Geography Framework for the 2014 National Assessment of Educational Progress

National Assessment Governing Board
U.S. Department of Education

The National Assessment Governing Board

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Geography Framework for the 2014 National Assessment of Educational Progress

Developed under contract number RN 91073001 by the Council of Chief State School Officers with the National Assessment Governing Board

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Preface

By the National Assessment Governing Board

For more than a generation, geography has been badly neglected in American schools. The consequence is widespread ignorance of our own country and of its place in the world.

In preparing the content framework for this exam, the National Assessment Governing Board was guided by the conviction that a broad knowledge of geography is an essential part of a full education. This is particularly true at a time when the lives of nearly all our citizens are deeply affected by what happens throughout the world. The impact comes not only from political and diplomatic events, but also—and at times more powerfully—from the cross-currents of an increasingly global economy.

With this in mind, the committees of researchers, teachers, and geography specialists who prepared the framework were charged by the Governing Board to propose a rich and rigorous assessment design. In addition, the framework committees were asked to prepare preliminary descriptions of achievement levels that truly reflect world-class standards.

The achievement levels describe what students should know and be able to do to reach *Basic*, *Proficient*, and *Advanced* levels of achievement in grades 4, 8, and 12—the 3 grades tested by the National Assessment of Educational Progress (NAEP).
Under Governing Board policy, the expectations for these levels are high. The *Proficient* level represents competency over challenging subject matter.

To do well on this assessment, students will have to reach far beyond place-name geography, although they will be expected to know the names of many places with which they may not now be familiar. They will be tested both on knowledge and on analytic and problem-solving skills. About half of the testing time will be spent on multiple-choice questions. The other half will be spent on a variety of open-ended and extended-response items.

Thus, the assessment will provide important information as to where our students are and a far clearer notion of where they ought to be in geography. With its rigor and breadth, the assessment may well appear extremely challenging. We hope it will help schools, teachers, and students set their sights high.

Executive Summary

The purpose of geography education is to foster the development of citizens who will actively seek and systematically apply the knowledge and skills of geography in life situations. Geography education must be responsive to the abilities and needs of students and to the societal and workplace requirements of the community, the nation, and the world. Through rigorous instruction and an adaptable K-12 curriculum, geography education helps prepare students to cope with the complexities of contemporary life.

This framework is designed to assess the outcomes of students' education in geography in grades 4, 8, and 12 as part of the National Assessment of Educational Progress (NAEP). It melds key physical science and social science aspects of geography into a cohesive and topical whole. It focuses on what geography students should know to be competent and productive 21st-century citizens, and uses three content areas for assessing those outcomes of geography education. These content areas are Space and Place, Environment and Society, and Spatial Dynamics and Connections. Space and Place, which encompasses geography's basic fundamentals, should be assessed by 40 percent of the questions at grades 4, 8, and 12. The other content areas, which are more sophisticated, should be assessed by 30 percent of the questions at each of the 3 grade levels.

NAEP will include questions to measure students' cognitive abilities at a basic Knowing level, a more complex Understanding level, and at an Applying level that covers a broad range of critical-thinking skills.

In addition, the framework describes what students should know and be able to do using the NAEP achievement level criteria of *Basic, Proficient*, and *Advanced* at all three grade levels. *Advanced* achievement should equal the performance expected of top students in other industrialized nations.

The Governing Board has scheduled a national assessment in geography for 2014 to gauge knowledge and skills of the nation's eighth-grade students. Due to limited funding, the Governing Board decided to conduct the assessment at only grade 8 for 2014. This Geography Assessment will use the same framework as in 1994 to enable NAEP to report on trends in student achievement from 1994 to 2014.

Introduction

This document provides the framework to guide the development of the assessment instruments for the 2014 National Assessment of Educational Progress (NAEP) in geography. Altogether, four documents will be designed to guide the geography assessment and this assessment framework is the first. The others are the assessment and exercise specifications, the background variables and educational policies, and the student achievement data.

The National Assessment of Educational Progress

Due to limited funding, NAEP will perform an assessment of the geographic knowledge and skills of students at only grade 8 throughout the United States in 2014. The 2014 assessment continues the trend line from 1994, 2001, and 2010. Since 1969, NAEP—The Nation's Report Card—has used a national sample to survey what students know and can do in specific subjects at ages 9, 13, and 17, and—since the early 1980s—in grades 4, 8, and 12 as well.

NAEP assessments are viewed by policymakers as the most comprehensive measures of students' learning outcomes at critical junctures in their school experience. They are the only nationwide assessments that are designed to monitor American educational achievement. Congressionally authorized and federally funded, NAEP is charged with collecting and reporting educational achievement data in specific subjects: geography, reading, writing, mathematics, science, U.S. history, and other subjects. It is also charged with monitoring trends in student achievement in these subjects over time.

Prior to 1990, NAEP reported data only on a national and regional basis. But in 1990, NAEP conducted a trial assessment and reported data on eighth-grade mathematics on a state-by-state basis. The trial was repeated in 1992 with state-level assessments in mathematics at grades 4 and 8, and in reading at grade 4. State-by-state reporting has continued as parents and policymakers interested in raising student knowledge and skill levels seek

reliable data on student achievement at the state level. Data that allow comparisons among states provide incentives for much-needed improvements in student performance. In 2002, NAEP also began to report results for a number of large urban school districts.

In 1994, NAEP assessed geography learning at grades 4, 8, and 12 for the first time. This assessment was repeated in 2001 and 2010. The most reliable geography assessment prior to 1994 was carried out by NAEP in 1988 and involved a sample of 3,000 high school seniors. While the test instrument used was technically of high quality, and a representative sample of students was tested, the data obtained reflected the knowledge of only one segment of the school population.

Another important development in geography education occurred in October 1994, with the publication of the *National Geography Standards*. These widely disseminated standards were developed "to help students to see, understand, and appreciate the web of relationships between people, places, and environments" (Geography Education Standards Project, 1994). While NAEP's geography framework predated the geography standards, the two documents share common goals and expectations for our nation's students.

Framework Development

The NAEP geography framework was developed for the National Assessment Governing Board, the policymaking body established by Congress in 1988 to oversee the activities of the National Assessment of Educational Progress. The work was conducted through a contract that was awarded to the Council of Chief State School Officers in June 1991.

Through an intensive process, a planning committee of teachers, curriculum coordinators, geographic educators, academic geographers, assessment experts, and lay people worked for eight months to draft the NAEP geography framework. This work was guided by a steering committee made up of members of key education and policy organizations augmented by members of business and government agencies.

