

## NAEP MATHEMATICS FRAMEWORK UPDATE

Since its creation by Congress in 1988, the National Assessment Governing Board oversees and sets policy for NAEP in several congressionally-mandated areas, which include determining content to be assessed in NAEP. For each NAEP assessment, the Board conducts a framework development process resulting in a NAEP framework that outlines what is to be measured and how it will be measured. The process also produces test specifications with more detailed guidance for NCES assessment development, as well as recommendations for contextual variables to help stakeholders interpret student achievement in the subject area. The Governing Board has developed assessment frameworks and specifications in 11 subject areas.

In March 2018, the Governing Board adopted a revised Framework Development Policy. The revised policy continues the Board's tradition of conducting a comprehensive, inclusive, and deliberative process to determine the content and format of all NAEP assessments and adds details to address Board processes for framework review and updating.

In May 2018, the Assessment Development Committee (ADC) initiated a review of the [NAEP Mathematics Framework](#), which was last updated in 2001. The Board anticipates updates to several frameworks to support enhanced digital-based assessment. In accordance with the Board's Framework Development Policy, the ADC review included papers and discussions with an array of mathematics educators and experts, and focused on the relevance of the current NAEP Mathematics Framework.

Development and updates of NAEP assessment frameworks typically include reviews of recent research on teaching and learning, changes in state and local standards and assessments, and other factors. To inform its broader discussions about the extent to which the NAEP Mathematics Framework needs revisions, the Board decided it would be prudent to gather and analyze mathematics curricular standards from all states. The ADC NAEP Mathematics Framework review included a comprehensive analysis of how the NAEP Mathematics Framework for grades 4 and 8 relates to mathematics content standards used across the country.

ADC Chair Shannon Garrison will introduce and lead discussion on the Committee's recommendation for the NAEP Mathematics Framework. A draft of the recommendation is attached, along with the Governing Board Framework Development Policy. The Committee's recommendation is slated for full Board action. It will serve as a springboard for the update process to begin in Fall 2018, when the Board convenes Visioning and Development Panels to draft detailed framework update recommendations.

## **The National Assessment Governing Board Charge to the Visioning and Development Panels For the 2025 National Assessment of Educational Progress (NAEP) Mathematics Framework**

**Whereas**, The Nation's Report Card—also known as the National Assessment of Educational Progress (NAEP)—is mandated by Congress to conduct national assessments and report data on student academic achievement and trends in public and private elementary schools and secondary schools, and is prohibited from using any assessment to “evaluate individual students or teachers” or “to establish, require, or influence the standards, assessments, curriculum, ... or instructional practices of states or local education agencies” ([Public Law 107-279](#));

**Whereas**, Congress specifically assigned the National Assessment Governing Board responsibilities to “develop assessment objectives consistent with the requirements of this [law] and test specifications that produce an assessment that is valid and reliable, and are based on relevant widely accepted professional standards”;

**Whereas**, the Governing Board’s [Strategic Vision](#) adopted in November 2016 established that the Board will, “develop new approaches to update NAEP subject area frameworks to support the Board's responsibility to measure evolving expectations for students, while maintaining rigorous methods that support reporting student achievement trends”;

**Whereas**, the Governing Board established in its [Framework Development Policy](#) that the Board shall conduct “a comprehensive, inclusive, and deliberative process” to determine and update the content and format of all NAEP assessments;

**Whereas**, in accordance with the Governing Board’s Framework Development Policy, the Board’s Assessment Development Committee conducted a review of the current NAEP Mathematics Framework, which included papers from leading mathematics educators and a comprehensive analysis of current mathematics standards in all 50 states, the District of Columbia, and the Department of Defense Education Activity;

**Whereas**, based on the review of the NAEP Mathematics Framework conducted by the Assessment Development Committee, the Committee concludes that much of the framework remains relevant, observes that digital platforms and new research encourage innovation in the content and format of future NAEP Mathematics Assessments, and recommends that the Board update the NAEP Mathematics Framework last updated in 2001 “to be informed by a broad, balanced, and inclusive set of factors” balancing “current curricula and instruction, research regarding cognitive development and instruction, and the nation’s future needs and desirable levels of achievement, ” in accordance with the Framework Development Policy;

