Next and will require you to provide a response.

Often scroll to the bottom of the page and click “Save”

# APPENDIX Q

## NAEP Expert Review Agenda

### MATHEMATICS NAEP EXPERT REVIEW MEETING AGENDA

#### College Course Content Analysis Study

##### NAEP Expert Review Meeting

January 3, 2014 – January 5, 2014

Liaison Capitol Hill – 415 New Jersey Avenue, NW, Washington, DC

Phone: 202.638.1616

Website: [www.affinia.com/Liaison](http://www.affinia.com/Liaison)

##### Meeting Objective:

NAEP mathematics content experts will review the outcomes of the content review, evaluate the prerequisite KSAs for mathematics, and conduct a series of comparisons of the prerequisite KSAs to the NAEP framework and other preparedness research.

##### Schedule Overview

##### Friday, January 3<sup>rd</sup>, 2014

7:45 am – 8:00 am Coffee

8:00 am – 12:00 pm Work Session #1

1:00 pm – 5:00 pm Work Session #2

NAEP Review Activities: Review Content Maps & Develop Narrative Descriptions and Make Comparisons

##### Saturday, January 4<sup>th</sup>, 2014

7:45 am – 8:05 am Coffee

8:00 am – 12:00 pm CRT Group Work Session #3

1:00 pm – 5:00 pm CRT Group Work Session #4

NAEP Review Activities: Activities: Make Comparisons

##### Sunday, January 5<sup>th</sup>, 2014

7:45 am – 8:00 am Coffee

8:00 am – 12:00 pm CRT Group Work Session #5

1:00 pm – 5:00 pm CRT Group Work Session #6

NAEP Review Activities: Activities: Draft Report

##### NAEP Math Experts

Linda Wilson, Ph.D.

Mary Lindquist, Ph.D.

Jeremy Kilpatrick, Ph.D.

##### Project Staff

Sylvia Gillpatrick, M.B.A., Project Director, EPIC

Kristine Chadwick, Ph.D., Principal Research Scientist, EPIC

Mary Seburn, Ph.D., Consultant, Quantiful

##### Observers

Michelle Blair, M.P.A., NAGB

## NAEP REVIEW ACTIVITIES

Day	Activity	Steps	Materials	Outcomes
Friday	Review Content Maps & Develop Narrative Descriptions	<ol style="list-style-type: none"> <li>1. Independently review the prerequisite foundational KSAs, the prerequisite KSA exclusions, and additional KSAs.</li> <li>2. Collaboratively review and discuss the prerequisite foundational KSAs, the prerequisite KSA exclusions, and additional KSAs.</li> <li>3. Draft descriptions of the prerequisite KSAs for each course type.</li> </ol>	<ul style="list-style-type: none"> <li>• Content Maps for all course titles</li> </ul>	<ul style="list-style-type: none"> <li>• Narrative Descriptions that synthesize and summarize the prerequisite KSA based on the consensus ratings</li> </ul>
Friday/ Saturday	Make Comparisons	<ol style="list-style-type: none"> <li>4. Evaluate, interpret and compare/contrast the narrative descriptions with the 2009 and 2013 Grade 12 NAEP items to determine the content of the NAEP items that is or is not consistent with the prerequisite KSAs for each course title; and</li> <li>5. Evaluate, interpret and compare/contrast the narrative descriptions with the Borderline Performance Descriptors and determine the commonalities and differences in skill requirements.</li> </ol>	<ul style="list-style-type: none"> <li>• Content Maps</li> <li>• Narrative Descriptions</li> <li>• 2009 &amp; 2013 NAEP Items</li> <li>• Achievement Level Definitions</li> <li>• NAEP Frameworks</li> <li>• Borderline Performance Descriptors</li> </ul>	<ul style="list-style-type: none"> <li>• Comparisons between narrative descriptions and NAEP items and BPDs</li> </ul>
Sunday	Draft Report	<ol style="list-style-type: none"> <li>6. Produce a narrative report on the impact the research findings of this study on the NAEP framework and future item pool development. They will also be asked for their opinions and recommendations for future research that would provide further necessary information regarding how to better measure preparedness for college courses.</li> </ol>	<ul style="list-style-type: none"> <li>• Comparisons</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary Comparison Report</li> </ul>

## READING NAEP EXPERT REVIEW MEETING AGENDA

### College Course Content Analysis Study

#### NAEP Expert Review Meeting

November 15<sup>th</sup>, 2013 – November 17<sup>th</sup>, 2013

Courtyard by Marriott Portland City Center - Sellwood Room

#### Meeting Objective

NAEP reading content experts will review the outcomes of the content review, evaluate the prerequisite KSAs for reading, and conduct a series of comparisons of the prerequisite KSAs to the NAEP framework and other preparedness research.

#### Schedule Overview

##### Friday, November 15<sup>th</sup>, 2013

7:45 am – 8:00 am Coffee

8:00 am – 12:00 pm Work Session #1

1:00 pm – 5:00 pm Work Session #2

NAEP Review Activities: Review Content Maps & Develop Narrative Descriptions and Make Comparisons

##### Saturday, November 16<sup>th</sup>, 2013

7:45 am – 8:05 am Coffee

8:00 am – 12:00 pm CRT Group Work Session #3

1:00 pm – 5:00 pm CRT Group Work Session #4

NAEP Review Activities: Activities: Make Comparisons

5:30 pm Book Release Party at The RiverPlace Hotel

Getting Ready for College, Careers, and the Common Core:

What Every Educator Needs to Know

by Dr. David T. Conley, EPIC

##### Sunday, November 17<sup>th</sup>, 2013

7:45 am – 8:00 am Coffee

8:00 am – 12:00 pm CRT Group Work Session #5

1:00 pm – 5:00 pm CRT Group Work Session #6

NAEP Review Activities: Activities: Draft Report

#### NAEP Reading Experts

Jan Dole, Ph.D.

Mary Beth Curtis, Ph.D.

Charles Peters, Ph.D.

#### Project Staff

Sylvia Gillpatrick, M.B.A., Project Director, EPIC

Liz French, J.D., M.A., Assistant Research Scientist, EPIC

Kristine Chadwick, Ph.D., Principal Research Scientist, EPIC

Mary Seburn, Ph.D., Consultant, EPIC

#### Observers

Sharyn Rosenburg, Ph.D., Assistant Director for Psychometrics, NAGB

## NAEP REVIEW ACTIVITIES

Day	Activity	Steps	Materials	Outcomes
Friday	Review Content Maps & Develop Narrative Descriptions	<ol style="list-style-type: none"> <li>1. Independently review the prerequisite foundational KSAs, the prerequisite KSA exclusions, and additional KSAs.</li> <li>2. Collaboratively review and discuss the prerequisite foundational KSAs, the prerequisite KSA exclusions, and additional KSAs.</li> <li>3. Draft descriptions of the prerequisite KSAs for each course type.</li> </ol>	<ul style="list-style-type: none"> <li>• Content Maps for all course titles</li> </ul>	<ul style="list-style-type: none"> <li>• Narrative Descriptions that synthesize and summarize the prerequisite KSA based on the consensus ratings</li> </ul>
Friday/ Saturday	Make Comparisons	<ol style="list-style-type: none"> <li>4. Evaluate, interpret and compare/contrast the narrative descriptions with the 2009 and 2013 Grade 12 NAEP items to determine the content of the NAEP items that is or is not consistent with the prerequisite KSAs for each course title; and</li> <li>5. Evaluate, interpret and compare/contrast the narrative descriptions with the Borderline Performance Descriptors and determine the commonalities and differences in skill requirements.</li> </ol>	<ul style="list-style-type: none"> <li>• Content Maps</li> <li>• Narrative Descriptions</li> <li>• 2009 &amp; 2013 NAEP Items</li> <li>• Achievement Level Definitions</li> <li>• NAEP Frameworks</li> <li>• Borderline Performance Descriptors</li> </ul>	<ul style="list-style-type: none"> <li>• Comparisons between narrative descriptions and NAEP items and BPDs</li> </ul>
Sunday	Draft Report	<ol style="list-style-type: none"> <li>6. Produce a narrative report on the impact the research findings of this study on the NAEP framework and future item pool development. They will also be asked for their opinions and recommendations for future research that would provide further necessary information regarding how to better measure preparedness for college courses.</li> </ol>	<ul style="list-style-type: none"> <li>• Comparisons</li> </ul>	<ul style="list-style-type: none"> <li>• Preliminary Comparison Report</li> </ul>