The framework represents a comprehensive overview of the most essential outcomes of students' geography education at the prescribed grade levels as determined by the project committees and by the testimony of numerous witnesses at three public hearings.

Designed to guide the development of assessment instruments, the framework cannot encompass everything that is taught in geography in all of the nation's classrooms, much less everything that should be taught. Nevertheless, this broad and innovative framework attempts to capture the range of geography content and thinking skills that students should possess as they progress through school. The framework's content embraces the complex problems of modern life that students will inevitably encounter both inside and outside their classrooms. It should be viewed, therefore, both as a guide for assessment and a potential tool for crafting a relevant and contemporary geography curriculum as it reflects the discipline's involvement in the complexities of contemporary issues.

Chapter One

The Nature of Geography Education and the Geography Curriculum

Mission Statement

The purpose of geography education is to foster the development of citizens who will actively seek and systematically apply the knowledge and skills of geography in life situations. Geography education must be responsive to the abilities and needs of students and to the societal and workplace requirements of the community, the nation, and the world. Through rigorous instruction and an adaptable K-12 curriculum, geography education helps prepare students to cope with the complexities of contemporary life.

As the world becomes more interconnected through technological advancement and shared concerns about economic, political, social, and environmental issues, the need for geographic knowledge increases. Conditions and events occurring around the world, in industrialized nations as well as in less developed ones, affect the social and economic well-being of our citizens. Increased economic power and initiatives of other nations, changes in their politics and policies, and their abilities to affect global environmental quality validate the need for our nation's students to be internationally competent 21st-century voters, workers, parents, and leaders. Comprehensive knowledge, understanding, and application of geography's content and perspectives are essential to responsible citizenship because geography brings coherence to the causes and effects of physical and human events that occur on Earth's surface.

The Nature of Geography

Everything exists in space. Geography's concern is space. Geography uses a spatial perspective to study the arrangement and interaction of people and places over Earth's space. By understanding and using a spatial perspective, students seek

answers to the questions: What is it? Where is it? Why is it there? What is the significance of its location?

Geography teaches students to organize their thinking with a view that encompasses the spatial analysis of the properties of Earth's surface. It concentrates on the ideas of distance and connections. It views the physical and human elements on Earth's surface as interacting systems that connect the human experience with the natural environment.

Geography presents a framework for addressing local, regional, national, and global questions. Through geographic inquiry, which fosters critical-thinking skills, students learn that the spatial distribution and arrangements of people, places, and events are critical elements in a comprehensive knowledge of their world.

Geography captures students' imaginations through its focus on exploration and adventure. It helps students appreciate the meaning of their own place in the immediate world of childhood and adolescence—a sense of place in terms of home, school, and neighborhood. As an active mode of inquiry, an understanding of geography enables students to view issues involving people and places from multiple perspectives through travel, books, newspapers, television, and other media.

Geography Tools, Analytical Concepts, and Skills

The study of geography requires the use of numerous tools, concepts, and skills:

Tools, when used in conjunction with direct observation of a place and its characteristics, allow students to derive information and knowledge about the world, to enhance their spatial perspectives, and to develop an understanding of analysis in geography. Graphic tools range from simple maps to complex computer graphics. Those teachers and students who have access to computers increasingly recognize their usefulness across grade levels as a means of enhancing knowledge and broadening the skill base in geography.

Maps, geography's most basic tool, are used to study spatial patterns. Maps may range from very personal mental maps to complex map projections, cartograms, and thematic maps. Other tools include atlases, globes and other three-dimensional models, and raised relief maps.

In addition, this tool category encompasses aerial photographs and satellite images that provide graphic data that allow students to study Earth in detail. Increasingly, spatial data are manipulated by the use of computers. For example, geographic information systems (GIS), tools most frequently employed for this manipulation, work with data that analyze both actual and potential land use and landscape patterns.

Analytical concepts are also fundamental to geographic inquiry. These concepts—Scale, Change, Diversity, Models, and Systems—can be used singly or in combination to describe and explain spatial patterns and processes as well as human interactions with the environment.

Scale refers to relative measurements or dimensions—the effects of spatial size on events. Geography students must be able to use a large-scale or small-scale perspective, understanding that explanations at different scales may provide different answers.

Change reflects the sequencing of events over time. Just as the natural environment changes, human environments also change continually as technology, perceptions, attitudes, and human interaction undergo transformations.

Diversity refers to the variety of natural environments and peoples on Earth. Just as the world's ecosystems require diverse life forms to maintain balance and health, so are human communities enriched and strengthened (or sometimes confused or threatened) by contact between cultures. Natural diversity provides people with food sources and raw materials for products, as well as natural purifying and recycling processes that sustain life on Earth. Cultural diversity—and its study through the examination of geographic origins and characteristics of many peoples on Earth—clarifies students' perceptions as to how different cultures contribute to life in the United States and to life in other nations.

Models represent the underlying structure of events. Geographers use models to understand and explain complex relationships, filter information, and identify and explain important processes and elements of environments, cultures, and interactions between environment and society.

Systems organize the understanding of events into part and whole relationships. Systems have interrelated inputs, outputs, flows, interactions, feedback, boundaries, patterns, and processes.

Systems occur at many scales and may be static or in balance through dynamic equilibrium. They include ecosystems, weather systems, and systems of global ocean currents, as well as transportation networks, communications systems, and urban infrastructures.

Geographic skills are used by students to manage and apply the content of geography. These skills include learning to use geography's tools and analytical concepts noted above and other skills that enable students to analyze things geographically. In this process it is essential that students learn to ask geographic questions; to acquire information from primary and secondary sources; to learn the skills of observation and speculation; to gain the ability to analyze, synthesize, and evaluate geographic information; and to develop and test geographic generalizations. Geographic skills also include the abilities to employ statistical analysis and use GIS and other computer-based applications noted earlier.

Geography in the Curriculum

Since the Joint Committee on Geographic Education published *Guidelines for Geographic Education–Elementary and Secondary Schools* in 1984, the Five Themes of Geography have provided teachers with a convenient instructional framework for teaching and learning geography. These themes—Location, Place, Human/Environment Interaction, Movement, and Regions—serve as powerful content organizers for geography.