**Therefore,**

- The National Assessment Governing Board staff, with appropriate contractor support and oversight by the Governing Board's Assessment Development Committee, shall conduct a framework update by establishing a Visioning Panel with a subset of members continuing as the Development Panel, in accordance with the Governing Board Framework Development Policy;
- All processes and procedures identified in the Governing Board Framework Development Policy shall be followed;
- The Visioning and Development Panels will recommend to the Board how best to balance necessary changes in the NAEP Mathematics Framework at grades 4, 8, and 12, with the Board's desire for stable reporting of student achievement trends and assessment of a broad range of knowledge and skills, so as to maximize the value of NAEP to the nation; and the Panels are also tasked with considering opportunities to extend the depth of measurement and reporting given the affordances of digital based assessment;
- The update process shall result in three documents: a recommended framework, assessment and item specifications, and recommendations for contextual variables that relate to student achievement in mathematics;
- At the conclusion of the NAEP Mathematics Framework update process, the National Assessment Governing Board shall review recommendations from the Visioning and Development Panels, and take final action on recommended updates to the mathematics framework, assessment specifications, and subject-specific contextual variables; and
- The framework update adopted by the Board will guide development of the 2025 NAEP Mathematics Assessment.



**Adopted: March 3, 2018**

# **National Assessment Governing Board**

## **Framework Development**

### **Policy Statement**

It is the policy of the National Assessment Governing Board to conduct a comprehensive, inclusive, and deliberative process to determine and update the content and format of all assessments under the National Assessment of Educational Progress (NAEP). The primary result of this process shall be an assessment framework (hereafter, “framework”) with objectives to guide development of NAEP assessments for students in grades 4, 8, and 12 that are valid, reliable, and reflective of widely accepted professional standards.

The Governing Board, through its Assessment Development Committee, shall monitor the framework development and update processes to ensure that the final Governing Board-adopted framework, specifications, contextual variables documents, and their development processes comply with all principles and guidelines of the Governing Board Framework Development Policy.

### **Introduction**

Since its creation by Congress in 1988, the Governing Board has been responsible for determining the content and format of all NAEP assessments. The Governing Board has carried out this important statutory responsibility by engaging a broad spectrum of stakeholders in developing recommendations for the knowledge and skills NAEP should assess in various grades and subject areas. From this comprehensive process, the Governing Board develops a framework to outline the content and format for each NAEP assessment at grades 4, 8, and 12. Development of a framework for a new assessment is guided by the schedule of NAEP assessments adopted by the Governing Board.

Under provisions of the National Assessment of Educational Progress Authorization Act of 2002 ([P.L. 107-279](#)), Congress authorized the Governing Board to continue its mandate for determining the content and format of valid and reliable assessments based on widely accepted professional testing standards and active participation of stakeholders. This mandate

aligns with the purpose of NAEP, which is to provide fair and accurate measurement of student academic achievement.

Given this mandate, the Governing Board must ensure that the highest standards of test development are employed in framework development to support the validity of educational inferences made using NAEP data. The Governing Board Item Development Policy details principles and guidelines for NAEP assessment items, and the Governing Board has final authority on the appropriateness of all assessment items.

By law, NAEP assessments shall not evaluate personal beliefs or publicly disclose personally identifiable information, and NAEP assessment items shall be secular, neutral, and non-ideological and free from racial, cultural, gender, or regional bias.

To develop the recommended framework for Board adoption, the Governing Board convenes stakeholders to identify the content and design for each NAEP assessment.

In this process, involved stakeholders include:

Teachers	Policymakers
Curriculum Specialists	Business Representatives
Content Experts	Parents
Assessment Specialists	Users of Assessment Data
State Administrators	Researchers and Technical Experts
Local School Administrators	Members of the Public

This Policy complies with the National Assessment of Educational Progress Authorization Act of 2002 ([P.L. 107-279](#)) and the documents listed below which express widely accepted technical and professional standards for test development. These standards reflect the agreement of recognized experts in the field, as well as the policy positions of major professional and technical associations concerned with educational testing. A procedures manual shall provide additional detail about how this Policy is implemented.