# APPENDIX R

## Content Maps

### APPENDIX R.I. PRECALCULUS/CALCULUS CONTENT MAP

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
<b>1</b>	<b>Number properties and operations</b>				
<b>1.1</b>	Number sense				
<b>1.1.d</b>	Represent, interpret, or compare expressions for real numbers, including expressions using <del>exponents and logarithms.</del>	1, 6	0%	100%	0%
<b>1.1.f</b>	Represent or interpret expressions involving very large or very small numbers in scientific notation.	0	100%	0%	0%
<b>1.1.g</b>	Represent, interpret, or compare expressions or problem situations involving absolute values.	0	37%	63%	0%
<b>1.1.i</b>	Order or compare real numbers, <del>including very large and very small real numbers.</del>	4	21%	79%	0%
<b>1.2</b>	Estimation				
<b>1.2.b</b>	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.	0	100%	0%	0%
<b>1.2.c</b>	Verify solutions or determine the reasonableness of results in a variety of situations.	0	79%	21%	0%
<b>1.2.d</b>	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.	0	100%	0%	0%
<b>1.3</b>	Number operations				
<b>1.3.a</b>	Find integral or simple fractional powers of real numbers.	0	0%	95%	5%
<b>1.3.b</b>	Perform arithmetic operations with real numbers, <del>including common irrational numbers.</del>	2	0%	100%	0%
<b>1.3.c</b>	Perform arithmetic operations with expressions involving absolute value.	0	32%	63%	5%
<b>1.3.d</b>	Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.	0	74%	26%	0%
<b>1.3.f</b>	Solve application problems involving numbers, including rational <del>and common irrationals.</del>	3	5%	89%	5%
<b>1.4</b>	Ratios and proportional reasoning				
<b>1.4.c</b>	Use proportions to solve problems (including rates of change).	0	68%	26%	5%
<b>1.4.d</b>	Solve multistep problems involving percentages, including compound percentages.	0	74%	26%	0%
<b>1.5</b>	Properties of number and operations				
<b>1.5.c</b>	Solve problems using factors, multiples, <del>or prime factorization.</del>	1	11%	89%	0%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
1.5.d	Use divisibility or remainders in problem settings.	0	84%	16%	0%
1.5.e	Apply basic properties of operations, including conventions about the order of operations.	0	0%	95%	5%
1.5.f	Recognize properties of the number system (whole numbers, integers, rational numbers, real numbers, and <del>complex numbers</del> ) and how they are related to each other, and identify examples of each type of number.	7, 1	53%	42%	5%
1.6	Mathematical reasoning using number				
1.6.a	Give a mathematical argument to establish the validity of a simple numerical property or relationship.	0	89%	11%	0%
1.6.b	* Analyze or interpret a proof by mathematical induction of a simple numerical relationship.	0	100%	0%	0%
2	Measurement				
2.1	Measuring physical attributes				
2.1.b	Determine the effect of proportions and scaling on length, area, and volume.	0	100%	0%	0%
2.1.c	Estimate or compare perimeters or areas of two-dimensional geometric figures.	0	100%	0%	0%
2.1.d	Solve problems of angle measure, including those involving triangles or other polygons or parallel lines cut by a transversal.	0	95%	5%	0%
2.1.f	Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures.	0	68%	32%	0%
2.1.h	Solve problems by determining, estimating, or comparing volumes or surface areas of three-dimensional figures.	0	74%	26%	0%
2.1.i	Solve problems involving rates such as speed, density, population density, or flow rates.	0	79%	21%	0%
2.2	Systems of measurement				
2.2.a	Recognize that geometric measurements (length, area, perimeter, and volume) depend on the choice of a unit, and apply such units in expressions, equations, and problem solutions.	0	100%	0%	0%
2.2.b	Solve problems involving conversions within or between measurement systems, given the relationship between the units.	0	100%	0%	0%
2.2.d	Understand that numerical values associated with measurements of physical quantities are approximate, are subject to variation, and must be assigned units of measurement.	0	100%	0%	0%
2.2.e	Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of measurement of the dimensions to obtain a specified accuracy of area) and find the measure to that degree of accuracy.	0	100%	0%	0%
2.2.f	Construct or solve problems involving scale drawings.	0	100%	0%	0%
2.3	Measurement in triangles				
2.3.a	Solve problems involving indirect measurement.	0	84%	11%	5%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
2.3.b	Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) stay constant in similar triangles.	0	74%	16%	11%
2.3.c	Use the definitions of sine, cosine, and tangent as ratios of sides in a right triangle to solve problems about length of sides and measure of angles.	0	58%	32%	11%
2.3.d	Interpret and use the identity $\sin^2 q + \cos^2 q = 1$ for angles $q$ between $0^\circ$ and $90^\circ$ ; recognize this identity as a special representation of the Pythagorean theorem.	0	74%	26%	0%
2.3.e	* Determine the radian measure of an angle <del>and explain how radian measurement is related to a circle of radius 1.</del>	1	68%	26%	5%
2.3.f	* Use trigonometric formulas such as addition and double angle formulas.	0	63%	37%	0%
2.3.g	* Use the law of cosines and the law of sines to find unknown sides and angles of a triangle.	0	79%	21%	0%
3	Geometry				
3.1	Dimension and shape				
3.1.c	Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space.	0	100%	0%	0%
3.1.d	Draw or sketch from a written description plane figures and planar images of three-dimensional figures.	0	100%	0%	0%
3.1.e	Use two-dimensional representations of three-dimensional objects to visualize and solve problems.	0	84%	16%	0%
3.1.f	Analyze properties of three-dimensional figures including spheres and hemispheres.	0	100%	0%	0%
3.2	Transformation of shapes and preservation of properties				
3.2.a	Recognize or identify types of symmetries (e.g., point, line, rotational, self-congruence) of two- <del>and three</del> -dimensional figures.	1	95%	5%	0%
3.2.b	Give or recognize the precise mathematical relationship (e.g., congruence, similarity, orientation) between a figure and its image under a transformation.	0	100%	0%	0%
3.2.c	Perform or describe the effect of a single transformation on two- and three-dimensional geometric shapes (reflections across lines of symmetry, rotations, translations, and dilations).	0	100%	0%	0%
3.2.d	Identify transformations, combinations, or subdivisions of shapes that preserve the area of two-dimensional figures or the volume of three-dimensional figures.	0	100%	0%	0%
3.2.e	Justify relationships of congruence and similarity and apply these relationships using scaling and proportional reasoning.	0	100%	0%	0%
3.2.g	Perform or describe the effects of successive transformations.	0	95%	5%	0%
3.3	Relationships between geometric figures				
3.3.b	Apply geometric properties and relationships to solve problems in two and three dimensions.	0	89%	11%	0%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
3.3.c	Represent problem situations with geometric models to solve mathematical or real-world problems.	0	79%	21%	0%
3.3.d	Use the Pythagorean theorem to solve problems in two- or three-dimensional situations.	0	74%	26%	0%
3.3.e	Recall and interpret definitions and basic properties of <del>congruent and similar triangles</del> , circles, <del>quadrilaterals, polygons</del> , parallel, perpendicular <del>and intersecting lines</del> , and <del>associated angle relationships</del> .	1	95%	5%	0%
3.3.f	Analyze properties or relationships of triangles, quadrilaterals, and other polygonal plane figures.	0	100%	0%	0%
3.3.g	Analyze properties and relationships of parallel, perpendicular, or intersecting lines including the <del>angle relationships</del> that arise in these cases.	1	95%	5%	0%
3.3.h	Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, and chords).	0	100%	0%	0%
3.4	Position, direction, and coordinate geometry				
3.4.a	Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines.	0	58%	42%	0%
3.4.b	Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space.	0	100%	0%	0%
3.4.c	Describe or identify conic sections and other cross sections of solids.	0	79%	21%	0%
3.4.d	Represent two-dimensional figures algebraically using coordinates and/or equations.	0	79%	21%	0%
3.4.e	* Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically.	0	100%	0%	0%
3.4.f	Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.	0	79%	21%	0%
3.4.g	* Graph ellipses <del>and hyperbolas</del> whose axes are parallel to the coordinate axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.	1	89%	11%	0%
3.4.h	* Represent situations and solve problems involving polar coordinates.	0	100%	0%	0%
3.5	Mathematical reasoning in geometry				
3.5.a	Make, test, and validate geometric conjectures using a variety of methods including deductive reasoning and counterexamples.	0	100%	0%	0%
3.5.b	Determine the role of hypotheses, logical implications, and conclusion in proofs of geometric theorems.	0	100%	0%	0%
3.5.c	Analyze or explain a geometric argument by contradiction.	0	100%	0%	0%
3.5.d	Analyze or explain a geometric proof of the Pythagorean theorem.	0	100%	0%	0%
3.5.e	Prove basic theorems about congruent and similar triangles and circles.	0	100%	0%	0%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
4	Data analysis, statistics, and probability				
4.1	Data representation				
4.1.a	Read or interpret graphical or tabular representations of data.	0	42%	58%	0%
4.1.b	For a given set of data, complete a graph and solve a problem using the data in the graph ( <del>histograms</del> , scatterplots, and line graphs).	3	79%	21%	0%
4.1.c	Solve problems involving univariate or bivariate data.	0	100%	0%	0%
4.1.d	Given a graphical or tabular representation of a set of data, determine whether information is represented effectively and appropriately.	0	100%	0%	0%
4.1.e	Compare and contrast different graphical representations of univariate and bivariate data.	0	100%	0%	0%
4.1.f	Organize and display data in a spreadsheet in order to recognize patterns and solve problems.	0	100%	0%	0%
4.2	Characteristics of data sets				
4.2.a	Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, and standard deviation).	0	100%	0%	0%
4.2.b	Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.	0	100%	0%	0%
4.2.c	Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation.	0	100%	0%	0%
4.2.d	Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.	0	100%	0%	0%
4.2.e	Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line and use the line or equation to make predictions.	0	95%	5%	0%
4.2.f	Recognize that the correlation coefficient is a number from -1 to +1 that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.	0	100%	0%	0%
4.2.g	Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).	0	100%	0%	0%
4.3	Experiments and samples			0%	
4.3.a	Identify possible sources of bias in sample surveys and describe how such bias can be controlled and reduced.	0	100%	0%	0%
4.3.b	Recognize and describe a method to select a simple random sample.	0	100%	0%	0%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
4.3.c	* Draw inferences from samples, such as estimates of proportions in a population, estimates of population means, or decisions about differences in means for two "treatments."	0	100%	0%	0%
4.3.d	Identify or evaluate the characteristics of a good survey or of a well-designed experiment.	0	100%	0%	0%
4.3.e	* Recognize the differences in design and in conclusions between randomized experiments and observational studies.	0	100%	0%	0%
4.4	Probability			0%	
4.4.a	Recognize whether two events are independent or dependent.	0	100%	0%	0%
4.4.b	Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.c	Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.d	Use theoretical probability to evaluate or predict experimental outcomes.	0	100%	0%	0%
4.4.e	Determine the number of ways an event can occur using tree diagrams, formulas for combinations and permutations, or other counting techniques.	0	95%	0%	5%
4.4.h	Determine the probability of independent and dependent events.	0	100%	0%	0%
4.4.i	Determine conditional probability using two-way tables.	0	100%	0%	0%
4.4.j	Interpret and apply probability concepts to practical situations.	0	100%	0%	0%
4.4.k	*Use the binomial theorem to solve problems.	0	100%	0%	0%
4.5	Mathematical reasoning with data			0%	
4.5.a	Identify misleading uses of data in real-world settings and critique different ways of presenting and using information.	0	100%	0%	0%
4.5.b	Distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations.	0	100%	0%	0%
4.5.c	*Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.	0	100%	0%	0%
4.5.d	Recognize when arguments based on data confuse correlation with causation.	0	100%	0%	0%
4.5.e	* Recognize and explain the potential errors caused by extrapolating from data.	0	100%	0%	0%
5	Algebra				
5.1	Patterns, relations, and functions				
5.1.a	Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions.	0	84%	16%	0%
5.1.b	Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.	2	84%	16%	0%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
5.1.e	Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.	0	16%	68%	16%
5.1.g	Determine whether a relation, given in verbal, symbolic, tabular, or graphical form, is a function.	0	47%	42%	11%
5.1.h	Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions.	0	37%	53%	11%
5.1.i	Determine the domain <del>and range</del> of functions given in various forms and contexts.	2	26%	68%	5%
5.1.j	* Given a function, determine its inverse if it exists <del>and explain the contextual meaning of the inverse for a given situation.</del>	2	68%	32%	0%
5.2	Algebraic representations				
5.2.a	<del>Create and</del> translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.	3	11%	89%	0%
5.2.b	Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams (including Venn diagrams), or written descriptions <del>and evaluate the relative advantages or disadvantages of different representations to answer specific questions.</del>	3	79%	21%	0%
5.2.d	Perform or interpret transformations on the graphs of linear, quadratic, exponential, and *trigonometric functions.	0	63%	37%	0%
5.2.e	Make inferences or predictions using an algebraic model of a situation.	0	63%	32%	5%
5.2.f	Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.	0	79%	21%	0%
5.2.g	Solve problems involving exponential growth and decay.	0	74%	26%	0%
5.2.h	* Analyze properties of exponential, logarithmic, and rational functions.	0	79%	21%	0%
5.3	Variables, expressions, and operations				
5.3.b	Write algebraic expressions, equations, or inequalities to represent a situation.	0	32%	68%	0%
5.3.c	Perform basic operations, using appropriate tools, on algebraic expressions including polynomial <del>and rational expressions.</del>	2	11%	89%	0%
5.3.d	Write equivalent forms of algebraic expressions, equations, or inequalities to represent <del>and explain</del> mathematical relationships.	3	37%	63%	0%
5.3.e	Evaluate algebraic expressions including polynomials and rational expressions.	0	11%	89%	0%
5.3.f	Use function notation to evaluate a function at a specified point in its domain and combine functions by addition, subtraction, multiplication, division, <del>and composition.</del>	1	32%	68%	0%
5.3.g	* Determine the sum of finite and infinite arithmetic and geometric series.	0	100%	0%	0%

Precalculus/Calculus					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
5.3.h	Use basic properties of exponents <del>and *logarithms</del> to solve problems.	3	53%	42%	5%
5.4	Equations and inequalities				
5.4.a	Solve linear, rational, or quadratic equations or inequalities, <del>including those involving absolute value.</del>	6	11%	89%	0%
5.4.c	Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.	0	11%	89%	0%
5.4.d	Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.	0	100%	0%	0%
5.4.e	Solve problems involving special formulas such as: $A = P(1 + r)^t$ , $A = Pe^{rt}$ .	0	74%	26%	0%
5.4.f	Solve an equation or formula involving several variables for one variable in terms of the others.	0	74%	26%	0%
5.4.g	Solve quadratic equations with complex roots.	0	100%	0%	0%
5.5	Mathematical reasoning in algebra				
5.5.a	Use algebraic properties to develop a valid mathematical argument.	0	95%	5%	0%
5.5.b	Determine the role of hypotheses, logical implications, and conclusions in algebraic argument.	0	100%	0%	0%
5.5.c	Explain the use of relational conjunctions (and, or) in algebraic arguments.	0	100%	0%	0%

Due to rounding, some row percentages will not sum to 100%

## APPENDIX R2. COLLEGE ALGEBRA CONTENT MAP

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
1	Number properties and operations				
1.1	Number sense				
1.1.d	Represent, interpret, or compare expressions for real numbers, including expressions using exponents and <del>logarithms</del> .	18	10%	90%	0%
1.1.f	Represent or interpret expressions involving very large or very small numbers in scientific notation.	0	35%	65%	0%
1.1.g	Represent, interpret, or compare expressions or problem situations involving absolute values.	0	25%	75%	0%
1.1.i	Order or compare real numbers, <del>including very large and very small real numbers</del> .	5	0%	95%	5%
1.2	Estimation				
1.2.b	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.	0	100%	0%	0%
1.2.c	Verify solutions or determine the reasonableness of results in a variety of situations.	0	85%	15%	0%
1.2.d	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.	0	95%	0%	5%
1.3	Number operations				
1.3.a	Find integral or simple fractional powers of real numbers.	0	10%	90%	0%
1.3.b	Perform arithmetic operations with real numbers, <del>including common irrational numbers</del> .	4	0%	100%	0%
1.3.c	Perform arithmetic operations with expressions involving absolute value.	0	25%	75%	0%
1.3.d	Describe the effect of <del>multiplying and</del> dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.	1	63%	37%	0%
1.3.f	Solve application problems involving numbers, including rational <del>and common irrationals</del> .	2	10%	85%	5%
1.4	Ratios and proportional reasoning				
1.4.c	Use proportions to solve problems <del>(including rates of change)</del> .	1	80%	20%	0%
1.4.d	Solve multistep problems involving percentages, <del>including compound percentages</del> .	1	75%	25%	0%
1.5	Properties of number and operations				
1.5.c	Solve problems using factors, multiples, or prime factorization.	0	10%	85%	5%
1.5.d	Use divisibility or remainders <del>in problem settings</del> .	1	90%	10%	0%
1.5.e	Apply basic properties of operations, including conventions about the order of operations.	0	0%	95%	5%
1.5.f	<del>Recognize properties of the number system</del> (whole numbers, integers, rational numbers, real numbers, <del>and complex numbers</del> ) <del>and how they are related to each other</del> , and identify examples of each type of number.	7, 1	45%	50%	5%

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
1.6	Mathematical reasoning using number				
1.6.a	Give a mathematical argument to establish the validity of a simple numerical property or relationship.	0	90%	0%	10%
1.6.b	* Analyze or interpret a proof by mathematical induction of a simple numerical relationship.	0	100%	0%	0%
2	Measurement				
2.1	Measuring physical attributes				
2.1.b	Determine the effect of proportions and scaling on length, area, and volume.	0	100%	0%	0%
2.1.c	Estimate or compare perimeters or areas of two-dimensional geometric figures.	0	95%	5%	0%
2.1.d	Solve problems of angle measure, including those involving triangles or other polygons or parallel lines cut by a transversal.	0	100%	0%	0%
2.1.f	Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures.	0	60%	35%	5%
2.1.h	Solve problems by determining, estimating, or comparing volumes or surface areas of three-dimensional figures.	0	75%	25%	0%
2.1.i	Solve problems involving rates such as speed, density, population density, or flow rates.	0	80%	20%	0%
2.2	Systems of measurement				
2.2.a	Recognize that geometric measurements (length, area, perimeter, and volume) depend on the choice of a unit, and apply such units in expressions, equations, and problem solutions.	0	100%	0%	0%
2.2.b	Solve problems involving conversions within or between measurement systems, given the relationship between the units.	0	100%	0%	0%
2.2.d	Understand that numerical values associated with measurements of physical quantities are approximate, are subject to variation, and must be assigned units of measurement.	0	100%	0%	0%
2.2.e	Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of measurement of the dimensions to obtain a specified accuracy of area) and find the measure to that degree of accuracy.	0	100%	0%	0%
2.2.f	Construct or solve problems involving scale drawings.	0	100%	0%	0%
2.3	Measurement in triangles				
2.3.a	Solve problems involving indirect measurement.	0	75%	25%	0%
2.3.b	Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) stay constant in similar triangles.	0	100%	0%	0%
2.3.c	Use the definitions of sine, cosine, and tangent as ratios of sides in a right triangle to solve problems about length of sides and measure of angles.	0	100%	0%	0%
2.3.d	Interpret and use the identity $\sin^2 q + \cos^2 q = 1$ for angles $q$ between $0^\circ$ and $90^\circ$ ; recognize this identity as a special representation of the Pythagorean theorem.	0	100%	0%	0%

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre ([#Pre+#Pre- I]/#packets)	NC (#NC/# packets)
2.3.e	* Determine the radian measure of an angle and explain how radian measurement is related to a circle of radius 1.	0	100%	0%	0%
2.3.f	* Use trigonometric formulas such as addition and double angle formulas.	0	100%	0%	0%
2.3.g	* Use the law of cosines and the law of sines to find unknown sides and angles of a triangle.	0	100%	0%	0%
3	Geometry				
3.1	Dimension and shape				
3.1.c	Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space.	0	100%	0%	0%
3.1.d	Draw or sketch from a written description plane figures and planar images of three-dimensional figures.	0	90%	10%	0%
3.1.e	Use two-dimensional representations of three-dimensional objects to visualize and solve problems.	0	80%	20%	0%
3.1.f	Analyze properties of three-dimensional figures including spheres and hemispheres.	0	100%	0%	0%
3.2	Transformation of shapes and preservation of properties				
3.2.a	Recognize or identify types of symmetries (e.g., point, line, rotational, self-congruence) of two- and three-dimensional figures.	0	100%	0%	0%
3.2.b	Give or recognize the precise mathematical relationship (e.g., congruence, similarity, orientation) between a figure and its image under a transformation.	0	100%	0%	0%
3.2.c	Perform or describe the effect of a single transformation on two- and three-dimensional geometric shapes ( <del>reflections</del> across lines of symmetry, <del>rotations</del> , translations, <del>and dilations</del> ).	1	95%	5%	0%
3.2.d	Identify transformations, combinations, or subdivisions of shapes that preserve the area of two-dimensional figures or the volume of three-dimensional figures.	0	95%	5%	0%
3.2.e	Justify relationships of congruence and similarity and apply these relationships using scaling and proportional reasoning.	0	100%	0%	0%
3.2.g	Perform or describe the effects of successive transformations.	0	100%	0%	0%
3.3	Relationships between geometric figures				
3.3.b	Apply geometric properties and relationships to solve problems in two- <del>and three dimensions</del> .	3	80%	20%	0%
3.3.c	Represent problem situations with geometric models to solve mathematical or real-world problems.	0	70%	30%	0%
3.3.d	Use the Pythagorean theorem to solve problems in two- <del>or three-dimensional</del> situations.	1	55%	40%	5%
3.3.e	Recall and interpret definitions and basic properties of congruent and similar triangles, circles, <del>quadrilaterals, polygons, parallel, perpendicular and intersecting lines, and associated angle relationships</del> .	1	95%	5%	0%