Many classroom teachers assigned to teach geography have little, if any, formal geography instruction beyond place names and map identification. Geographers and educators designed the Five Themes, therefore, to establish major strands of geography for instruction in social studies, history, and other classes. They provide windows through which teachers can view geography content. Thus, the Five Themes serve as an instructional framework for organizing ideas in the teaching of geography.

In contrast, this *NAEP Geography Framework* and its three content outcomes serve to clarify specifics of subject matter that should be measured in the NAEP geography assessment. These content areas—Space and Place, Environment and Society, and Spatial Dynamics and Connections—are designed

to structure the development and reporting of assessment exercises that measure the outcomes of student learning (see figure 1).

The Five Themes of Geography embrace the following instructional concepts:

Location refers to the absolute location, usually determined by use of latitude and longitude coordinates, of places and people on Earth. Location also refers to relative location determined by associating a particular place with other places ("near to," for example, or "a short drive from"). Before any geographic analysis or higher-order thinking can take place, it is essential to know the location of the place one is trying to understand.

Place refers to the describable physical and human characteristics of places. All places on Earth have distinctive tangible and intangible characteristics that give them meaning and character and distinguish them from other places. Using observation and description, the themes of Location and Place set the stage for further geographic analysis.

Human/Environment Interaction refers to how people interact with particular places. All places on Earth have advantages and disadvantages for human settlement. This theme encourages the study of the modification and transformation of environments by human and physical causes and the effects of physical features on the lives of people.

Movement refers to people interacting with each other on Earth. Humans occupy places unevenly on Earth, but they interact with each other through the transportation of commodities and through travel, trade, information flows, and political events. This theme also concentrates on the patterns of human migration and the movement of ideas from one place to another.

Regions are a basic unit of geography study. A region is an area that displays a coherent unity in terms of specific criteria, such as a governmental unit, a language group, or a landform type. Regions are human constructs, and they can be mapped and analyzed.

The themes of Human/Environment Interaction, Movement, and Regions are designed to organize geographical concepts and stimulate problem-solving, critical thinking, and decision-making. They flow from the factual knowledge gained in the observation and description of the first two themes.

Figure 1. Geography instructional themes and content learning outcomes for the NAEP assessment framework

INSTRUCTION ——— ASSESSMENT

Organizing Ideas	NAEP Assessment Framework
Five Themes of Geography*	**Three Content Outcomes**
LOCATION Position on Earth's Surface	**SPACE AND PLACE** Knowledge of geography related to particular places on Earth, to spatial patterns on Earth's surface, and to physical and human processes that shape such patterns.
PLACE Physical and Human Characteristics	
HUMAN/ENVIRONMENT INTERACTION Relationships Within Places	**ENVIRONMENT AND SOCIETY** Knowledge of geography related to the interactions between environment and society.
MOVEMENT Humans Interacting on Earth	
REGIONS How They Form and Change	**SPATIAL DYNAMICS AND CONNECTIONS** Knowledge of geography related to spacial variations and connections among people and places.

INSTRUCTION ——— ASSESSMENT

**Guidelines for Geographic Education—Elementary and Secondary Schools*. Joint Committee on Geographic Education of the National Council for Geographic Education and the Association of American Geographers, 1984.

Chapter Two

Overview of the Framework for the 2014 NAEP Geography Assessment

The framework committees developing this *NAEP Geography Framework* sought to identify and evaluate the relative importance of and support for broad points of view. They studied the results of surveys of teachers and professors; scrutinized testimony of many interested citizens from the business, public interest, and education communities at 3 public hearings; questioned state assessment directors, curriculum supervisors, and geography teachers in K-12 and higher education; and reviewed state and district curriculum and assessment materials to determine current expectations of student achievement in geography. They also studied curricula and assessments from other nations to determine international expectations and evaluate the performance of their top students.

The committees found that, while emphasis on geography teaching in the United States is minimal, public leaders believe in the need for geographically knowledgeable citizens. Thus, the framework process was strongly influenced by mounting concern about our nation's geographic ignorance. The framework reflects this concern and endorses a strong commitment to geography education, with one guiding question foremost in mind: What fundamental geographic knowledge, understanding, and applications should students have mastered to be informed and productive 21st-century citizens?

The NAEP Geography Assessment

The committees designed a framework that provides test developers with a blueprint they must follow to develop a test instrument that is both interesting and compelling to students.

NAEP assessment instruments must measure the prescribed content and cognitive dimensions outlined in this framework. The committees have given careful consideration to what constitutes

Figure 2. NAEP Geography Assessment Framework elements

GEOGRAPHY ASSESSMENT FRAMEWORK ELEMENTS

Cognitive Dimension	Content Dimension		
	Space and Place	Environment and Society	Spatial Dynamics and Connections
Knowing	Where is the world's largest tropical rain forest?	What mineral resources are often extracted by strip mining?	What factors stimulate human migrations?
Understanding	Why are tropical rain forests located near the equator?	Explain the effects of strip mining and shaft mining on the landscape.	Explain the motivations of modern-day Mexicans and Cubans for immigrating to the United States.
Applying*	Support the conclusion that tropical rain forests promote wide species variation.	How can both economic and environmental interests be reconciled in an area of strip mining?	Compare current settlement and employment patterns of Cuban and Mexican immigrants in the United States.

Note: Example questions are illustrative only and are not meant to represent the full array of assessment content.
*Applying = a range of higher-order thinking skills

adequate levels of achievement (*Basic*, *Proficient*, and *Advanced*) at the three targeted grade levels. These achievement levels, based on informed judgments, describe what students should know and be able to do at grades 4, 8, and 12, as measured by NAEP (see chapter four).

Overview of Assessment Content Dimension

The framework is designed to capture the substance and practical applications of geography by assessing desired outcomes of students' geography education. It contains two primary dimensions: a content dimension and a cognitive (or thinking) dimension.

Three broad content areas make up the essential content dimension of the geography assessment. These content areas are represented in figure 2 as Space and Place, Environment and Society, and Spatial Dynamics and Connections.

Content Area One: Space and Place

Example: Where is New York City? Why is it there? What are its most notable features? How has its physical location contributed to its population growth and density?[1]

Spatial understanding is measured by questions such as these. It develops as students learn the context of place geography—where a specific place (or a particular thing) is located in the community, the nation, and the world. Knowing the location of a place is practical information, and thinking about why it is there and what it is like helps students develop an understanding of a place and the issues
that affect it. The spatial perspective helps students see the patterns and arrangements of places, things, and events that characterize Earth's space. Examples include the distributions of climates, crop regions, factories owned by multinational corporations, or sites where earthquakes occur. Studying patterns and the processes that shape them helps students understand and solve problems they will confront in their personal and civic lives.