*The Standards for Educational and Psychological Testing.* (2014). Washington, DC: American Educational Research Association, American Psychological Association, and National Council on Measurement in Education.

*Code of Fair Testing Practices in Education.* (2004). Washington, DC: Joint Committee on Testing Practices.

*National Center for Education Statistics (NCES) Statistical Standards.* (2012).

# **Principles for Framework Development**

**Principle 1: Elements of Frameworks**

**Principle 2: Development and Update Process**

**Principle 3: Framework Review**

**Principle 4: Resources for the Process**

**Principle 5: Elements of Specifications**

**Principle 6: Role of the Governing Board**

# Guidelines for the Principles

## Principle 1: Elements of Frameworks

**The Governing Board is responsible for developing a framework for each NAEP assessment. The framework shall define the scope of the domain to be measured by delineating the knowledge and skills to be tested at each grade, the format of the NAEP assessment, and the achievement levels.**

### Guidelines

- a) The framework shall determine the extent of the domain and the scope of the construct to be measured for each grade level in a NAEP assessment. The framework shall provide information to the public and test developers on three key aspects of the assessment:
  - What is to be measured, including definitions of the constructs being assessed and reported upon and descriptions of the purpose(s) of the assessment;
  - How that domain of content is most appropriately measured in a large-scale assessment, including the format requirements of the items and the assessment, the content and skills to be tested at each grade, sample items for each grade to be tested, the weighting of the item pool in terms of content and cognitive process dimensions, and any additional requirements for the assessment administration unique to a given subject area, such as provision of ancillary materials and uses of technology; and
  - How much of the content domain, in terms of knowledge and skills, should students know and be able to do at the basic, proficient, and advanced levels in achievement level descriptions for each grade to be tested. The achievement level descriptions shall be based on the Governing Board's policy definitions for basic, proficient, and advanced achievement and shall incorporate the content and process dimensions of the assessment at each grade.
- b) The framework shall determine the construction of items for each NAEP assessment. The achievement level descriptions in each framework shall also be used in the level-setting process.
- c) The framework shall focus on important, measurable indicators of student achievement to inform the nation about what students know and are able to do without endorsing or advocating a particular instructional approach.
- d) Content coverage in each subject and grade shall be broad, inclusive of content valued by the public as important to measure, and reflect high aspirations for student achievement. (See *Principle 4* for more detail on the factors balanced in content coverage.)
- e) Frameworks shall be written to be clear and accessible to educators and the general public. The framework shall contain sufficient information to inform all stakeholders about the nature and scope of the given assessment. Following Governing Board adoption, the framework shall be widely disseminated.

## Principle 2: Development and Update Process

**The Governing Board shall develop and update frameworks through a comprehensive, inclusive, and deliberative process that involves active participation of stakeholders.**

### Guidelines

- a) In accordance with the NAEP statute, framework development and update processes shall be fair and open through active participation of stakeholders representing all major constituents in the various NAEP audiences, as listed in the introduction above.
  - Framework panels shall reflect diversity in terms of gender, race/ethnicity, region of the country, and viewpoints regarding the content of the assessment under development.
  - Public comment shall be sought from various segments of the population to reflect many different views, as well as those employed in the specific content area under consideration.
- b) Framework development and update processes shall be executed primarily via two panels: a Visioning Panel with a subset of members continuing as the Development Panel. This process shall result in three documents: a recommended framework, assessment and item specifications, and recommendations for contextual variables that relate to the subject being assessed. For each framework,
  - The Framework Visioning Panel shall formulate high-level guidance about the state of the field to inform the process, providing these in the form of guidelines. The major part of the Visioning Panel work will be at the beginning to provide initial guidance for developing a recommended framework. The Visioning Panel shall be comprised of the stakeholders referenced in the introduction above. At least 20 percent of this panel shall have classroom teaching experience in the subject areas under consideration. This panel may include up to 30 members with additional members as needed.
  - The Framework Development Panel shall develop drafts of the three project documents and engage in the detailed deliberations about how issues outlined in the Visioning Panel discussion should be reflected in a recommended framework. As a subset of the Visioning Panel, the Development Panel shall have a proportionally higher representation of content experts and educators, whose expertise collectively addresses all grade levels designated for the assessment under development. Educators shall be drawn from schools across the nation, including individuals who work with students from high-poverty and low-performing schools, as well as public and private schools. This panel may include up to 15 members, with additional members as needed.
- c) In addition to a recommended framework, the framework development or update process shall result in assessment and item specifications (see *Principle 5*) and recommendations on



related contextual variables to be collected from students, teachers, and school administrators. Recommendations shall take into account burden, cost, quality of the data to be obtained, and other factors. (See the Governing Board [Policy on Collecting and Reporting Contextual Data](#).)