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
3.3.f	Analyze properties or relationships of triangles, quadrilaterals, and other polygonal plane figures.	0	100%	0%	0%
3.3.g	Analyze properties and relationships of parallel, perpendicular, or intersecting lines including the angle relationships that arise in these cases.	0	100%	0%	0%
3.3.h	Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, and chords).	0	100%	0%	0%
3.4	Position, direction, and coordinate geometry				
3.4.a	Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines.	0	80%	15%	5%
3.4.b	Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space.	0	95%	5%	0%
3.4.c	Describe or identify conic sections and other cross sections of solids.	0	100%	0%	0%
3.4.d	Represent two-dimensional figures algebraically using coordinates and/or equations.	0	90%	10%	0%
3.4.e	* Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically.	0	100%	0%	0%
3.4.f	Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.	0	95%	5%	0%
3.4.g	* Graph ellipses and hyperbolas whose axes are parallel to the coordinate axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.	0	100%	0%	0%
3.4.h	* Represent situations and solve problems involving polar coordinates.	0	100%	0%	0%
3.5	Mathematical reasoning in geometry				
3.5.a	Make, test, and validate geometric conjectures using a variety of methods including deductive reasoning and counterexamples.	0	100%	0%	0%
3.5.b	Determine the role of hypotheses, logical implications, and conclusion in proofs of geometric theorems.	0	100%	0%	0%
3.5.c	Analyze or explain a geometric argument by contradiction.	0	100%	0%	0%
3.5.d	Analyze or explain a geometric proof of the Pythagorean theorem.	0	100%	0%	0%
3.5.e	Prove basic theorems about congruent and similar triangles and circles.	0	100%	0%	0%
4	Data analysis, statistics, and probability				
4.1	Data representation				
4.1.a	Read or interpret graphical or tabular representations of data.	0	65%	35%	0%
4.1.b	For a given set of data, complete a graph and solve a problem using the data in the graph (histograms, scatterplots, and line graphs).	0	100%	0%	0%
4.1.c	Solve problems involving univariate or bivariate	0	100%	0%	0%

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
	data.				
4.1.d	Given a graphical or tabular representation of a set of data, determine whether information is represented effectively and appropriately.	0	95%	5%	0%
4.1.e	Compare and contrast different graphical representations of univariate and bivariate data.	0	100%	0%	0%
4.1.f	Organize and display data in a spreadsheet in order to recognize patterns and solve problems.	0	100%	0%	0%
4.2	Characteristics of data sets				
4.2.a	Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, and standard deviation).	0	100%	0%	0%
4.2.b	Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.	0	100%	0%	0%
4.2.c	Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation.	0	100%	0%	0%
4.2.d	Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.	0	100%	0%	0%
4.2.e	Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line and use the line or equation to make predictions.	0	100%	0%	0%
4.2.f	Recognize that the correlation coefficient is a number from -1 to +1 that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.	0	100%	0%	0%
4.2.g	Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).	0	100%	0%	0%
4.3	Experiments and samples				
4.3.a	Identify possible sources of bias in sample surveys and describe how such bias can be controlled and reduced.	0	100%	0%	0%
4.3.b	Recognize and describe a method to select a simple random sample.	0	100%	0%	0%
4.3.c	* Draw inferences from samples, such as estimates of proportions in a population, estimates of population means, or decisions about differences in means for two "treatments."	0	100%	0%	0%
4.3.d	Identify or evaluate the characteristics of a good survey or of a well-designed experiment.	0	100%	0%	0%
4.3.e	* Recognize the differences in design and in conclusions between randomized experiments and observational studies.	0	100%	0%	0%
4.4	Probability				

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
4.4.a	Recognize whether two events are independent or dependent.	0	100%	0%	0%
4.4.b	Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.c	Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.d	Use theoretical probability to evaluate or predict experimental outcomes.	0	100%	0%	0%
4.4.e	Determine the number of ways an event can occur using tree diagrams, formulas for combinations and permutations, or other counting techniques.	0	100%	0%	0%
4.4.h	Determine the probability of independent and dependent events.	0	100%	0%	0%
4.4.i	Determine conditional probability using two-way tables.	0	100%	0%	0%
4.4.j	Interpret and apply probability concepts to practical situations.	0	100%	0%	0%
4.4.k	*Use the binomial theorem to solve problems.	0	100%	0%	0%
4.5	Mathematical reasoning with data				
4.5.a	Identify misleading uses of data in real-world settings and critique different ways of presenting and using information.	0	100%	0%	0%
4.5.b	Distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations.	0	100%	0%	0%
4.5.c	*Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.	0	100%	0%	0%
4.5.d	Recognize when arguments based on data confuse correlation with causation.	0	100%	0%	0%
4.5.e	* Recognize and explain the potential errors caused by extrapolating from data.	0	100%	0%	0%
5	Algebra				
5.1	Patterns, relations, and functions				
5.1.a	Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions.	0	100%	0%	0%
5.1.b	Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.	0	100%	0%	0%
5.1.e	Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.	0	70%	30%	0%
5.1.g	Determine whether a relation, given in verbal, symbolic, tabular, or graphical form, is a function.	0	80%	20%	0%
5.1.h	Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions.	0	80%	20%	0%
5.1.i	Determine the domain and range of functions given in various forms and contexts.	2	70%	30%	0%

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre (#Pre+Pre- I)/#packets)	NC (#NC/# packets)
5.1.j	* Given a function, determine its inverse if it exists and explain the contextual meaning of the inverse for a given situation.	0	100%	0%	0%
5.2	Algebraic representations				
5.2.a	<del>Create and</del> translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.	5	20%	70%	10%
5.2.b	Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams (including Venn diagrams), or written descriptions and evaluate the relative advantages or disadvantages of different representations to answer specific questions.	0	95%	0%	5%
5.2.d	Perform or interpret transformations on the graphs of linear, quadratic, <del>exponential, and *trigonometric</del> functions.	1	95%	5%	0%
5.2.e	Make inferences or predictions using an algebraic model of a situation.	0	75%	25%	0%
5.2.f	Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.	0	90%	10%	0%
5.2.g	Solve problems involving exponential growth and decay.	0	100%	0%	0%
5.2.h	* Analyze properties of exponential, logarithmic, and rational functions.	0	100%	0%	0%
5.3	Variables, expressions, and operations				
5.3.b	Write algebraic expressions, equations, or inequalities to represent a situation.	0	20%	75%	5%
5.3.c	Perform basic operations, using appropriate tools, on algebraic expressions including polynomial <del>and rational</del> expressions.	1	10%	90%	0%
5.3.d	Write equivalent forms of algebraic expressions, equations, or inequalities to represent and explain mathematical relationships.	0	60%	30%	10%
5.3.e	Evaluate algebraic expressions including polynomials <del>and rational</del> expressions.	2	10%	90%	0%
5.3.f	Use function notation to evaluate a function at a specified point in its domain and combine functions by addition, subtraction, multiplication, division, and composition.	0	95%	5%	0%
5.3.g	* Determine the sum of finite and infinite arithmetic and geometric series.	0	100%	0%	0%
5.3.h	Use basic properties of exponents <del>and *logarithms</del> to solve problems.	9	25%	70%	5%
5.4	Equations and inequalities				
5.4.a	Solve linear, rational, or quadratic equations or inequalities, including those involving <del>absolute value</del> .	2	25%	75%	0%
5.4.c	Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.	0	50%	50%	0%

College Algebra					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
5.4.d	Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.	0	100%	0%	0%
5.4.e	Solve problems involving special formulas such as: $A = P(1 + r)^t$ , $A = Pe^{rt}$ .	0	85%	10%	5%
5.4.f	Solve an equation or formula involving several variables for one variable in terms of the others.	0	75%	25%	0%
5.4.g	Solve quadratic equations with complex roots.	0	95%	0%	5%
5.5	Mathematical reasoning in algebra				
5.5.a	Use algebraic properties to develop a valid mathematical argument.	0	100%	0%	0%
5.5.b	Determine the role of hypotheses, logical implications, and conclusions in algebraic argument.	0	100%	0%	0%
5.5.c	Explain the use of relational conjunctions (and, or) in algebraic arguments.	0	100%	0%	0%

\* Due to rounding, some row percentages will not sum to 100%

## APPENDIX R3. FINITE MATHEMATICS CONTENT MAP

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ([#Pre+Pre- I]/#packets)	NC (#NC/# packets)
1	Number properties and operations				
1.1	Number sense				
1.1.d	Represent, interpret, or compare expressions for real numbers, <del>including expressions using exponents and logarithms.</del>	11, 18	5%	95%	0%
1.1.f	Represent or interpret expressions involving very large or very small numbers in scientific notation.	0	90%	10%	0%
1.1.g	Represent, interpret, or compare expressions or problem situations involving absolute values.	0	100%	0%	0%
1.1.i	Order or compare real numbers, <del>including very large and very small real numbers.</del>	6	40%	60%	0%
1.2	Estimation				
1.2.b	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.	0	95%	5%	0%
1.2.c	Verify solutions or determine the reasonableness of results in a variety of situations.	0	95%	5%	0%
1.2.d	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.	0	100%	0%	0%
1.3	Number operations				
1.3.a	Find integral or simple fractional powers of real numbers.	0	60%	40%	0%
1.3.b	Perform arithmetic operations with real numbers, <del>including common irrational numbers.</del>	14	0%	90%	10%
1.3.c	Perform arithmetic operations with expressions involving absolute value.	0	100%	0%	0%
1.3.d	Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.	0	90%	10%	0%
1.3.f	Solve application problems involving numbers, including rational <del>and common irrationals.</del>	4	55%	40%	5%
1.4	Ratios and proportional reasoning				
1.4.c	Use proportions to solve problems <del>(including rates of change).</del>	1	80%	20%	0%
1.4.d	Solve multistep problems involving percentages, including compound percentages.	0	85%	15%	0%
1.5	Properties of number and operations				
1.5.c	Solve problems using factors, multiples, or prime factorization.	0	90%	10%	0%
1.5.d	Use divisibility or remainders in problem settings.	0	95%	5%	0%
1.5.e	Apply basic properties of operations, including conventions about the order of operations.	0	10%	85%	5%
1.5.f	<del>Recognize properties of the number system (whole numbers, integers, rational numbers, real numbers, and complex numbers) and how they are related to each other,</del> and identify	1, 4	80%	20%	0%

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
	examples of each type of number.				
1.6	Mathematical reasoning using number				
1.6.a	Give a mathematical argument to establish the validity of a simple numerical property or relationship.	0	100%	0%	0%
1.6.b	* Analyze or interpret a proof by mathematical induction of a simple numerical relationship.	0	100%	0%	0%
2	Measurement				
2.1	Measuring physical attributes				
2.1.b	Determine the effect of proportions and scaling on length, area, and volume.	0	100%	0%	0%
2.1.c	Estimate or compare perimeters or areas of two-dimensional geometric figures.	0	100%	0%	0%
2.1.d	Solve problems of angle measure, including those involving triangles or other polygons or parallel lines cut by a transversal.	0	100%	0%	0%
2.1.f	Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures.	0	100%	0%	0%
2.1.h	Solve problems by determining, estimating, or comparing volumes or surface areas of three-dimensional figures.	0	95%	5%	0%
2.1.i	Solve problems involving rates such as speed, density, population density, or flow rates.	0	100%	0%	0%
2.2	Systems of measurement				
2.2.a	Recognize that geometric measurements (length, area, perimeter, and volume) depend on the choice of a unit, and apply such units in expressions, equations, and problem solutions.	0	100%	0%	0%
2.2.b	Solve problems involving conversions within or between measurement systems, given the relationship between the units.	0	95%	5%	0%
2.2.d	Understand that numerical values associated with measurements of physical quantities <del>are approximate, are subject to variation, and</del> must be assigned units of measurement.	1	95%	5%	0%
2.2.e	Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of measurement of the dimensions to obtain a specified accuracy of area) and find the measure to that degree of accuracy.	0	100%	0%	0%
2.2.f	Construct or solve problems involving scale drawings.	0	100%	0%	0%
2.3	Measurement in triangles				
2.3.a	Solve problems involving indirect measurement.	0	100%	0%	0%
2.3.b	Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) stay constant in similar triangles.	0	100%	0%	0%
2.3.c	Use the definitions of sine, cosine, and tangent as ratios of sides in a right triangle to solve problems about length of sides and measure of angles.	0	100%	0%	0%

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
2.3.d	Interpret and use the identity $\sin^2 q + \cos^2 q = 1$ for angles $q$ between $0^\circ$ and $90^\circ$ ; recognize this identity as a special representation of the Pythagorean theorem.	0	100%	0%	0%
2.3.e	* Determine the radian measure of an angle and explain how radian measurement is related to a circle of radius 1.	0	100%	0%	0%
2.3.f	* Use trigonometric formulas such as addition and double angle formulas.	0	100%	0%	0%
2.3.g	* Use the law of cosines and the law of sines to find unknown sides and angles of a triangle.	0	100%	0%	0%
3	Geometry				
3.1	Dimension and shape				
3.1.c	Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space.	0	100%	0%	0%
3.1.d	Draw or sketch from a written description plane figures and planar images of three-dimensional figures.	0	100%	0%	0%
3.1.e	Use two-dimensional representations of three-dimensional objects to visualize and solve problems.	0	100%	0%	0%
3.1.f	Analyze properties of three-dimensional figures including spheres and hemispheres.	0	100%	0%	0%
3.2	Transformation of shapes and preservation of properties				
3.2.a	Recognize or identify types of symmetries (e.g., point, line, rotational, self-congruence) of two- and three-dimensional figures.	0	100%	0%	0%
3.2.b	Give or recognize the precise mathematical relationship (e.g., congruence, similarity, orientation) between a figure and its image under a transformation.	0	100%	0%	0%
3.2.c	Perform or describe the effect of a single transformation on two- and three-dimensional geometric shapes (reflections across lines of symmetry, rotations, translations, and dilations).	0	100%	0%	0%
3.2.d	Identify transformations, combinations, or subdivisions of shapes that preserve the area of two-dimensional figures or the volume of three-dimensional figures.	0	100%	0%	0%
3.2.e	Justify relationships of congruence and similarity and apply these relationships using scaling and proportional reasoning.	0	100%	0%	0%
3.2.g	Perform or describe the effects of successive transformations.	0	100%	0%	0%
3.3	Relationships between geometric figures				
3.3.b	Apply geometric properties and relationships to solve problems in two and three dimensions.	0	100%	0%	0%
3.3.c	Represent problem situations with geometric models to solve mathematical or real-world problems.	0	95%	5%	0%
3.3.d	Use the Pythagorean theorem to solve problems in two- or three-dimensional situations.	0	90%	10%	0%