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[1] All questions in this framework are presented as illustrative examples and should not be viewed as sample assessment items.

Fourth-grade students should have a foundation of basic knowledge of the human and physical world. They can use map scales, grids, and map projections, and can measure relief. Students should be able to synthesize facts into generalizations.

By eighth grade, the study of Space and Place has increased in sophistication (as have the other two content areas, Environment and Society, and Spatial Dynamics and Connections). Students begin to understand the practical applications of geography to everyday life. Students should be able to use latitude and longitude and have a solid knowledge of facts and concepts embraced by this content area. As Space and Place is taught during the middle school years, students should have a good sense of the location and general characteristics of places, of basic human and physical distribution patterns, and of the processes that create these patterns so that they have a working knowledge of the world.

By 12th grade, basic understandings acquired in middle school and high school will be elaborated on at increasing levels of sophistication. Performing simple statistical analyses and using remotely sensed images, for example, will prepare students to live in an increasingly complex, technologically innovative, and economically competitive world.

Content Area Two: Environment and Society

Example: What environmental modifications have enabled modern settlers to live in arid regions of the United States and Southwest Asia and/or North Africa?

Earth's surface is the fragile home for human activity. Knowing the answers to geography questions such as these makes comprehensible the web of interactivity that connects the human experience with the natural environment. Through knowledge of environment-society interactions, geography helps students learn how people depend on, adapt to, are affected by, and modify the natural environment. Many modifications, such as planting trees to reduce erosion from winds, may have positive consequences. Other modifications, such as locating a landfill over a groundwater source, may have negative consequences. The continually developing force of technology requires that society give even greater attention to the results and potential outcomes of environment-society interactions.

By the time they are in fourth grade, students should have been introduced to the fundamentals of weather, climate, and other

processes that form Earth's surface and be able to identify a range of environmental issues—from air quality and water pollution to the sometimes dramatic impacts of natural hazards on how and where people live. Students should be able to understand both their personal relationships with and responsibilities to the environment and society and begin to develop a local to global perspective.

By eighth grade, students should understand how humans depend on their environment and how they adapt to and change it. Students should be able to link environment to culture and economics and recognize and interpret environmental issues. They should be able to compare changes in landscape and identify associated causes and consequences.

By 12th grade, students should have a solid foundation in physical geography basic to the understanding of environment-society issues. They should recognize and explain cultural, political, and economic influences on agriculture, urbanization, and other land uses. Students should also be able to analyze the impact technology has on environment and society.

Content Area Three: Spatial Dynamics and Connections

Example: The rise of the Internet and new communication devices has greatly increased the speed at which news travels around the world. Describe the consequences of these developments on global communication.

An assignment such as this stimulates thinking about geography's spatial perspective and helps students understand the dynamics of connections among people and places. These connections are influenced by a wide variety of factors that characterize modern life, including advances in communications, transportation, and trade relationships; cultural and economic diversity; political change and tensions; human migration, travel, and tourism; and the diffusion of ideas, technological innovations, and disease epidemics. Distinguishing and understanding such connections augment a student's capacity to anticipate the impact that an event may have on distant but connected locations.

Fourth-grade students should be able to define and compare human characteristics among different places and should be aware of major patterns of spatial connections between regions. Students should be able to relate knowledge and understanding to the realities of issues in local areas.

By eighth grade, regional diversity becomes increasingly relevant to students who are struggling to understand themselves in the wider context of society and who are growing more aware of the rest of the world. Students have a broad appreciation of the causes and consequences of connections between regions at local to global scales and are developing problem-solving skills related to personal and societal decisions.

By 12th grade, students have joined or will soon be joining the workforce and will begin to participate in decision-making as citizens. Students should be able to synthesize previously learned geographic knowledge; acquire new concepts related to spatial aspects of geopolitics, economics, and human characteristics; and apply them to understanding the conflicts and compromises that characterize contemporary issues. Students should be able to think critically and analytically, so that they leave school with the problem-solving skills necessary for responsible decision-making.

Overview of Assessment Cognitive Dimension

Three cognitive areas displayed as horizontal rows on the framework (figure 2) specify areas of thinking expected of students as they embrace specific geography content. These cognitive areas are defined as Knowing, Understanding, and Applying (which covers a broad range of thinking skills). The cognitive dimension tests the student's ability to perform mental tasks in these areas and expects students in grades 4, 8, and 12 to be able to think geographically in 3 ways. All students will be given the opportunity to demonstrate their thinking abilities as they work with content appropriate to their grade levels.

Chapter Three

Specifics of the Framework for the 2014 NAEP Geography Assessment

The Governing Board has scheduled a national assessment in geography for 2014 to gauge knowledge and skills of the nation's eighth-grade students. Due to limited funding, the Board decided to conduct the assessment at only grade 8 for 2014. This Geography Assessment will use the same framework as in 1994 to enable NAEP to report on trends in student achievement from 1994 to 2014.

Content Domain

The three content areas addressed in this framework are each subdivided into topics, subtopics, and sample objectives for each grade level to illustrate the cumulative nature of geographic learning. The sample objectives are designed to demonstrate various levels of difficulty across a wide range of subject matter.

Content Area One: Space and Place

Knowledge of geography as it relates to particular places on Earth, to spatial patterns on Earth's surface, and to physical and human processes that shape such spatial patterns.

Basic to all geographic concern is the nature of space and place, and the patterns of places as they appear on Earth. Space is the basic resource and organizing element for geography. Patterns that are illustrated on maps come both from observation of natural features such as landforms and from human features such as farms and cities. This content area requires students to distinguish between and understand the spatial distribution of physical and human characteristics. To accomplish this, they must be able to locate significant features and places on Earth, to recognize existing patterns in the distribution of features and places, and to comprehend reasons for the development and existence of these patterns. This first content area provides the necessary support for the geographic learning implicit in Content Area Two (Environment and Society) and Content Area Three (Spatial Dynamics and Connections).

Topics falling within Content Area One are illustrated with sample objectives.

Topic I. Fundamental Place Location

Subtopic 1. Physical features and patterns of the physical environment such as major landforms, bodies of water, climate, and vegetation regions.

Sample Objectives:

Grade 4: Locate and label continents and oceans on a globe or world map.
Grade 8: Locate and label selected natural regions such as major mountain ranges and deserts on a world map.
Grade 12: Locate and label selected physical features such as a continental divide, a rift valley, and the drainage basin of the Amazon River on a world map.