- d) The scope and size of a framework development project shall determine the size of framework panels and the number of panel meetings needed. A framework update project may require smaller panels and fewer meetings if a smaller scope is anticipated for recommended revisions. Each project shall begin with a review of major issues in the content area. For a framework update, the project shall also begin with an extensive review of the current framework, and the Visioning Panel shall discuss the potential risk of changing frameworks to trends and assessment of educational progress. (See 4.b).
- e) Framework development and updating shall be comprehensive in approach and conducted in an environment that is open, balanced, and even-handed. Panels shall consider all viewpoints and debate all pertinent issues in formulating the content and design of a NAEP assessment, including findings from research. Reference materials shall represent multiple views.
- f) For each project, protocols shall be established to support panel deliberations and to develop a unified proposal for the content and design of the assessment. Written summaries of all hearings, forums, surveys, and panel meetings shall be made available in a timely manner to inform deliberations.

### **Principle 3: Framework Review**

**Reviews of existing frameworks shall determine whether an update is needed to continue valid and reliable measurement of the content and cognitive processes reflected in evolving expectations of students.**

#### **Guidelines**

- a) At least once every 10 years, the Governing Board, through its Assessment Development Committee (ADC), shall review the relevance of assessments and their underlying frameworks. In the review, the ADC shall solicit input from experts to determine if changes are warranted, making clear the potential risk of changing frameworks to trends and assessment of educational progress. The Board may decide based on the input that the framework does not require revision, or that the framework may require minor or major updates. To initiate updates, the ADC shall prepare a recommendation for full Board approval. Minor updates include clarifications or corrections that do not affect the construct defined for the assessment. Major updates shall include the convening of a Visioning Panel (see *Principle 2*). Framework revisions shall also be subject to full Board approval.
- b) Within the 10 year period for an ADC review, major changes in the states' or nation's educational system may occur that relate to one or more NAEP frameworks. In this instance, the ADC will determine whether and how changing conditions warrant an update

and the Governing Board via recommendation may convene a Visioning Panel to revise or replace the framework. Before framework panels are convened, special research and analysis may also be commissioned to inform the updates to be considered.

- c) If the Visioning Panel recommends major updates, then a subset of panel members shall continue as the Development Panel to develop the draft framework and assessment and item specifications, in accordance with *Principle 2*. Regular reports will be provided to the ADC and the recommended framework update shall be subject to full Board approval.
- d) When a framework update is conducted, framework Visioning and Development Panel recommendations shall describe the extent to which adjustments in the achievement level descriptors (see *1.a*) and contextual variables (see *2.c*) are needed. (See the Governing Board [Policy on Achievement Levels](#) and the Governing Board [Policy on Collecting and Reporting Contextual Data](#) for additional details.)

## **Principle 4: Resources for the Process**

**Framework development and update processes shall take into account state and local curricula and assessments, widely accepted professional standards, exemplary research, international standards and assessments, and other pertinent factors and information.**

### **Guidelines**

- a) The NAEP framework development and update processes shall be informed by a broad, balanced, and inclusive set of factors. The framework shall reflect current curricula and instruction, research regarding cognitive development and instruction, and the nation's future needs and desirable levels of achievement. This delicate balance between “what is” and “what should be” is at the core of the NAEP framework development process.
- b) An initial compilation of resources shall summarize relevant research, advantages and disadvantages of the latest developments, and trends in state standards and assessments for the content area. This compilation shall also summarize how stakeholders have used previous NAEP student achievement trends in the assessment area. The compilation may include public comment. Using this compilation as a springboard, framework panel deliberations shall begin by thoroughly identifying major policy and assessment issues in the content area.
- c) The framework panels shall also consider a wide variety of resources as deliberations proceed, including but not limited to curriculum guides and assessments developed by states and local districts, widely accepted professional standards, scientific research, other types of research studies in the literature, key reports having significant national and international interest, international standards and assessments, other assessment instruments in the content area, and prior NAEP frameworks, if available.
- d) Technical experts shall be involved to uphold the highest technical standards for development of the NAEP framework and specifications. As a resource to the framework

panels, these experts shall respond to technical issues raised during panel deliberations.