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
3.3.e	Recall and interpret definitions and basic properties of congruent and similar triangles, circles, quadrilaterals, polygons, parallel, perpendicular and intersecting lines, and associated angle relationships.	0	100%	0%	0%
3.3.f	Analyze properties or relationships of triangles, quadrilaterals, and other polygonal plane figures.	0	100%	0%	0%
3.3.g	Analyze properties and relationships of parallel, perpendicular, or intersecting lines including the angle relationships that arise in these cases.	0	95%	5%	0%
3.3.h	Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, and chords).	0	100%	0%	0%
3.4	Position, direction, and coordinate geometry				
3.4.a	Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines.	0	90%	10%	0%
3.4.b	Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space.	0	100%	0%	0%
3.4.c	Describe or identify conic sections and other cross sections of solids.	0	100%	0%	0%
3.4.d	Represent two-dimensional figures algebraically using coordinates and/or equations.	0	100%	0%	0%
3.4.e	* Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically.	0	100%	0%	0%
3.4.f	Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.	0	95%	5%	0%
3.4.g	* Graph ellipses and hyperbolas whose axes are parallel to the coordinate axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.	0	100%	0%	0%
3.4.h	* Represent situations and solve problems involving polar coordinates.	0	100%	0%	0%
3.5	Mathematical reasoning in geometry				
3.5.a	Make, test, and validate geometric conjectures using a variety of methods including deductive reasoning and counterexamples.	0	100%	0%	0%
3.5.b	Determine the role of hypotheses, logical implications, and conclusion in proofs of geometric theorems.	0	100%	0%	0%
3.5.c	Analyze or explain a geometric argument by contradiction.	0	100%	0%	0%
3.5.d	Analyze or explain a geometric proof of the Pythagorean theorem.	0	100%	0%	0%
3.5.e	Prove basic theorems about congruent and similar triangles and circles.	0	100%	0%	0%
4	Data analysis, statistics, and probability				
4.1	Data representation				

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
4.1.a	Read or interpret graphical or tabular representations of data.	0	45%	55%	0%
4.1.b	For a given set of data, complete a graph and solve a problem using the data in the graph (histograms, scatterplots, and line graphs).	0	90%	5%	5%
4.1.c	Solve problems involving univariate or bivariate data.	0	100%	0%	0%
4.1.d	Given a graphical or tabular representation of a set of data, determine whether information is represented effectively and appropriately.	0	100%	0%	0%
4.1.e	Compare and contrast different graphical representations of univariate and bivariate data.	0	100%	0%	0%
4.1.f	Organize and display data in a spreadsheet in order to recognize patterns and solve problems.	0	100%	0%	0%
4.2	Characteristics of data sets				
4.2.a	Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, and standard deviation).	0	100%	0%	0%
4.2.b	Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.	0	100%	0%	0%
4.2.c	Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation.	0	100%	0%	0%
4.2.d	Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.	0	100%	0%	0%
4.2.e	Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line and use the line or equation to make predictions.	0	95%	5%	0%
4.2.f	Recognize that the correlation coefficient is a number from -1 to +1 that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.	0	100%	0%	0%
4.2.g	Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).	0	100%	0%	0%
4.3	Experiments and samples				
4.3.a	Identify possible sources of bias in sample surveys and describe how such bias can be controlled and reduced.	0	100%	0%	0%
4.3.b	Recognize and describe a method to select a simple random sample.	0	100%	0%	0%
4.3.c	* Draw inferences from samples, such as estimates of proportions in a population, estimates of population means, or decisions about differences in means for two "treatments."	0	100%	0%	0%

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
4.3.d	Identify or evaluate the characteristics of a good survey or of a well-designed experiment.	0	100%	0%	0%
4.3.e	* Recognize the differences in design and in conclusions between randomized experiments and observational studies.	0	100%	0%	0%
4.4	Probability				
4.4.a	Recognize whether two events are independent or dependent.	0	100%	0%	0%
4.4.b	Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.c	Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.d	Use theoretical probability to evaluate or predict experimental outcomes.	0	100%	0%	0%
4.4.e	Determine the number of ways an event can occur using tree diagrams, formulas for combinations and permutations, or other counting techniques.	0	100%	0%	0%
4.4.h	Determine the probability of independent and dependent events.	0	100%	0%	0%
4.4.i	Determine conditional probability using two-way tables.	0	100%	0%	0%
4.4.j	Interpret and apply probability concepts to practical situations.	0	100%	0%	0%
4.4.k	*Use the binomial theorem to solve problems.	0	100%	0%	0%
4.5	Mathematical reasoning with data				
4.5.a	Identify misleading uses of data in real-world settings and critique different ways of presenting and using information.	0	100%	0%	0%
4.5.b	Distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations.	0	100%	0%	0%
4.5.c	*Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.	0	100%	0%	0%
4.5.d	Recognize when arguments based on data confuse correlation with causation.	0	100%	0%	0%
4.5.e	* Recognize and explain the potential errors caused by extrapolating from data.	0	100%	0%	0%
5	Algebra				
5.1	Patterns, relations, and functions				
5.1.a	Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions.	0	95%	5%	0%
5.1.b	Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.	0	95%	5%	0%
5.1.e	Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.	0	90%	10%	0%
5.1.g	Determine whether a relation, given in verbal, symbolic, tabular, or graphical form, is a	0	95%	5%	0%

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
	function.				
5.1.h	Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions.	0	90%	10%	0%
5.1.i	Determine the domain and range of functions given in various forms and contexts.	0	95%	5%	0%
5.1.j	* Given a function, determine its inverse if it exists and explain the contextual meaning of the inverse for a given situation.	0	100%	0%	0%
5.2	Algebraic representations				
5.2.a	<del>Create and</del> translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.	2	80%	20%	0%
5.2.b	Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams (including Venn diagrams), or written descriptions <del>and evaluate the relative advantages or disadvantages of different representations to answer specific questions.</del>	2	90%	10%	0%
5.2.d	Perform or interpret transformations on the graphs of linear, quadratic, exponential, and *trigonometric functions.	0	100%	0%	0%
5.2.e	Make inferences or predictions using an algebraic model of a situation.	0	80%	20%	0%
5.2.f	Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.	0	100%	0%	0%
5.2.g	Solve problems involving exponential growth and decay.	0	100%	0%	0%
5.2.h	* Analyze properties of exponential, logarithmic, and rational functions.	0	100%	0%	0%
5.3	Variables, expressions, and operations				
5.3.b	Write algebraic expressions, equations, or inequalities to represent a situation.	0	60%	40%	0%
5.3.c	Perform basic operations, using appropriate tools, on algebraic expressions <del>including polynomial and rational expressions.</del>	2	65%	30%	5%
5.3.d	Write equivalent forms of algebraic expressions, equations, or inequalities to represent and explain mathematical relationships.	0	75%	25%	0%
5.3.e	Evaluate algebraic expressions including <del>polynomials and rational expressions.</del>	2, 3	55%	45%	0%
5.3.f	Use function notation to evaluate a function at a specified point in its domain and combine functions by addition, subtraction, <del>multiplication, division, and composition.</del>	2	85%	15%	0%
5.3.g	* Determine the sum of finite and infinite arithmetic and geometric series.	0	100%	0%	0%
5.3.h	Use basic properties of exponents and *logarithms to solve problems.	0	95%	0%	5%
5.4	Equations and inequalities				

Finite Mathematics					
ID	Objective Statement	Exclusions (# statements excluded across packets)	NA (#NA ratings /#packets)	Pre ((#Pre+#Pre- I)/#packets)	NC (#NC/# packets)
5.4.a	Solve linear, rational, or quadratic equations or inequalities, <del>including those involving absolute value.</del>	5	75%	25%	0%
5.4.c	Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.	0	95%	5%	0%
5.4.d	Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.	0	95%	5%	0%
5.4.e	Solve problems involving special formulas such as: $A = P(1 + r)^t$ , $A = Pe^{rt}$ .	0	95%	5%	0%
5.4.f	Solve an equation or formula involving several variables for one variable in terms of the others.	0	90%	10%	0%
5.4.g	Solve quadratic equations with complex roots.	0	100%	0%	0%
5.5	Mathematical reasoning in algebra				
5.5.a	Use algebraic properties to develop a valid mathematical argument.	0	90%	5%	5%
5.5.b	Determine the role of hypotheses, logical implications, and conclusions in algebraic argument.	0	100%	0%	0%
5.5.c	Explain the use of relational conjunctions (and, or) in algebraic arguments.	0	95%	5%	0%

Due to rounding, some row percentages will not sum to 100%

## APPENDIX R4: STATISTICS CONTENT MAP

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App- I]/#packets)	NC (#NC/ #packets)
1	Number properties and operations				
1.1	Number sense				
1.1.d	Represent, interpret, or compare expressions for real numbers, <del>including expressions using exponents and logarithms.</del>	10, 16	5%	85%	10%
1.1.f	Represent or interpret expressions involving very large or very small numbers in scientific notation.	0	95%	5%	0%
1.1.g	Represent, interpret, or compare expressions or problem situations involving absolute values.	0	100%	0%	0%
1.1.i	Order or compare real numbers, <del>including very large and very small real numbers.</del>	7	40%	60%	0%
1.2	Estimation				
1.2.b	Identify situations where estimation is appropriate, determine the needed degree of accuracy, and analyze* the effect of the estimation method on the accuracy of results.	0	100%	0%	0%
1.2.c	Verify solutions or determine the reasonableness of results in a variety of situations.	0	100%	0%	0%
1.2.d	Estimate square or cube roots of numbers less than 1,000 between two whole numbers.	0	100%	0%	0%
1.3	Number operations				
1.3.a	Find integral or simple fractional powers of real numbers.	0	75%	25%	0%
1.3.b	Perform arithmetic operations with real numbers, <del>including common irrational numbers.</del>	12	0%	100%	0%
1.3.c	Perform arithmetic operations with expressions involving absolute value.	0	100%	0%	0%
1.3.d	Describe the effect of multiplying and dividing by numbers including the effect of multiplying or dividing a real number by: Zero, or A number less than zero, or A number between zero and one, or One, or A number greater than one.	0	100%	0%	0%
1.3.f	Solve application problems involving numbers, <del>including rational and common irrationals.</del>	1, 6	30%	40%	30%
1.4	Ratios and proportional reasoning				
1.4.c	Use proportions to solve problems <del>(including rates of change).</del>	2	45%	30%	25%
1.4.d	Solve multistep problems involving percentages, including compound percentages.	0	90%	10%	0%
1.5	Properties of number and operations				
1.5.c	Solve problems using factors, multiples, or prime factorization.	0	95%	5%	0%
1.5.d	Use divisibility or remainders in problem settings.	0	100%	0%	0%
1.5.e	Apply basic properties of operations, including conventions about the order of operations.	0	20%	80%	0%

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App- I]/#packets)	NC (#NC/ #packets)
1.5.f	Recognize properties of the number system (whole numbers, integers, rational numbers, real numbers, and complex numbers) and how they are related to each other, and identify examples of each type of number.	0	100%	0%	0%
1.6	Mathematical reasoning using number				
1.6.a	Give a mathematical argument to establish the validity of a simple numerical property or relationship.	0	100%	0%	0%
1.6.b	* Analyze or interpret a proof by mathematical induction of a simple numerical relationship.	0	100%	0%	0%
2	Measurement				
2.1	Measuring physical attributes				
2.1.b	Determine the effect of proportions and scaling on length, area, and volume.	0	100%	0%	0%
2.1.c	Estimate or compare perimeters or areas of two-dimensional geometric figures.	0	100%	0%	0%
2.1.d	Solve problems of angle measure, including those involving triangles or other polygons or parallel lines cut by a transversal.	0	100%	0%	0%
2.1.f	Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures.	0	100%	0%	0%
2.1.h	Solve problems by determining, estimating, or comparing volumes or surface areas of three-dimensional figures.	0	100%	0%	0%
2.1.i	Solve problems involving rates such as speed, density, population density, or flow rates.	0	100%	0%	0%
2.2	Systems of measurement				
2.2.a	Recognize that geometric measurements (length, area, perimeter, and volume) depend on the choice of a unit, and apply such units in expressions, equations, and problem solutions.	0	100%	0%	0%
2.2.b	Solve problems involving conversions within or between measurement systems, given the relationship between the units.	0	100%	0%	0%
2.2.d	Understand that numerical values associated with measurements of physical quantities are approximate, are subject to variation, and must be assigned units of measurement.	0	95%	0%	5%
2.2.e	Determine appropriate accuracy of measurement in problem situations (e.g., the accuracy of measurement of the dimensions to obtain a specified accuracy of area) and find the measure to that degree of accuracy.	0	100%	0%	0%
2.2.f	Construct or solve problems involving scale drawings.	0	100%	0%	0%
2.3	Measurement in triangles				
2.3.a	Solve problems involving indirect measurement.	0	100%	0%	0%
2.3.b	Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) stay constant in similar triangles.	0	100%	0%	0%