Subtopic 2. Features and patterns of the human environment such as urban centers, farming regions, and political divisions.

Sample Objectives:

Grade 4: Locate countries and major cities in North America. Grade 8: Locate selected cities in the world of historical and current importance.
Grade 12: Locate and label cultural phenomena (such as major population centers), well-known cultural features (such as the Great Wall of China), and members of major political, economic, and ethnic alliances.

Topic II. Fundamental Geographic Concepts and Methods

Subtopic 1. Concepts such as absolute and relative location, proximity, separation, direction, region, hierarchy, density, and dispersion, and methods that are used to describe and analyze spatial patterns.

Sample Objectives:

Grade 4: Compare and contrast information about a region using maps drawn to different scales.
Grade 8: Draw boundaries around regions, describe their characteristics, and explain the regional criteria selected.
Grade 12: Analyze similarities and differences among regions.

Subtopic 2. Basic spatial units of measurement such as distance and area.

Sample Objectives:

Grade 4: Evaluate maps of the same area drawn at different scales to decide which is the best to answer particular questions.

Grade 8: Use alternative units of measure (miles, kilometers, time, cost, etc.) to compute and compare the distance between places.

Grade 12: Use varied types of scale (graphic, word, fractional) to measure distance on maps, globes, and aerial photographs.

Subtopic 3. Absolute location systems such as latitude-longitude and alphanumeric grids, and relative location terms such as "near to" and "distant from."

Sample Objectives:

Grade 4: Use number/letter grids to plot locations on a simple map.

Grade 8: Use latitude and longitude to specify and plot locations on a world map.

Grade 12: Explain and apply the relationship between degrees of longitude and time zones.

Topic III. Fundamental Physical Geography

Subtopic 1. Major spatial features and patterns in the natural environment such as those relating to climate, oceans, soils, landforms, and vegetation.

Sample Objectives:

Grade 4: Define landforms such as mountains, hills, valleys, plateaus, and plains.

Grade 8: Compare the characteristics of major regions shown on a world climate map.

Grade 12: Use an outline map of the world to define boundaries of various climate regions and explain the processes that create those characteristics.

Subtopic 2. Major processes, such as atmospheric circulation, weathering and erosion, ocean currents, plate tectonics, and vulcanism that shape patterns in the natural environment.

Sample Objectives:

Grade 4: Draw or describe ways that erosion changes the landscape.

Grade 8: Interpret, sketch, or build a model to show the components and processes in the formation of features on Earth's surface such as plains, hills, plateaus, and mountains.

Grade 12: Cite probable causes of particular natural events and relate them to long-term patterns such as earthquakes, volcanic eruptions, floods, hurricanes, and El Niño.

Topic IV. Fundamental Human Geography

Subtopic 1. Major spatial features and patterns in the cultural environment such as language, religion, and agriculture and economic, political, and demographic regions.

Sample Objectives:

Grade 4: Compare two landscapes that have both had characteristics added to them by humans.

Grade 8: Use databases (computerized or noncomputerized) displayed on tables, graphs, and maps to make inferences about urban population trends.

Grade 12: Define and chart selected demographic indicators (birth and death rates, population increases, population-doubling time, emigration and immigration patterns, population characteristics, gross domestic product) and evaluate the strengths and limitations of the indicators selected to answer particular questions.

Subtopic 2. Major processes such as settlement, migration, trade, technological development, diffusion, and landscape transformation that shape cultural patterns.

Sample Objectives:

Grade 4: Identify the processes that shape cultural patterns, such as time of day, traffic patterns, travel patterns, and selection of where to travel.

Grade 8: Interpret or sketch a model to show how push and pull factors affect population migrations to and within the U.S.

Grade 12: Form and test hypotheses to explain urban patterns such as population growth and decline, urban sprawl, and urban decay.

Content Area Two: Environment and Society

Knowledge of geography as it relates to the interactions between environment and society.

Geography is an integrative discipline that focuses on the interrelationships between the physical environment and society. Human adaptation to and modification of the environment have been of continual and increasing importance since the control of fire and the domestication of plants and animals. The delicate balance of nature has been altered in ways that have brought economic prosperity to some areas and have created environmental dilemmas and crises for others. Clearing land for settlements and farms provides habitation and food, for example, but at the same time alters natural systems and affects human populations, flora, and fauna. Understanding the nature, scale, and ramifications of such environmental transformations is fundamental in geography education.

Students must be aware that every environmental issue lends itself to many interpretations, depending on people's perspectives. Students must consider such multiple perspectives as they evaluate decisions about issues such as land use and resource development because the results of such decisions often have complicated and unpredictable consequences. A river dammed as a reservoir for flood control and multipurpose use, for example, may also flood human and animal communities or affect downriver water supplies. Making wise decisions concerning the costs and benefits of such environmental modification is an expressed goal of geography education.

Finally, students must understand the causes and effects of natural hazards and disasters on the livability of certain areas and that the phrase "a safe place to live" is subject to personal interpretation. Many people in the Netherlands, for example, live below sea level, protected from disaster by a series of dikes. Other people live in areas that are subject to tornadoes, floods, earthquakes, and hurricanes. Living in a naturally hazardous area, on a flood plain or volcanic island or in a place that is subject to extreme heat or cold, makes human habitation dangerous. Nevertheless, many people live in such areas.

Topics falling within Content Area Two are illustrated with sample objectives.

Topic I. Interactions Among Earth Systems

Subtopic 1. Interactions occur among Earth's natural systems such as the hydrosphere, lithosphere, biosphere, and atmosphere.

Sample Objectives:

Grade 4: Describe a natural system.
Grade 8: Explain relationships between major natural systems.
Grade 12: Explain ways in which major changes in the atmospheric system have effects on precipitation, stream flow, and flood frequency.

Subtopic 2. Interactions occur among Earth's human systems such as urban, agricultural, political, economic, and transportation systems.

Sample Objectives:

Grade 4: Use photos to identify different areas of a city.
Grade 8: Explain the relationships between two or more human systems such as transportation and urbanization.
Grade 12: Model and develop an economic system that connects a resource base to a city.

Subtopic 3. Interactions occur among natural and human systems such as a forest and a recreation area.