- e) In balancing the relative importance of various sources of information, framework panels shall consider direction from the Governing Board, the role and purpose of NAEP in informing the public about student achievement, the legislative parameters for NAEP, constraints of a large-scale assessment, technical assessment standards, issues of burden and cost-effectiveness in designing the assessment, and other factors unique to the content area.

## **Principle 5: Elements of Specifications**

**The specifications document shall be developed for use by NCES as the blueprint for constructing the NAEP assessment and items.**

### **Guidelines**

- a) The assessment and item specifications shall produce an assessment that is valid, reliable, and based on relevant widely accepted professional standards. The specifications shall also be consistent with Governing Board policies regarding NAEP design, such as groupings of items, test administration conditions, and accommodations for students with disabilities and English language learners (see the Governing Board [Policy on NAEP Testing and Reporting on Students with Disabilities and English Language Learners](#)). The specifications shall be reviewed by technical experts involved in the process, prior to submission to the Governing Board.
- b) The primary audience for the specifications, or assessment blueprint, shall be NCES and the contractor(s) responsible for developing the assessment and the test questions.
- c) The specifications shall evolve from the framework and shall be written in sufficient detail so that item writers can develop high-quality questions based on the framework objectives for grades 4, 8, and 12, where applicable. The specifications shall include, but not be limited to detailed descriptions of:
  - the content and process dimensions, including the weighting of those dimensions in the pool of questions at each grade;
  - types of items;
  - guidelines for stimulus material;
  - types of response formats;
  - scoring procedures;
  - achievement level descriptions;
  - administration conditions;
  - ancillary or additional materials, if any;
  - considerations for special populations;
  - sample items, including a substantial number and range of sample items with scoring guidelines for each grade level; and
  - any unique requirements for the given assessment.
- d) Special studies, if any, to be conducted as part of the assessment shall be described in the

specifications. This description shall provide an overview of the purpose and rationale for the study, the nature of the student sample(s), and a discussion of the instrument and administration procedures.

## **Principle 6: Role of the Governing Board**

**The Governing Board, through its Assessment Development Committee, shall monitor all framework development and updates. The result of this process shall be recommendations for Governing Board action in the form of three key documents: the framework; assessment and item specifications; and contextual variables that relate to the subject being assessed.**

### **Guidelines**

- a) The Assessment Development Committee (ADC) shall be responsible for monitoring framework development and updates that result in recommendations to the Governing Board on the content and format of each NAEP assessment. The ADC will provide direction to the framework panels, via Governing Board staff. This guidance shall ensure compliance with the NAEP law, Governing Board policies, Department of Education and government-wide regulations, and requirements of the contract(s) used to implement the framework project.
- b) When a framework Visioning Panel is to be convened, the ADC shall develop a charge for the panel, and the charge shall be subject to full Board approval. The charge will outline any special considerations for an assessment area.
- c) The ADC shall receive regular reports on the progress of framework development and updates.
- d) In initiating a framework update, the Governing Board shall balance needs for stable reporting of student achievement trends. Regarding when and how an adopted framework update will be implemented, the Board may consider the NAEP Assessment Schedule, cost and technical issues, and research and innovations to support possibilities for continuous trend reporting.
- e) At the conclusion of the framework development or update process, the Governing Board shall take final action on the recommended framework, specifications, and contextual variables. The Governing Board shall make the final decision on the content and format of NAEP assessments.
- f) Following adoption by the Governing Board, the final framework, specifications, and contextual variables shall be provided to the National Center for Education Statistics (NCES). These documents, which include the achievement level descriptions for Basic, Proficient, and Advanced performance definitions, are provided to NCES to guide development of NAEP test questions and questionnaires.