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App- I]/#packets)	NC (#NC/ #packets)
2.3.c	Use the definitions of sine, cosine, and tangent as ratios of sides in a right triangle to solve problems about length of sides and measure of angles.	0	100%	0%	0%
2.3.d	Interpret and use the identity $\sin^2 q + \cos^2 q = 1$ for angles $q$ between $0^\circ$ and $90^\circ$ ; recognize this identity as a special representation of the Pythagorean theorem.	0	100%	0%	0%
2.3.e	* Determine the radian measure of an angle and explain how radian measurement is related to a circle of radius 1.	0	100%	0%	0%
2.3.f	* Use trigonometric formulas such as addition and double angle formulas.	0	100%	0%	0%
2.3.g	* Use the law of cosines and the law of sines to find unknown sides and angles of a triangle.	0	100%	0%	0%
3	Geometry				
3.1	Dimension and shape				
3.1.c	Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space.	0	100%	0%	0%
3.1.d	Draw or sketch from a written description plane figures and planar images of three-dimensional figures.	0	100%	0%	0%
3.1.e	Use two-dimensional representations of three-dimensional objects to visualize and solve problems.	0	100%	0%	0%
3.1.f	Analyze properties of three-dimensional figures including spheres and hemispheres.	0	100%	0%	0%
3.2	Transformation of shapes and preservation of properties				
3.2.a	Recognize or identify types of symmetries (e.g., point, line, rotational, self-congruence) of two- and three-dimensional figures.	0	100%	0%	0%
3.2.b	Give or recognize the precise mathematical relationship (e.g., congruence, similarity, orientation) between a figure and its image under a transformation.	0	100%	0%	0%
3.2.c	Perform or describe the effect of a single transformation on two- and three-dimensional geometric shapes (reflections across lines of symmetry, rotations, translations, and dilations).	0	100%	0%	0%
3.2.d	Identify transformations, combinations, or subdivisions of shapes that preserve the area of two-dimensional figures or the volume of three-dimensional figures.	0	100%	0%	0%
3.2.e	Justify relationships of congruence and similarity and apply these relationships using scaling and proportional reasoning.	0	100%	0%	0%
3.2.g	Perform or describe the effects of successive transformations.	0	100%	0%	0%
3.3	Relationships between geometric figures				
3.3.b	Apply geometric properties and relationships to solve problems in two and three dimensions.	0	100%	0%	0%
3.3.c	Represent problem situations with geometric models to solve mathematical or real-world problems.	0	100%	0%	0%

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App- I]/#packets)	NC (#NC/ #packets)
3.3.d	Use the Pythagorean theorem to solve problems in two- or three-dimensional situations.	0	100%	0%	0%
3.3.e	Recall and interpret definitions and basic properties of congruent and similar triangles, circles, quadrilaterals, polygons, parallel, perpendicular and intersecting lines, and associated angle relationships.	0	100%	0%	0%
3.3.f	Analyze properties or relationships of triangles, quadrilaterals, and other polygonal plane figures.	0	100%	0%	0%
3.3.g	Analyze properties and relationships of parallel, perpendicular, or intersecting lines including the angle relationships that arise in these cases.	0	100%	0%	0%
3.3.h	Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, and chords).	0	100%	0%	0%
3.4	Position, direction, and coordinate geometry				
3.4.a	Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines.	0	100%	0%	0%
3.4.b	Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space.	0	100%	0%	0%
3.4.c	Describe or identify conic sections and other cross sections of solids.	0	100%	0%	0%
3.4.d	Represent two-dimensional figures algebraically using coordinates and/or equations.	0	100%	0%	0%
3.4.e	* Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically.	0	100%	0%	0%
3.4.f	Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius.	0	100%	0%	0%
3.4.g	* Graph ellipses and hyperbolas whose axes are parallel to the coordinate axes and demonstrate understanding of the relationship between their standard algebraic form and their graphical characteristics.	0	100%	0%	0%
3.4.h	* Represent situations and solve problems involving polar coordinates.	0	100%	0%	0%
3.5	Mathematical reasoning in geometry				
3.5.a	Make, test, and validate geometric conjectures using a variety of methods including deductive reasoning and counterexamples.	0	100%	0%	0%
3.5.b	Determine the role of hypotheses, logical implications, and conclusion in proofs of geometric theorems.	0	100%	0%	0%
3.5.c	Analyze or explain a geometric argument by contradiction.	0	100%	0%	0%
3.5.d	Analyze or explain a geometric proof of the Pythagorean theorem.	0	100%	0%	0%
3.5.e	Prove basic theorems about congruent and similar triangles and circles.	0	100%	0%	0%
4	Data analysis, statistics, and probability				

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App- I]/#packets)	NC (#NC/ #packets)
4.1	Data representation				
4.1.a	Read or interpret graphical or tabular representations of data.	0	40%	50%	10%
4.1.b	For a given set of data, complete a graph and solve a problem using the data in the graph (histograms, scatterplots, and line graphs).	1	95%	5%	0%
4.1.c	Solve problems involving univariate or bivariate data.	0	100%	0%	0%
4.1.d	Given a graphical or tabular representation of a set of data, determine whether information is represented effectively and appropriately.	0	100%	0%	0%
4.1.e	Compare and contrast different graphical representations of univariate and bivariate data.	0	95%	0%	5%
4.1.f	Organize and display data in a spreadsheet in order to recognize patterns and solve problems.	0	95%	5%	0%
4.2	Characteristics of data sets				
4.2.a	Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, and standard deviation).	0	100%	0%	0%
4.2.b	Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.	0	100%	0%	0%
4.2.c	Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation.	0	100%	0%	0%
4.2.d	Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.	0	100%	0%	0%
4.2.e	Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line and use the line or equation to make predictions.	0	100%	0%	0%
4.2.f	Recognize that the correlation coefficient is a number from -1 to +1 that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.	0	100%	0%	0%
4.2.g	Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).	0	100%	0%	0%
4.3	Experiments and samples				
4.3.a	Identify possible sources of bias in sample surveys and describe how such bias can be controlled and reduced.	0	100%	0%	0%
4.3.b	Recognize and describe a method to select a simple random sample.	0	100%	0%	0%
4.3.c	* Draw inferences from samples, such as estimates of proportions in a population, estimates of population means, or decisions about differences in means for two "treatments."	0	100%	0%	0%

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App- I]/#packets)	NC (#NC/ #packets)
4.3.d	Identify or evaluate the characteristics of a good survey or of a well-designed experiment.	0	100%	0%	0%
4.3.e	* Recognize the differences in design and in conclusions between randomized experiments and observational studies.	0	100%	0%	0%
4.4	Probability				
4.4.a	Recognize whether two events are independent or dependent.	0	100%	0%	0%
4.4.b	Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.c	Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.	0	100%	0%	0%
4.4.d	Use theoretical probability to evaluate or predict experimental outcomes.	0	100%	0%	0%
4.4.e	Determine the number of ways an event can occur using tree diagrams, formulas for combinations and permutations, or other counting techniques.	0	100%	0%	0%
4.4.h	Determine the probability of independent and dependent events.	0	100%	0%	0%
4.4.i	Determine conditional probability using two-way tables.	0	100%	0%	0%
4.4.j	Interpret and apply probability concepts to practical situations.	0	100%	0%	0%
4.4.k	*Use the binomial theorem to solve problems.	0	100%	0%	0%
4.5	Mathematical reasoning with data				
4.5.a	Identify misleading uses of data in real-world settings and critique different ways of presenting and using information.	0	100%	0%	0%
4.5.b	Distinguish relevant from irrelevant information, identify missing information, and either find what is needed or make appropriate approximations.	0	100%	0%	0%
4.5.c	*Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.	0	100%	0%	0%
4.5.d	Recognize when arguments based on data confuse correlation with causation.	0	100%	0%	0%
4.5.e	* Recognize and explain the potential errors caused by extrapolating from data.	0	100%	0%	0%
5	Algebra				
5.1	Patterns, relations, and functions				
5.1.a	Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions.	0	100%	0%	0%
5.1.b	Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.	0	100%	0%	0%
5.1.e	Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.	0	100%	0%	0%

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+App- I]/#packets)	NC (#NC/ #packets)
5.1.g	Determine whether a relation, given in verbal, symbolic, tabular, or graphical form, is a function.	0	100%	0%	0%
5.1.h	Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions.	0	100%	0%	0%
5.1.i	Determine the domain and range of functions given in various forms and contexts.	0	100%	0%	0%
5.1.j	* Given a function, determine its inverse if it exists and explain the contextual meaning of the inverse for a given situation.	0	100%	0%	0%
5.2	Algebraic representations				
5.2.a	Create and translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.	0	100%	0%	0%
5.2.b	Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams (including Venn diagrams), or written descriptions and evaluate the relative advantages or disadvantages of different representations to answer specific questions.	0	100%	0%	0%
5.2.d	Perform or interpret transformations on the graphs of linear, quadratic, exponential, and *trigonometric functions.	0	100%	0%	0%
5.2.e	Make inferences or predictions using an algebraic model of a situation.	0	100%	0%	0%
5.2.f	Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.	0	100%	0%	0%
5.2.g	Solve problems involving exponential growth and decay.	0	100%	0%	0%
5.2.h	* Analyze properties of exponential, logarithmic, and rational functions.	0	100%	0%	0%
5.3	Variables, expressions, and operations				
5.3.b	Write algebraic expressions, equations, or inequalities to represent a situation.	0	100%	0%	0%
5.3.c	Perform basic operations, using appropriate tools, on algebraic expressions including polynomial and rational expressions.	0	95%	5%	0%
5.3.d	Write equivalent forms of algebraic expressions, equations, or inequalities to represent and explain mathematical relationships.	0	100%	0%	0%
5.3.e	Evaluate algebraic expressions including polynomials and rational expressions.	0	90%	10%	0%
5.3.f	Use function notation to evaluate a function at a specified point in its domain <del>and combine functions by addition, subtraction, multiplication, division, and composition.</del>	1	95%	5%	0%
5.3.g	* Determine the sum of finite and infinite arithmetic and geometric series.	0	100%	0%	0%
5.3.h	Use basic properties of exponents and *logarithms to solve problems.	0	100%	0%	0%

Statistics					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App (#App+App- I)/#packets)	NC (#NC/ #packets)
5.4	Equations and inequalities				
5.4.a	Solve linear, rational, or quadratic equations or inequalities, <del>including those involving absolute value.</del>	1	95%	5%	0%
5.4.c	Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.	0	100%	0%	0%
5.4.d	Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.	0	100%	0%	0%
5.4.e	Solve problems involving special formulas such as: $A = P(I + r)^t$ , $A = Pe^{rt}$ .	0	100%	0%	0%
5.4.f	Solve an equation or formula involving several variables for one variable in terms of the others.	0	100%	0%	0%
5.4.g	Solve quadratic equations with complex roots.	0	100%	0%	0%
5.5	Mathematical reasoning in algebra				
5.5.a	Use algebraic properties to develop a valid mathematical argument.	0	100%	0%	0%
5.5.b	Determine the role of hypotheses, logical implications, and conclusions in algebraic argument.	0	100%	0%	0%
5.5.c	Explain the use of relational conjunctions (and, or) in algebraic arguments.	0	100%	0%	0%

Due to rounding, some row percentages will not sum to 100%

## APPENDIX R5. ENGLISH LITERATURE CONTENT MAP

English Literature					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App (#App+#App-I) /#packets)	NC (#NC/ #packets)
1	Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension				
1.1	Locate or recall textually explicit information and make simple inferences within and across <del>both</del> literary <del>and informational</del> texts.				
1.1.a	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics.	9	0%	100%	0%
1.2	Locate or recall textually explicit information and make simple inferences within and across literary texts.				
1.2.a	Locate or recall character traits.	0	10%	85%	5%
1.2.b	Locate or recall sequence of events or actions.	0	10%	90%	0%
1.2.c	Locate or recall setting.	0	10%	85%	5%
1.2.d	Locate or recall figurative language.	0	20%	80%	0%
1.2.e	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction.	0	20%	80%	0%
1.3	Locate or recall textually explicit information and make simple inferences within and across informational texts.				
1.3.a	Locate or recall the topic sentence or main idea.	0	45%	55%	0%
1.3.b	Locate or recall the author's purpose.	0	65%	35%	0%
1.3.c	Locate or recall causal relations.*	0	53%	47%	0%
1.3.d	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.	0	65%	30%	5%
2	Integrate/Interpret: Make complex inferences within and across texts				
2.1	Make complex inferences within and across <del>both</del> literary <del>and informational</del> texts.				
2.1.a	Describe problem and solution, or cause and effect.	10	15%	85%	0%
2.1.b	Compare or connect ideas, perspectives, problems, or situations.	11	0%	100%	0%
2.1.c	Determine unstated assumptions in an argument.	6	45%	55%	0%
2.1.d	Describe or analyze how an author uses literary devices or text features to convey meaning.	11	5%	80%	15%
2.1.e	Describe or analyze how an author uses organizing structures to convey meaning.	9	10%	85%	5%
2.1.f	Describe or analyze author's purpose.	11	5%	90%	5%
2.2	Make complex inferences within and across texts literary texts				
2.2.a	Interpret mood, tone, or voice.	0	30%	70%	0%
2.2.b	Integrate ideas to determine theme.	0	5%	95%	0%
2.2.c	Interpret a character's conflicts, motivations, and decisions.	0	30%	55%	15%
2.2.d	Examine relations between or among theme, setting, plot, or characters.	0	25%	65%	10%
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning.	0	40%	55%	5%
2.3	Make complex inferences within and across informational texts.				

English Literature					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App ([#App+#App-I] /#packets)	NC (#NC/ #packets)
2.3.a	Summarize major ideas.	0	55%	45%	0%
2.3.b	Draw conclusions and provide supporting information.	0	60%	35%	5%
2.3.c	Find evidence in support of an argument.	0	60%	35%	5%
2.3.d	Distinguish facts from opinions.	0	85%	15%	0%
2.3.e	Determine the importance of information within and across texts.	0	60%	35%	5%
2.4	Apply understanding of vocabulary to comprehension of both literary and informational texts.			0%	
2.4.a	Determine word meaning as used in context.	5	5%	80%	15%
3	Critique/Evaluate: Consider text(s) critically				
3.1	Consider both literary and informational texts critically.				
3.1.a	Judge the author's craft and technique.	8	30%	65%	5%
3.1.b	Analyze, critique, or evaluate the author's perspective or point of view.	7	20%	60%	20%
3.1.c	Take different perspectives in relation to a text.	7	20%	75%	5%
3.2	Consider literary texts critically.			0%	
3.2.a	Evaluate the role of literary devices in conveying meaning.	0	30%	65%	5%
3.2.b	Determine the degree to which literary devices enhance a literary work.	0	40%	40%	20%
3.2.c	Evaluate a character's conflict, motivations, and decisions.	0	40%	50%	10%
3.3	Consider informational text critically.				
3.3.a	Evaluate the way the author selects language to influence readers.	0	75%	15%	10%
3.3.b	Evaluate the strength and quality of evidence used by the author to support his or her position.	0	70%	15%	15%
3.3.c	Determine the quality of counterarguments within and across texts.	0	80%	20%	0%
3.3.d	Judge the coherence or logic of an argument.	0	75%	20%	5%

\*One course is missing data for 1.3.c (Eng\_20\_623).