Sample Objectives:

Grade 4: Cite interactive elements of natural and human systems.
Grade 8: Explain the influence of natural systems on urban development, such as the relationships between topography and the built environment.
Grade 12: Explain the motivations required to shift a natural system such as grasslands to a human system such as a suburban tract development.

Subtopic 4. Changes in one system lead to changes within the system and in other systems such as the impact of El Niño on commercial fishing or the effects of drought on forest fires.

Sample Objectives:

Grade 4: Describe examples of how changes in rainfall can affect crop production.

Grade 8: Describe relationships that exist between systems such as climate and agriculture or landforms and transportation.

Grade 12: Explain the effects a specific change in one system can have on another system, such as the impact of organic fertilizers on groundwater quality.

Subtopic 5. Changes in a system can increase in scale and have regional and global implications, such as the eruption of Mount Pinatubo in the Philippines and its effect on the world's climate.

Sample Objectives:

Grade 4: Explain ways in which a major storm alters the life of both individuals and their community.

Grade 8: Explain the consequences of building a dam on a free-flowing river in relation to wildlife habitats, vegetation cover, and the control of flooding downstream.

Grade 12: Evaluate possible global environmental change as a result of technological innovations such as nuclear energy.

Topic II. Adaptations to Earth Systems

Subtopic 1. The environment is limited in its capacity to absorb the effects of human activity such as the impact of the imported Mediterranean fruit flies on California's produce production or of overhunting on the elephant population and tourism industry of Kenya.

Sample Objectives:

Grade 4: Locate and describe habitats of endangered species.

Grade 8: Illustrate how human activity can influence the survival of other species.

Grade 12: Explain why the biodiversity of plants and animals is decreasing because of human use of the environment.

Subtopic 2. Human adaptations to or modifications of the environment are influenced by the characteristics of specific environments such as weather and climate, landscape features, and natural resources.

Sample Objectives:

Grade 4: Describe human adaptations, such as clothing, types of housing, heating, and cooling, to climatic characteristics.
Grade 8: Describe and evaluate ways in which different societies adapt to or modify the environment through actions such as terracing mountainous terrain and irrigating deserts.
Grade 12: Describe and evaluate ways the carrying capacity of a particular region depends on many interrelated factors such as the availability of natural resources, climatic characteristics, topographic features, and population density.

Subtopic 3. Positive and negative consequences of human changes to the environment such as overgrazing and plowing arid land may temporarily increase food production but, over time, contribute to desertification.

Sample Objectives:

Grade 4: Cite examples that show how human activities such as producing energy for heating or dumping trash in landfills have both positive and negative consequences.
Grade 8: Identify examples of how complex alterations to the environment have positive and negative consequences.
Grade 12: Demonstrate how the limits of human knowledge of natural systems complicate decision-making by determining the cause-and-effect relationships and relative economic impacts of energy production on the acidity of rainfall.

Subtopic 4. Human systems are affected by the characteristics of natural systems such as weather, plate tectonics, and vulcanism.

Sample Objectives:

Grade 4: Identify examples of events such as earthquakes, floods, droughts, and hurricanes that can be destructive to humans, plants, and animals.
Grade 8: Explain the effects of natural system events such as earthquakes, volcanic eruptions, hurricanes, and tornadoes on people.
Grade 12: Evaluate the effectiveness of human attempts to limit damage from natural events and explain ways in which people who live in naturally hazardous areas adapt to their environment.

Topic III. Implications of Technology for Earth Systems

Subtopic 1. Use of technology results in changes to the environment, both intended and unintended. Transporting oil or chemicals by ship or rail, for example, can harm the environment if an accident occurs.

Sample Objectives:

Grade 4: Cite examples of technologies that have changed the environment in areas such as energy, transportation, and communications.

Grade 8: Explain the positive and negative effects of technology in reclaiming deserts, drilling for oil offshore, and building subterranean energy pipeline systems.

Grade 12: Provide examples of how the characteristics of environments such as climate are affected by use of technology.

Subtopic 2. Use of technology has positive and negative consequences on the environment and society, such as automobiles enhancing human mobility but car exhaust decreasing air quality.

Sample Objectives:

Grade 4: Cite types and uses of different technologies such as factories, hydroelectric dams, and power lines, and describe their effects on the local community.

Grade 8: Describe how technologies, such as the invention of automobiles, chain saws, bulldozers, and energy pipelines, have positive and negative effects.

Grade 12: Explain how strip mining has allowed enhanced access to subterranean resources while often increasing soil erosion, water contamination, and habitat destruction.

Topic IV. Perceptions of Earth Systems

Subtopic 1. People's perceptions of the same environment differ as their experiences and interests differ. A developer and an environmentalist may view the use of forest land at the edge of a city very differently. A farmer and an urban dweller may perceive the construction of a chemical fertilizer plant outside of town very differently.

Sample Objectives:

Grade 4: Describe a community environmental issue from more than one perspective.

Grade 8: Describe ways in which people view places differently—such as viewing cities as safe or unsafe places.

Grade 12: Evaluate examples of different viewpoints on the value of environmental modification on a regional to global scale.

Subtopic 2. People's perceptions of environmental modification change over time—such as the perceptions of industrial smokestacks in the 1920s versus the 1990s or the use of forest resources in the 19th and 20th centuries.

Sample Objectives:

Grade 4: Describe and evaluate ways in which technology, such as automobiles or air conditioning, has changed people's lives over time.

Grade 8: Explain what has caused the change in the general reaction to belching smokestacks, piles of coal, and massive factory complexes between the 1920s and today.

Grade 12: Compare possible reactions over time to an economic activity that involves risks to human health.

Content Area Three: Spatial Dynamics and Connections

Knowledge of geography as it relates to spatial connections among people, places, and regions.

Geography's spatial perspective helps students understand the dynamics of connections among people, places, and regions. Connections are made when people travel from place to place, when ideas and beliefs such as capitalism or Islam spread across the world, or when products such as petroleum and automobiles move from producing to consuming areas. These connections are influenced by a wide variety of factors, including trade relationships, political tensions and changes, human migration, and technological change. Their effects may be positive in providing expanded opportunities and progress. They may be negative (for example, in the cases of disease or military conflict). Or they may combine both positive and negative consequences in the sense of advantages for some and hardships for others.

This content area requires students to demonstrate comprehension of the cultural, economic, and political regions and the

connections among them. At advanced levels, this content area explores critical problem areas in human interaction, providing opportunities for systematic analysis and problem-solving. Students must understand how peoples and places are alike and how they differ and demonstrate that a comprehensive understanding of these similarities and differences can contribute to our performance as citizens on both a personal and a broad international scale.