Due to rounding, some row percentages will not sum to 100%

## APPENDIX R6. PSYCHOLOGY CONTENT MAP

Psychology					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App-1 (#App-1/ #packets)	NC (#NC/ #packets)
1	Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension.				
1.1	Locate or recall textually explicit information and make simple inferences within and across <del>both literary and informational</del> texts.				
1.1.a	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics.	19	0%	100%	0%
1.2	Locate or recall textually explicit information and make simple inferences within and across literary texts.				
1.2.a	Locate or recall character traits.	0	100%	0%	0%
1.2.b	Locate or recall sequence of events or actions.	0	100%	0%	0%
1.2.c	Locate or recall setting.	0	100%	0%	0%
1.2.d	Locate or recall figurative language.	0	100%	0%	0%
1.2.e	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction.	0	100%	0%	0%
1.3	Locate or recall textually explicit information and make simple inferences within and across informational texts.				
1.3.a	Locate or recall the topic sentence or main idea.	0	0%	100%	0%
1.3.b	Locate or recall the author's purpose.	0	20%	80%	0%
1.3.c	Locate or recall causal relations.	0	0%	100%	0%
1.3.d	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.	0	5%	95%	0%
2	Integrate/Interpret: Make complex inferences within and across texts				
2.1	Make complex inferences within and across <del>both literary and informational</del> texts.				
2.1.a	Describe problem and solution, or cause and effect.	19	0%	95%	5%
2.1.b	Compare or connect ideas, perspectives, problems, or situations.	20	0%	100%	0%
2.1.c	Determine unstated assumptions in an argument.	13	35%	65%	0%
2.1.d	Describe or analyze how an author uses literary devices or text features to convey meaning.	14	30%	70%	0%
2.1.e	Describe or analyze how an author uses organizing structures to convey meaning.	8	55%	40%	5%
2.1.f	Describe or analyze author's purpose.	16	20%	80%	0%
2.2	Make complex inferences within and across texts literary texts			0%	
2.2.a	Interpret mood, tone, or voice.	0	100%	0%	0%
2.2.b	Integrate ideas to determine theme.	0	100%	0%	0%
2.2.c	Interpret a character's conflicts, motivations, and decisions.	0	100%	0%	0%
2.2.d	Examine relations between or among theme, setting, plot, or characters.	0	100%	0%	0%
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning.	0	100%	0%	0%
2.3v	Make complex inferences within and across			0%	

Psychology					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/ #packets)	App-1 (#App-1/ #packets)	NC (#NC/ #packets)
	informational texts.				
2.3.a	Summarize major ideas.	0	0%	100%	0%
2.3.b	Draw conclusions and provide supporting information.	0	5%	95%	0%
2.3.c	Find evidence in support of an argument.*	0	0%	100%	0%
2.3.d	Distinguish facts from opinions.	0	20%	80%	0%
2.3.e	Determine the importance of information within and across texts.	0	0%	100%	0%
2.4	Apply understanding of vocabulary to comprehension of <b>both literary and</b> informational texts.				
2.4.a	Determine word meaning as used in context.	17	0%	100%	0%
3	Critique/Evaluate: Consider text(s) critically				
3.1	Consider <b>both literary and</b> informational texts critically.				
3.1.a	Judge the author's craft and technique.	3	85%	15%	0%
3.1.b	Analyze, critique, or evaluate the author's perspective or point of view.	12	35%	60%	5%
3.1.c	Take different perspectives in relation to a text.	15	20%	80%	0%
3.2	Consider literary texts critically.				
3.2.a	Evaluate the role of literary devices in conveying meaning.	0	100%	0%	0%
3.2.b	Determine the degree to which literary devices enhance a literary work.	0	100%	0%	0%
3.2.c	Evaluate a character's conflict, motivations, and decisions.	0	100%	0%	0%
3.3	Consider informational text critically.				
3.3.a	Evaluate the way the author selects language to influence readers.	0	85%	10%	5%
3.3.b	Evaluate the strength and quality of evidence used by the author to support his or her position.	0	30%	70%	0%
3.3.c	Determine the quality of counterarguments within and across texts.	0	35%	65%	0%
3.3.d	Judge the coherence or logic of an argument.	0	20%	80%	0%

\* One course is missing data for 2.3.c (Psy\_20\_1928).

Due to rounding, some row percentages will not sum to 100%

## APPENDIX R7. U.S. GOVERNMENT CONTENT MAP

U.S. Government					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/#packets)	App ([#App+#App- I]/#packets)	NC (#NC/#packets)
1	Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension				
1.1	Locate or recall textually explicit information and make simple inferences within and across <b>both</b> literary <b>and</b> informational texts.				
1.1.a	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics.	18	0%	100%	0%
1.2	Locate or recall textually explicit information and make simple inferences within and across literary texts.				
1.2.a	Locate or recall character traits.	0	100%	0%	0%
1.2.b	Locate or recall sequence of events or actions.	0	100%	0%	0%
1.2.c	Locate or recall setting.	0	100%	0%	0%
1.2.d	Locate or recall figurative language.	0	100%	0%	0%
1.2.e	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction.	0	100%	0%	0%
1.3	Locate or recall textually explicit information and make simple inferences within and across informational texts.			0%	
1.3.a	Locate or recall the topic sentence or main idea.	0	5%	95%	0%
1.3.b	Locate or recall the author's purpose.	0	15%	85%	0%
1.3.c	Locate or recall causal relations.	0	0%	100%	0%
1.3.d	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.	0	10%	85%	5%
2	Integrate/Interpret: Make complex inferences within and across texts				
2.1	Make complex inferences within and across <b>both</b> literary <b>and</b> informational texts.				
2.1.a	Describe problem and solution, or cause and effect.	18	0%	95%	5%
2.1.b	Compare or connect ideas, perspectives, problems, or situations.	17	0%	95%	5%
2.1.c	Determine unstated assumptions in an argument.	14	20%	75%	5%
2.1.d	Describe or analyze how an author uses literary devices or text features to convey meaning.	10	45%	55%	0%
2.1.e	Describe or analyze how an author uses organizing structures to convey meaning.	9	50%	50%	0%
2.1.f	Describe or analyze author's purpose.	12	30%	65%	5%
2.2	Make complex inferences within and across texts literary texts				
2.2.a	Interpret mood, tone, or voice.	0	100%	0%	0%

U.S. Government					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/#packets)	App ([#App+#App- I]/#packets)	NC (#NC/#packets)
2.2.b	Integrate ideas to determine theme.	0	100%	0%	0%
2.2.c	Interpret a character's conflicts, motivations, and decisions.	0	100%	0%	0%
2.2.d	Examine relations between or among theme, setting, plot, or characters.	0	100%	0%	0%
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning.	0	100%	0%	0%
2.3	Make complex inferences within and across informational texts.				
2.3.a	Summarize major ideas.	0	5%	90%	5%
2.3.b	Draw conclusions and provide supporting information.	0	5%	85%	10%
2.3.c	Find evidence in support of an argument.*	0	5%	85%	10%
2.3.d	Distinguish facts from opinions.	0	10%	85%	5%
2.3.e	Determine the importance of information within and across texts.	0	0%	95%	5%
2.4	Apply understanding of vocabulary to comprehension of <del>both literary and</del> informational texts.				
2.4.a	Determine word meaning as used in context.	13	0%	75%	25%
3	Critique/Evaluate: Consider text(s) critically				
3.1	Consider <del>both literary and</del> informational texts critically.				
3.1.a	Judge the author's craft and technique.	2	85%	15%	0%
3.1.b	Analyze, critique, or evaluate the author's perspective or point of view.	13	20%	75%	5%
3.1.c	Take different perspectives in relation to a text.	16	5%	90%	5%
3.2	Consider literary texts critically.				
3.2.a	Evaluate the role of literary devices in conveying meaning.	0	100%	0%	0%
3.2.b	Determine the degree to which literary devices enhance a literary work.	0	100%	0%	0%
3.2.c	Evaluate a character's conflict, motivations, and decisions.	0	100%	0%	0%
3.3	Consider informational text critically.				
3.3.a	Evaluate the way the author selects language to influence readers.	0	55%	40%	5%
3.3.b	Evaluate the strength and quality of evidence used by the author to support his or her position.	0	20%	75%	5%
3.3.c	Determine the quality of counterarguments within and across texts.	0	10%	85%	5%
3.3.d	Judge the coherence or logic of an argument.	0	10%	85%	5%

\* Due to rounding, some percentages will not sum to 100%

## APPENDIX R8. U.S. HISTORY CONTENT MAP

U.S. History					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/#packets)	App (#App+App- I)/#packets)	NC (#NC/#packets)
<b>1</b>	Locate/Recall: Locate or recall textually explicit information within and across texts, which may involve making simple inferences as needed for literal comprehension				
<b>1.1</b>	Locate or recall textually explicit information and make simple inferences within and across <del>both</del> literary <del>and informational</del> texts.				
<b>1.1.a</b>	Locate or recall specific information such as definitions, facts, and supporting details in text or graphics.	15	0%	100%	0%
<b>1.2</b>	Locate or recall textually explicit information and make simple inferences within and across literary texts.				
<b>1.2.a</b>	Locate or recall character traits.	0	90%	10%	0%
<b>1.2.b</b>	Locate or recall sequence of events or actions.	0	85%	15%	0%
<b>1.2.c</b>	Locate or recall setting.	0	85%	15%	0%
<b>1.2.d</b>	Locate or recall figurative language.	0	100%	0%	0%
<b>1.2.e</b>	Locate or recall organizing structures of literary texts, such as verse or stanza in poetry or description, chronology, comparison, etc. in literary non-fiction.	0	95%	5%	0%
<b>1.3</b>	Locate or recall textually explicit information and make simple inferences within and across informational texts.				
<b>1.3.a</b>	Locate or recall the topic sentence or main idea.	0	0%	100%	0%
<b>1.3.b</b>	Locate or recall the author's purpose.	0	25%	75%	0%
<b>1.3.c</b>	Locate or recall causal relations.	0	5%	95%	0%
<b>1.3.d</b>	Locate or recall organizing structures of texts, such as comparison/contrast, problem/solution, enumeration, etc.	0	5%	95%	0%
<b>2</b>	Integrate/Interpret: Make complex inferences within and across texts				
<b>2.1</b>	Make complex inferences within and across <del>both</del> literary <del>and</del> informational texts.				
<b>2.1.a</b>	Describe problem and solution, or cause and effect.	14	10%	90%	0%
<b>2.1.b</b>	Compare or connect ideas, perspectives, problems, or situations.	15	0%	100%	0%
<b>2.1.c</b>	Determine unstated assumptions in an argument.	11	20%	80%	0%
<b>2.1.d</b>	Describe or analyze how an author uses literary devices or text features to convey meaning.	7	50%	50%	0%
<b>2.1.e</b>	Describe or analyze how an author uses organizing structures to convey meaning.	9	40%	60%	0%
<b>2.1.f</b>	Describe or analyze author's purpose.	11	25%	75%	0%
<b>2.2</b>	Make complex inferences within and across texts literary texts				
<b>2.2.a</b>	Interpret mood, tone, or voice.	1	95%	5%	0%
<b>2.2.b</b>	Integrate ideas to determine theme.	0	90%	10%	0%
<b>2.2.c</b>	Interpret a character's conflicts, motivations, and decisions.	0	90%	10%	0%
<b>2.2.d</b>	Examine relations between or among theme, setting, plot, or characters.	0	90%	10%	0%

U.S. History					
ID	Objective Statement	Exclusions (# statement excluded across packets)	NA (#NA ratings/#packets)	App ([#App+#App- I]/#packets)	NC (#NC/#packets)
2.2.e	Explain how rhythm, rhyme, sound, or form in poetry contribute to meaning.	0	100%	0%	0%
2.3	Make complex inferences within and across informational texts.				
2.3.a	Summarize major ideas.	0	0%	100%	0%
2.3.b	Draw conclusions and provide supporting information.	0	10%	90%	0%
2.3.c	Find evidence in support of an argument.*	0	5%	95%	0%
2.3.d	Distinguish facts from opinions.	0	10%	90%	0%
2.3.e	Determine the importance of information within and across texts.	0	5%	95%	0%
2.4	Apply understanding of vocabulary to comprehension of <del>both literary and</del> informational texts.				
2.4.a	Determine word meaning as used in context.	13	0%	95%	5%
3	Critique/Evaluate: Consider text(s) critically				
3.1	Consider <del>both literary and</del> informational texts critically.				
3.1.a	Judge the author's craft and technique.	5	65%	35%	0%
3.1.b	Analyze, critique, or evaluate the author's perspective or point of view.	11	25%	75%	0%
3.1.c	Take different perspectives in relation to a text.	15	10%	90%	0%
3.2	Consider literary texts critically.				
3.2.a	Evaluate the role of literary devices in conveying meaning.	0	100%	0%	0%
3.2.b	Determine the degree to which literary devices enhance a literary work.	0	100%	0%	0%
3.2.c	Evaluate a character's conflict, motivations, and decisions.	0	90%	10%	0%
3.3	Consider informational text critically.				
3.3.a	Evaluate the way the author selects language to influence readers.	0	75%	25%	0%
3.3.b	Evaluate the strength and quality of evidence used by the author to support his or her position.	0	30%	70%	0%
3.3.c	Determine the quality of counterarguments within and across texts.	0	20%	80%	0%
3.3.d	Judge the coherence or logic of an argument.	0	25%	75%	0%

\* Due to rounding, some percentages will not sum to 100%

# APPENDIX S

## Process Evaluation Questionnaires

### NAEP EXPERTS—ADVISORY PANEL PROCESS EVALUATION

Question	Response options
I am confident I understood the role of the NAEP expert advisory panel.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
Time was used efficiently in the advisory panel meeting.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
The changes implemented to the content review training reflect the guidance provided by the NAEP expert advisory panel.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
Please provide any additional comments in the space below.	(textbox)

### CONTENT REVIEWERS—HOLISTIC AND INDEPENDENT REVIEW TRAINING PROCESS EVALUATION

Question	Response Options
The holistic review training webinar made the task clear to me.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
The holistic review training webinar was well organized.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
The independent review webinar training made the task clear to me.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree

Question	Response Options
The independent review training webinars were well organized.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
The independent review training clearly identified the goals for the NAEP objective coding procedure.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
The independent review training clearly identified the goals of the NAEP objective annotation procedure.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
The training materials were helpful.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
I am confident I understand my role.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
Time was used efficiently in the trainings.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
I felt comfortable participating in the training webinars.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
Overall, I feel well trained and prepared to complete the independent review.	1. Strongly disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly agree
Please add your comments in the space below.	(textbox)