Students should know that people of every nation are increasingly connected to and dependent on other peoples and places of the world for both human and natural resources. Modern transportation and communications help accelerate the movement of people and their goods and ideas from one place to another in a search to satisfy basic needs and wants. This movement of people, goods, and ideas can enrich the diversity of cultures, but it can also provoke tension among competing cultures.

Students should know that the world's resources are unevenly distributed and understand how this contributes to the movement of people and to patterns of warfare, as well as to patterns of trade. Students should also understand the increasing significance of human interdependence even while countless populations are searching for a clearer identity and independence. Such knowledge of the interaction of goods, people, and ideas between and among places is essential, for such patterns will increasingly define the world in which students live.

Topics falling within Content Area Three are illustrated with sample objectives.

Topic I. Spatial Dynamics Among People, Places, and Regions

Subtopic 1. The organization and identity of regions such as a neighborhood, a metropolitan area, or the American Midwest are affected by a variety of factors.

Sample Objectives:

Grade 4: List characteristics that define a region in the United States.

Grade 8: Identify ways in which a state's commonly accepted regional identity has a cultural and economic significance to its population.

Grade 12: Discuss ways in which regional economic and cultural vitality can change through the discovery of natural resources or the development of new transport technologies.

Subtopic 2. Relationships between and among places are affected by factors such as proximity and distance.

Sample Objectives:

Grade 4: Provide examples to show that the frequency of spatial interaction usually declines with distance.

Grade 8: Identify and explain spatial hierarchies and patterns such as those associated with shopping in a neighborhood store as opposed to a regional shopping center.

Grade 12: Use maps of agricultural land use in a variety of regions to draw conclusions about distance from market, value of product, and agricultural production.

Subtopic 3. Concepts of specialization and comparative advantage affect the location of economic activities such as U.S. specialization in commercial airplane production. The U.S. dominates in this field and therefore has a comparative advantage over other nations.

Sample Objectives:

Grade 4: Describe how people make a living in different places and regions.

Grade 8: Describe the relationships between natural resources, transportation, labor, and other factors in the location of economic activities.

Grade 12: Evaluate the comparative success of competing regions in the world economy.

Subtopic 4. Diverse cultures shape the characteristics of places and regions, such as the ways in which American grid cities differ from Islamic cities or ways in which various cultures construct housing.

Sample Objectives:

Grade 4: List the various cultural groups in a community and their contributions to that society.

Grade 8: Identify and describe values, attitudes, and perceptions of people as revealed in various modes of expression such as poems, songs, dances, stories, paintings, and photographs.

Grade 12: Cite the cultural, economic, and political consequences of various boundaries such as neighborhoods, school districts, and voting districts.

Topic II. Connections Among People, Places, and Regions

Subtopic 1. Concepts that are related to connections among people, places, and regions, such as systems and networks.

Sample Objectives:

Grade 4: Demonstrate knowledge of a geographic system (such as a school or town) as a set of mutually dependent parts that work together to perform a function.

Grade 8: Sketch and show the interplay between the parts of a system such as the highway system that connects their locale to the rest of their state.

Grade 12: Illustrate the interconnections between different systems.

Subtopic 2. Changes in information systems, communication networks, and transportation technologies increase connections among people and places, such as in the building of supertankers or in the completion of the Trans-Alaska Pipeline.

Sample Objectives:

Grade 4: Demonstrate a basic understanding of how technological change contributes to connections between people and places.

Grade 8: Explain how transportation and communication have changed over time and the effects of these changes on interaction among places and regions.

Grade 12: Speculate how changes in transportation and communications technologies may affect links between a community and the rest of the world.

Subtopic 3. Patterns of function in urban, suburban, and rural regions, such as land use and service requirements, are distinct.

Sample Objectives:

Grade 4: Identify the characteristics of urban, suburban, and rural areas.

Grade 8: Explain the interconnections between an urban area and its hinterland.

Grade 12: Analyze and explain land-value patterns in urban, suburban, and rural areas.

Subtopic 4. Geographic factors contribute to conflict and cooperation in social, political, and economic settings on a variety of scales, such as neighborhood youth and their perception of a local park as their territory, or the varying national claims on seabed resources.

Sample Objectives:

Grade 4: Describe how economic and geopolitical changes in one part of the world can affect people in distant places.

Grade 8: Analyze how regional differences (such as resources and religions) affect prospects for conflict and cooperation.

Grade 12: Use a case study to work with examples of conflict and cooperation on a geographic topic and evaluate issues cited in the study from multiple perspectives.

Subtopic 5. Transregional organizations (alliances, cartels, formal international organizations, and nongovernmental organizations) are formed to address common issues and to modify spatial characteristics, such as the creation of the Organization of the Petroleum Exporting Countries (OPEC) to influence the international price of petroleum.

Sample Objectives:

Grade 4: Demonstrate an awareness of organized responses to global, social, and environmental issues.

Grade 8: Identify international and regional organizations and alliances and relate them to global issues.

Grade 12: Identify changes in the nature of international partnerships and alliances in the 1990s, such as within NATO and OPEC.

Topic III. Movement Among People, Places, and Regions

Subtopic 1. Natural and cultural phenomena, such as coffee, cocaine, and capitalism, are spread by diffusion throughout the world.

Sample Objectives:

Grade 4: Cite examples of characteristics (such as foods, languages, and religions) that have spread from one culture to another.

Grade 8: Give examples of ways that concepts, practices, or substances spread from person to person and place to place.

Grade 12: Analyze and give examples of factors that affect the rate and extent of diffusion (such as population densities, distance, language, means of communication, economic systems, and political ideologies).

Subtopic 2. Human migration, both voluntary and involuntary (such as Russian Jews to Israel or Mexicans to the United States), occurs in patterns that appear over time.

Sample Objectives:

Grade 4: Cite examples of general routes of human migration over time.

Grade 8: Give examples and trace routes of human migrations, both large and small in scale, and suggest how these examples affect areas of interchange.

Grade 12: Analyze causes and consequences of migration for particular individuals and groups (refugees, ethnic groups, or specially skilled workers).

Subtopic 3. Unequal distribution of resources generates trade, encourages interdependence, and shapes economic patterns such as U.S. export of lumber to—and import of electronics from—Japan.

Sample Objectives:

Grade 4: Describe the difference between exports and imports and give examples of each.