## CONTENT REVIEWERS—INDEPENDENT REVIEW PROCESS EVALUATION

Question	Response Options
The training prepared me for independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
During training and qualifying, I learned how to code the NAEP objectives as I progressed, so my later training and qualifying coding may not be consistent with my earlier coding.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
The training materials were helpful.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
The holistic review process helped me code my packets during independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
Referring to the NAEP frameworks helped me code my packets during independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
Referring to the decision rules helped me code my packets during independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
I understood how to code the NAEP objectives in my course packets during independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
Overall, I am satisfied with how I coded my packets during independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
The amount of work required to complete independent review was about what I expected when I was recruited.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>

Question	Response Options
I am satisfied with the support I received during the independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
Please provide specific feedback on the decision rules, if any, in the space below.	(textbox)
Please add additional comments about independent review in the space below.	(textbox)
Overall, the independent review survey was easy to use.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
Overall, Basecamp was an effective communication tool for this project.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
I found the to-dos in Basecamp useful for keeping track of packets during independent review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
I found it easy to access materials training materials, packets, and other files on Basecamp.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>

## CONTENT REVIEWERS—GROUP REVIEW PROCESS EVALUATION

Question	Response Options
The orientation and training prepared me for group review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
My notes and annotations were useful during group review.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>
During group review, my group had enough time to discuss all of our packets.	<ol style="list-style-type: none"> <li>1. Strongly disagree</li> <li>2. Disagree</li> <li>3. Agree</li> <li>4. Strongly agree</li> </ol>

Question	Response Options
Overall, I think my group's discussions were open and honest.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
Overall, I believe that my opinions were considered and valued by my group.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
I feel this procedure was fair.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
My group followed the decision rules.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
I am confident in the outcomes of the group review process.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
Overall, I am satisfied with my group's final coding on our packets.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
The meeting was well organized.	1. Strongly disagree 2. Disagree 3. Agree 4. Strongly agree
Please add additional comments about group review in the space below.	(textbox)

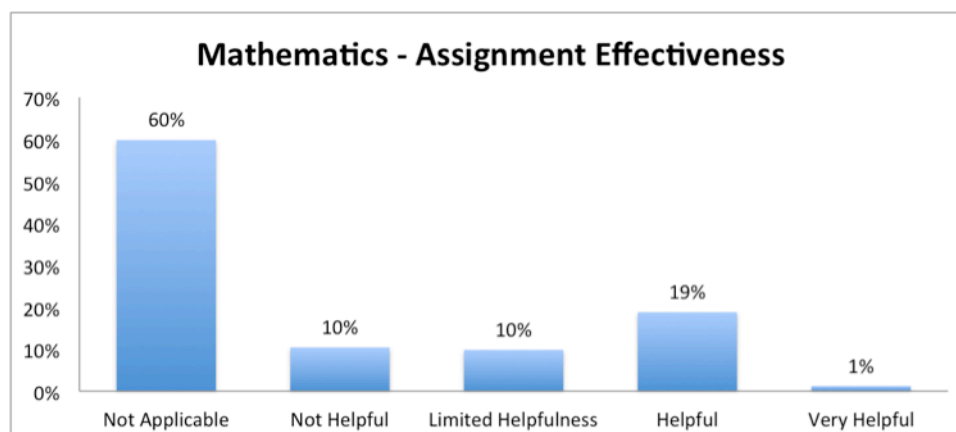
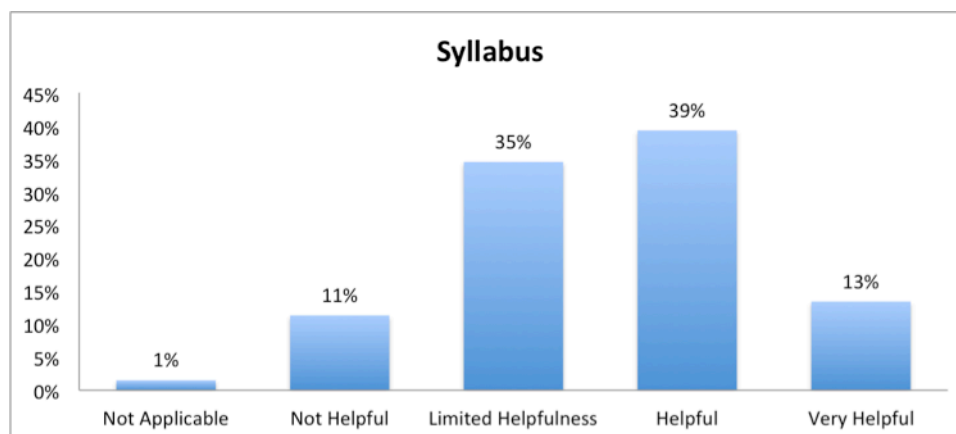
## NAEP EXPERTS—QUESTIONS FOR DISCUSSION

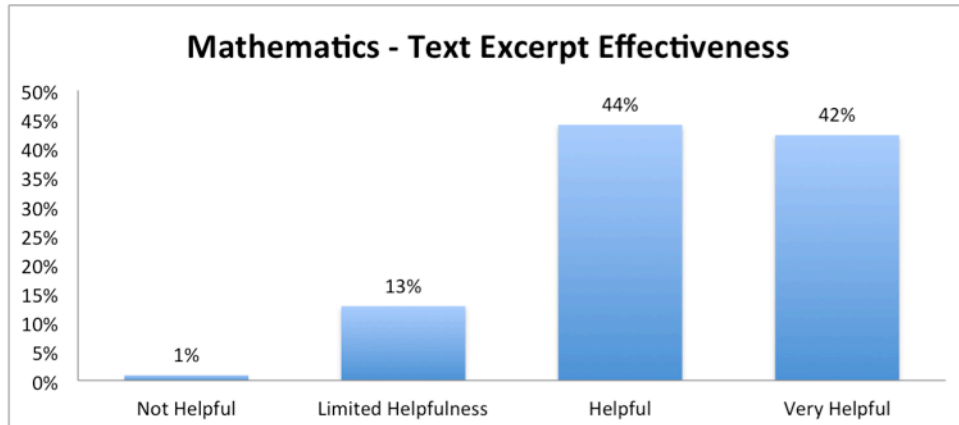
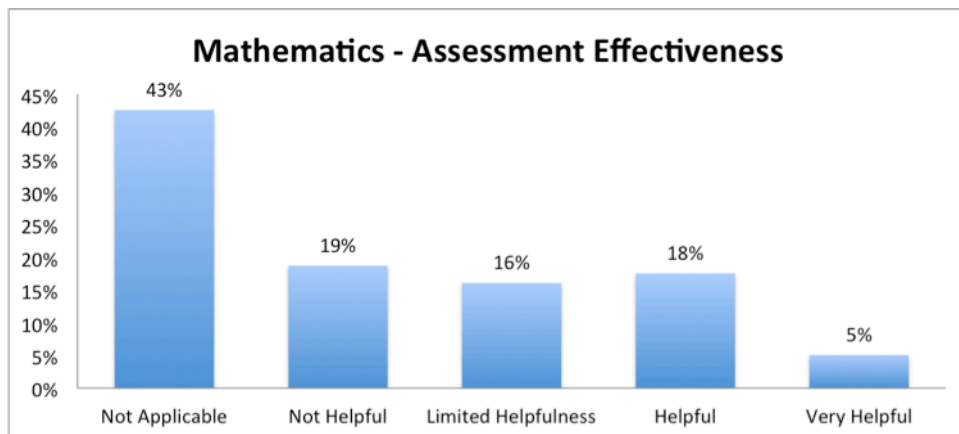
- What does each of you see as the most important implication or application of the prerequisite KSAs and their corresponding point on the NAEP scale? What are your recommendations for next steps?
- Based on the prerequisite KSAs, what can we suggest as priorities for NAEP?
- Based on the prerequisite KSAs, what can we suggest as priorities for high schools?
- JSS was done before the implementation of the Common Core State Standards (CCSS). Did the lack of the CCSS affect the development of the JSS BPD?
- What guidance, qualifications, or context should be noted to help readers interpret the outcomes of this study?
- What questions do you have that would inform future research efforts on the NAEP?

# APPENDIX T

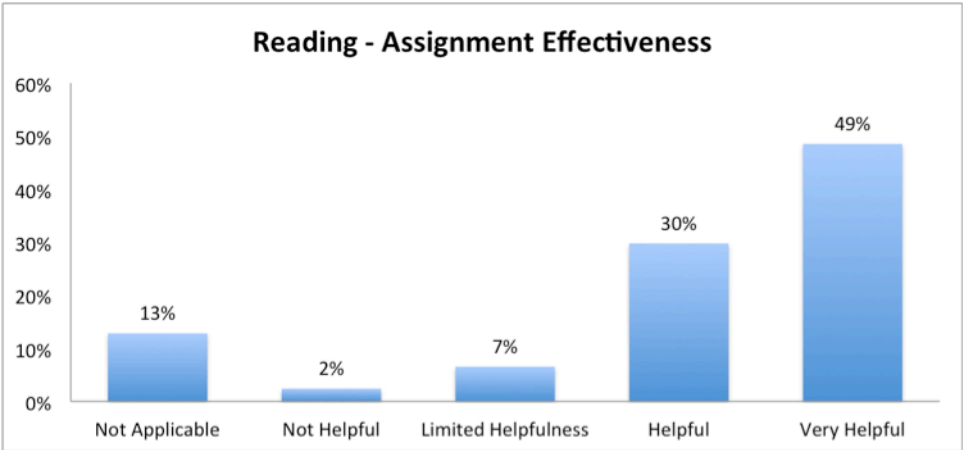
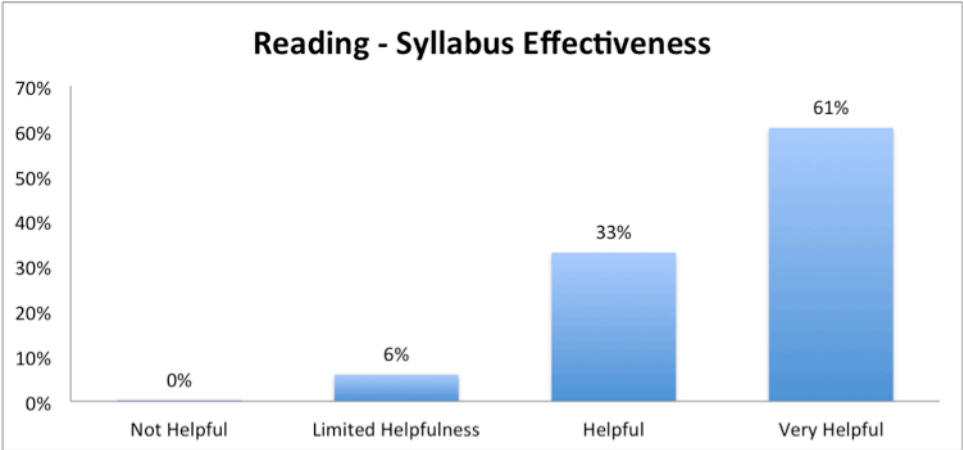
## Artifact Effectiveness by Course Type

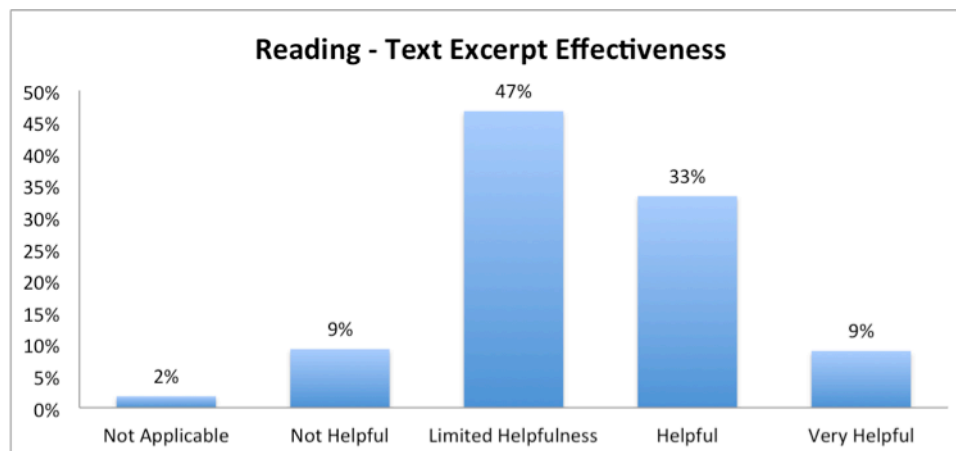
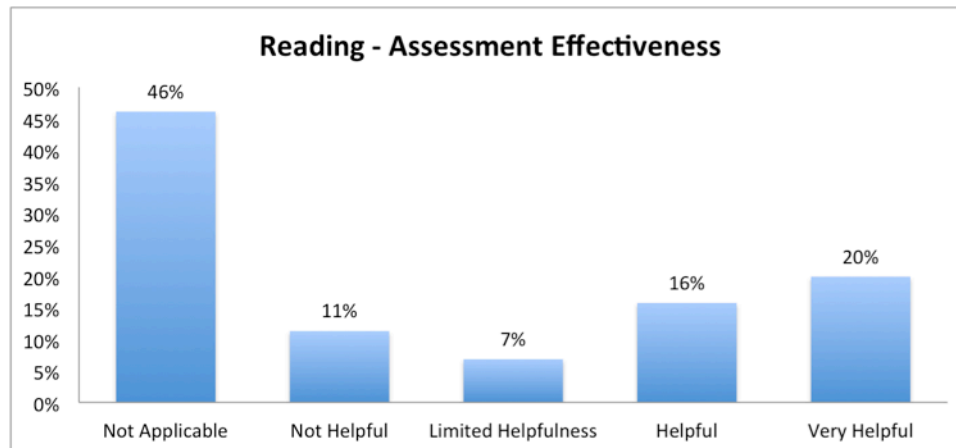
### MATHEMATICS COURSE PACKETS





COURSE PACKETS WITH SUBSTANTIAL READING DEMANDS





# APPENDIX U

## Content Reviewer Characteristics by Subject Area and Content Review Group

Table U1. Content Reviewer Educational Background

Content area	N	HSD or GED	Bachelor's	Master's	Doctorate
<b>Mathematics overall</b>	<b>12</b>				
Mathematics Group 1	3	0	0	1	2
Mathematics Group 2	3	0	0	1	2
Mathematics Group 3	3	0	0	1	2
Mathematics Group 4	3	0	0	2	1
<b>Reading overall</b>	<b>12</b>				
Reading Group 1	3	0	0	2	1
Reading Group 2	3	0	0	1	2
Reading Group 3	3	0	0	1	2
Reading Group 4	3	0	0	1	2

Table U2. Content Reviewer Primary or Most Recent Occupation

Content area	N	Community college educator	University educator	Education consultant	Other
<b>Mathematics overall</b>	<b>12</b>				
Mathematics Group 1	3	1	1	1	0
Mathematics Group 2	3	1	2	0	0
Mathematics Group 3	3	0	2	0	1
Mathematics Group 4	3	0	3	0	0
<b>Reading overall</b>	<b>12</b>				
Reading Group 1	3	1	2	0	0
Reading Group 2	3	0	3	0	0
Reading Group 3	3	0	2	1	0
Reading Group 4	3	0	3	0	0

**Table U3. Content Reviewer Years of Experience in Education**

Content area	N	1–5 years	6–10 years	11–15 years	16–20 years	21+ years
<b>Mathematics overall</b>	<b>12</b>					
Mathematics Group 1	3	0	1	1	0	1
Mathematics Group 2	3	1	0	0	0	2
Mathematics Group 3	3	0	0	0	1	2
Mathematics Group 4	3	0	0	1	1	1
<b>Reading overall</b>	<b>12</b>					
Reading Group 1	3	0	0	2	0	1
Reading Group 2	3	1	1	0	1	0
Reading Group 3	3	0	1	0	0	2
Reading Group 4	3	1	1	0	0	1

**Table U4. Content Reviewer Gender**

Content area	N	Male	Female
<b>Mathematics Overall</b>	<b>12</b>		
Mathematics Group 1	3	2	1
Mathematics Group 2	3	2	1
Mathematics Group 3	3	3	0
Mathematics Group 4	3	1	2
<b>Reading Overall</b>	<b>12</b>		
Reading Group 1	3	0	3
Reading Group 2	3	3	0
Reading Group 3	3	1	2
Reading Group 4	3	1	2

**Table U5. Content Reviewers of Hispanic Origin**

Content area	N	Yes	No
<b>Mathematics overall</b>	<b>12</b>		
Mathematics Group 1	3	0	3
Mathematics Group 2	3	0	3
Mathematics Group 3	3	0	3
Mathematics Group 4	3	0	3
<b>Reading overall</b>	<b>12</b>		
Reading Group 1	3	0	3
Reading Group 2	3	0	3
Reading Group 3	3	0	3
Reading Group 4	3	0	3

**Table U6. Content Reviewer Race**

Content area	N	Asian/Pacific Islander	Black/African American	American Indian	White	I prefer not to answer
<b>Mathematics overall</b>	<b>12</b>					
Mathematics Group 1	3	0	0	0	3	0
Mathematics Group 2	3	0	0	0	3	0
Mathematics Group 3	3	0	0	0	3	0
Mathematics Group 4	3	0	0	0	2	1
<b>Reading overall</b>	<b>12</b>					
Reading Group 1	3	1	1	0	1	0
Reading Group 2	3	0	0	0	3	0
Reading Group 3	3	0	0	0	3	0
Reading Group 4	3	0	0	0	2	1

# APPENDIX V

## Response Change Rationales by Reviewer

### MATH GROUP REVIEW

Group 1: Why did Member 1/2/3 change his/her mind? (n = 2,194)	Total
M1 Changed understanding of application of decision rule	0.87%
M1 Evidence not seen before or changed understanding of evidence	6.84%
M1 New shared understanding of the objective	10.03%
M1 Other	0.23%
M1 Other group member(s) disputed evidence	4.60%
M1 Other group member(s) made convincing argument	0.77%
M1 Technical error with survey tool	0.18%
M2 Changed understanding of application of decision rule	0.46%
M2 Evidence not seen before or changed understanding of evidence	3.65%
M2 New shared understanding of the objective	10.53%
M2 Other	0.27%
M2 Other group member(s) disputed evidence	32.50%
M2 Other group member(s) made convincing argument	0.64%
M2 Technical error with survey tool	0.91%
M3 Changed understanding of application of decision rule	0.91%
M3 Evidence not seen before or changed understanding of evidence	7.47%
M3 New shared understanding of the objective	6.52%
M3 Other	0.41%
M3 Other group member(s) disputed evidence	10.80%
M3 Other group member(s) made convincing argument	1.19%
M3 Technical error with survey tool	0.23%
<b>Total</b>	<b>100.00%</b>

Group 2: Why did Member 1/2/3 change his/her mind? (n = 2,194)	Total
M1 Changed understanding of application of decision rule	0.87%
M1 Evidence not seen before or changed understanding of evidence	6.84%
M1 New shared understanding of the objective	10.03%
M1 Other	0.23%
M1 Other group member(s) disputed evidence	4.60%
M1 Other group member(s) made convincing argument	0.77%
M1 Technical error with survey tool	0.18%
M2 Changed understanding of application of decision rule	0.46%
M2 Evidence not seen before or changed understanding of evidence	3.65%
M2 New shared understanding of the objective	10.53%
M2 Other	0.27%
M2 Other group member(s) disputed evidence	32.50%
M2 Other group member(s) made convincing argument	0.64%
M2 Technical error with survey tool	0.91%
M3 Changed understanding of application of decision rule	0.91%
M3 Evidence not seen before or changed understanding of evidence	7.47%
M3 New shared understanding of the objective	6.52%
M3 Other	0.41%
M3 Other group member(s) disputed evidence	10.80%
M3 Other group member(s) made convincing argument	1.19%
M3 Technical error with survey tool	0.23%
<b>Total</b>	<b>100.00%</b>

Group 3: Why did Member 1/2/3 change his/her mind? (n = 1,346)	Total
M1 Changed understanding of application of decision rule	2.15%
M1 Changed understanding of terminology	0.15%
M1 Evidence not seen before or changed understanding of evidence	10.85%
M1 New shared understanding of the objective	0.30%
M1 Other	14.71%
M1 Other group member(s) disputed evidence	3.05%
M1 Other group member(s) made convincing argument	0.15%
M1 Technical error with survey tool	1.49%
M2 Changed understanding of application of decision rule	5.87%
M2 Changed understanding of terminology	0.07%
M2 Evidence not seen before or changed understanding of evidence	11.29%
M2 New shared understanding of the objective	0.45%
M2 Other	12.48%
M2 Other group member(s) disputed evidence	4.53%
M2 Other group member(s) made convincing argument	1.19%
M2 Technical error with survey tool	1.19%
M3 Changed understanding of application of decision rule	4.98%
M3 Changed understanding of terminology	0.07%
M3 Evidence not seen before or changed understanding of evidence	7.50%
M3 New shared understanding of the objective	0.30%
M3 Other	10.40%
M3 Other group member(s) disputed evidence	4.61%
M3 Other group member(s) made convincing argument	1.34%
M3 Technical error with survey tool	0.89%
<b>Total</b>	<b>100.00%</b>

Group 4: Why did Member 1/2/3 change his/her mind? (n = 1,154)	Total
M1 Changed understanding of application of decision rule	0.09%
M1 Changed understanding of terminology	0.52%
M1 Evidence not seen before or changed understanding of evidence	11.87%
M1 New shared understanding of the objective	18.80%
M1 Other group member(s) disputed evidence	0.26%
M1 Other group member(s) made convincing argument	2.43%
M1 Technical error with survey tool	0.35%
M2 Changed understanding of application of decision rule	1.73%
M2 Changed understanding of terminology	1.82%
M2 Evidence not seen before or changed understanding of evidence	8.58%
M2 New shared understanding of the objective	7.54%
M2 Other	7.89%
M2 Other group member(s) disputed evidence	1.73%
M2 Other group member(s) made convincing argument	4.59%
M2 Technical error with survey tool	3.73%
M3 Changed understanding of application of decision rule	0.17%
M3 Changed understanding of terminology	0.43%
M3 Evidence not seen before or changed understanding of evidence	4.68%
M3 New shared understanding of the objective	5.63%
M3 Other	0.09%
M3 Other group member(s) disputed evidence	7.71%
M3 Other group member(s) made convincing argument	7.80%
M3 Technical error with survey tool	1.56%
<b>Grand Total</b>	<b>100.00%</b>

## READING GROUP REVIEW

Group 1: Why did Member 1/2/3 change his/her mind? (n = 1,932)	Total
M1 Changed understanding of application of decision rule	1.29%
M1 Changed understanding of terminology	2.28%
M1 Evidence not seen before or changed understanding of evidence	5.90%
M1 New shared understanding of the objective	8.70%
M1 Other	6.37%
M1 Other group member(s) made convincing argument	2.17%
M1 Other group member(s) disputed evidence	0.10%
M2 Changed understanding of application of decision rule	0.16%
M2 Changed understanding of terminology	0.47%
M2 Evidence not seen before or changed understanding of evidence	5.64%
M2 New shared understanding of the objective	20.96%
M2 Other	5.59%
M2 Other group member(s) made convincing argument	1.19%
M2 Technical error with survey tool	0.31%
M3 Changed understanding of application of decision rule	1.76%
M3 Changed understanding of terminology	4.76%
M3 Evidence not seen before or changed understanding of evidence	9.99%
M3 New shared understanding of the objective	3.99%
M3 Other	13.72%
M3 Other group member(s) made convincing argument	4.45%
M3 Other group member(s) disputed evidence	0.05%
M3 Technical error with survey tool	0.16%
<b>Total</b>	<b>100.00%</b>

Group 2: Why did Member 1/2/3 change his/her mind? (n = 1,614)	Total
M1 Changed understanding of application of decision rule	1.43%
M1 Changed understanding of terminology	0.99%
M1 Evidence not seen before or changed understanding of evidence	19.64%
M1 Other	8.86%
M1 Other group member(s) made convincing argument	3.53%
M2 Changed understanding of application of decision rule	0.68%
M2 Changed understanding of terminology	2.48%
M2 Evidence not seen before or changed understanding of evidence	25.59%
M2 New shared understanding of the objective	0.06%
M2 Other	12.45%
M2 Other group member(s) made convincing argument	2.35%
M3 Changed understanding of application of decision rule	0.37%
M3 Changed understanding of terminology	1.05%
M3 Evidence not seen before or changed understanding of evidence	13.32%
M3 Other	3.47%
M3 Other group member(s) made convincing argument	3.72%
<b>Total</b>	<b>100.00%</b>

Group 3: Why did Member 1/2/3 change his/her mind? (n = 1,023)	Total
M1 Changed understanding of application of decision rule	1.47%
M1 Changed understanding of terminology	0.49%
M1 Evidence not seen before or changed understanding of evidence	10.56%
M1 New shared understanding of the objective	6.06%
M1 Other group member(s) disputed evidence	0.39%
M1 Other group member(s) made convincing argument	1.56%
M1 Technical error with survey tool	1.47%
M2 Changed understanding of application of decision rule	1.47%
M2 Changed understanding of terminology	4.50%
M2 Evidence not seen before or changed understanding of evidence	9.97%
M2 New shared understanding of the objective	7.82%
M2 Other	0.20%
M2 Other group member(s) disputed evidence	0.39%
M2 Other group member(s) made convincing argument	3.03%
M2 Technical error with survey tool	10.85%
M3 Changed understanding of application of decision rule	0.39%
M3 Changed understanding of terminology	1.17%
M3 Evidence not seen before or changed understanding of evidence	20.82%
M3 New shared understanding of the objective	14.08%
M3 Other group member(s) disputed evidence	0.20%
M3 Other group member(s) made convincing argument	2.64%
M3 Technical error with survey tool	0.49%
<b>Total</b>	<b>100.00%</b>

Group 4: Why did Member 1/2/3 change his/her mind? (n = 1,160)	Total
M1 Changed understanding of application of decision rule	0.17%
M1 Changed understanding of terminology	5.00%
M1 Evidence not seen before or changed understanding of evidence	7.67%
M1 New shared understanding of the objective	0.95%
M1 Other group member(s) made convincing argument	5.00%
M2 Changed understanding of application of decision rule	0.09%
M2 Changed understanding of terminology	18.53%
M2 Evidence not seen before or changed understanding of evidence	7.24%
M2 New shared understanding of the objective	1.21%
M2 Other	0.09%
M2 Other group member(s) made convincing argument	6.98%
M2 Technical error with survey tool	0.09%
M3 Changed understanding of application of decision rule	0.09%
M3 Changed understanding of terminology	23.71%
M3 Evidence not seen before or changed understanding of evidence	13.28%
M3 New shared understanding of the objective	1.38%
M3 Other	0.43%
M3 Other group member(s) made convincing argument	7.93%
M3 Technical error with survey tool	0.17%
<b>Total</b>	<b>100.00%</b>

# APPENDIX W

## Borderline Performance Descriptions (BPDs) for College Preparedness (v. 4.0) From the JSS Study

### Mathematics Borderline Performance Description College Preparedness Operational Workshop (Version 4.0)

In the area of **number properties and operations**, students who are minimally prepared for placement into entry-level, credit-bearing, post-secondary courses should be able to interpret and compare various representations of numbers. They should understand and know how to perform operations with real numbers, understand and use properties of numbers and the number system—including basic properties of exponents and radicals—and apply that knowledge to solve problems. They should also know how to use proportional reasoning to solve problems. These students should know how to estimate and identify situations where estimation is appropriate. They should be able to verify solutions and determine the reasonableness of results in a variety of situations.

In **measurement and geometry**, to demonstrate at least minimal preparedness, students should understand perimeter, area, volume, and measures of angles and be able to solve problems involving those concepts. Additionally, they should be able to solve problems involving rates of change and units of measurement. These students should understand properties of plane figures and know how to apply the Pythagorean Theorem. They should also be able to solve problems involving the coordinate plane.

In **data analysis, statistics, and probability**, to demonstrate at least minimal preparedness, students should know how to create and interpret graphs and tables from sets of data. They should understand measures of center and spread of data as well as basic concepts of probability.

In **algebra**, to demonstrate at least minimal preparedness, students should know how to solve problems involving numerical patterns. They should know how to write algebraic expressions, equations, and inequalities to represent situations; manipulate expressions; and solve linear equations and inequalities. Students who are minimally prepared should be able to evaluate algebraic expressions and functions. They should be able to create, interpret, and translate between verbal, tabular, graphic, and symbolic representations of functions, equations, and inequalities. Given an algebraic model of a situation, these students should know how to make inferences or predictions. They should also be able to recognize general forms of functions and understand properties of functions.

Reading Borderline Performance Description  
College Preparedness  
Operational Workshop  
(Version 4.0)

Students who are minimally prepared for placement into entry-level, credit-bearing, post-secondary courses should be able to do the following, at a simple level, with the texts they encounter:

They should be able to understand the role of context in the meaning of words. They should be able to locate relevant information in texts and explain why the information is included. They should be able to draw simple inferences from what they read and develop interpretations of a text by offering evidence to support their interpretations. They should be able to recognize and understand the organizational elements or patterns of a text. They should be able to identify the intended audience and purpose of the text. They should be able to identify, analyze, and evaluate the author's argument and evidence. They should be able to identify and explain the author's point or theme using the text as reference. They should be able to make connections among ideas within and across texts and draw conclusions based upon relevant evidence. They should understand figurative language within the text.