Grade 8: Describe and explain the consequences for a region if trade networks shut down, even temporarily.

Grade 12: Compare and contrast economic trends influenced by differential resource distribution within and among regions.

Topic IV. Living Conditions—Regional Economic Dynamics

Subtopic 1. Standards of living relate to regional economic differences and relationships such as cities to farms, the Rust Belt to the Sun Belt, or the United States to Canada and Mexico.

Sample Objectives:

Grade 4: Identify how certain types of jobs are tied to specific locations.

Grade 8: Trace changes in spatial patterns caused by economic change and explain why recessions or booms affect some regions more than others.

Grade 12: Analyze current economic and employment indicators, trace the resulting spatial patterns, and apply to decisions about particular career choices.

Chapter Four

Characteristics of the Assessment

The framework committees made the following recommendations to guide the development of assessment instruments. These include general recommendations, recommended item types, content emphases, cognitive dimensions, and setting preliminary achievement levels.

General Recommendations

The NAEP geography assessment should be administered and reported on a state-by-state basis to better measure the progress that individual states are making in helping students learn geography. Limiting the reporting of data based on NAEP's traditional national and regional samples will lessen the potential impact of the assessment on policy and education reform. NAEP should also produce national and regional profiles to form baseline data for future comparison and policy implications. One measure of success toward reaching these goals is state-by-state reporting.

The committees believe test instruments should be translated into Spanish so that states choosing to do so may make the assessment available to limited-English proficient students who are primarily Spanish-speaking. A Spanish-language translation would enlarge the pool of students available for testing because NAEP currently limits its testing to students who are proficient in English.

In addition, the *Advanced* achievement level should equal world-class achievement. World-class achievement is defined as achievement in challenging subject matter comparable to that required of top students by other technologically advanced nations. (See information under Achievement Levels in Geography later in this chapter.)

Item Pool Recommendations

Multiple-choice questions will make up no more than 50 percent of the students' assessment time. The use of multiple-choice questions will give NAEP an opportunity to assess a wide range of content. By asking a number of questions that address a broad range of subject matter, NAEP will be able to measure and to report, with some assurance of precision, what students know (or do not know) over a wide spectrum of content.

Although there is some concern as to the ability to measure higher-order thinking skills using multiple-choice questions, many experienced assessment professionals believe that a series of good multiple-choice questions can measure knowledge of a subject at higher, as well as lower, cognitive levels.

The remaining 50 percent of the testing time will be made up of constructed-response exercises: short written answer (words, phrases, or a sentence or two), extended-response written items (one or more paragraphs), production exercises (the creation of maps, graphs, and charts), or a combination of response types. Up to 20 percent of the time devoted to constructed responses over all grades will include such production exercises.

The assessment at the fourth grade will include few extended-response written items. Younger students should not be required to write lengthy answers to demonstrate geographic competence—this could confound the measurement of knowledge of geography content. Both 8th- and 12th-grade students will be required to answer extended-response items, and the proportion of these items will be greater for older students.

Finally, some 8th- and 12th-grade students will be given a block of exercises (both multiple-choice and constructed-response) examining a single topic and requiring an in-depth interpretation of primary and secondary source material, including text, graphics, and/or photographs.

Content Dimension

In the K-12 curriculum, geography is often taught within other subjects. In the elementary grades, it is almost always taught as part of social studies. Typically, teachers address map and globe skills

and try to provide students with a basic geographic vocabulary. Direction, location, environment, scale, and distance are frequently taught. Developing a sense of place is also a common goal of instruction.

In the middle and junior high school years, geography frequently appears as a separate subject at the sixth- or seventh-grade levels or as units of instruction within a particular course. Content is aimed at helping students recognize the nature of regionalization as well as the physical characteristics of Earth and the cultural characteristics of those who inhabit it.

In high school, geography is not ordinarily mandated as a specific course. But more and more high schools are offering courses in geography as an alternative to other courses in the social studies and/or are teaching it within the history curriculum. In addition, science and earth-science courses contain much physical geography subject matter.

Table 1. Distribution of exercise pool across content dimension: grades 4, 8, and 12[2]

	Space and Place	Environment and Society	Spatial Dynamics and Connections
Grade 4	40%	30%	30%
Grade 8	40%	30%	30%
Grade 12	40%	30%	30%

These percentages reflect the realities of the teaching of geography in the K-12 curriculum. Many teachers have a stronger foundation in the Space and Place content area than in the other two. In addition, the concepts of Space and Place are represented clearly by the first two of the Five Themes of Geography—Location and Place—both of which are fundamental to geography instruction and familiar to most teachers of geography. Newer social studies and

[2] The content dimension is divided approximately equally among the content areas. The reason Space and Place is given a higher percentage (40 percent) at all three grade levels is that it outlines the basic vocabulary, knowledge, and skills that are fundamental to geography.

geography textbooks teach geography using these Five Themes and put particular emphasis on the first two.

To balance this reality, the percentage emphasis (30 percent) in all three grade levels in both Environment and Society and Spatial Dynamics and Connections reflects the need to put more weight on the content contained in these two assessment areas. Students must know the subject matter addressed within these two areas in order to grapple with the complex issues of modern life.

Like all disciplines, knowledge of geography is acquired progressively. Students in fourth grade will not be expected to have as sophisticated a grasp of Space and Place as students in grades 8 and 12. Fourth-grade students should know some basic concepts relating to Environment and Society as well as to Spatial Dynamics and Connections but, again, at a lesser level of sophistication than students in grades 8 and 12.

Cognitive Dimension

This dimension reflects the importance the framework committees placed on students' learning the concepts and vocabulary of geography (Knowing) so they can begin to think about what they mean (Understanding) and apply them to real problems (Applying).

By the time they reach 12th grade, students should have a firm grasp of facts and concepts that are used in understanding and applying fact-based knowledge. Students must use higher-order thinking skills in work, in managing their own lives, and in contributing to society. Thus the Applying area will be tested more thoroughly at 12th grade (40 percent) than it is in 4th grade (25 percent) or in 8th grade (30 percent).

Table 2. Distribution of exercise pool across cognitive dimension: grades 4, 8, and 12[3]

	Knowing	Understanding	Applying*
Grade 4	45%	30%	25%
Grade 8	40%	30%	30%
Grade 12	30%	30%	40%

*Applying = a range of higher-order thinking skills

The assessment will use the following criteria in probing cognitive development:

I. Knowing—What is it? Where is it? In this area, students should be able to perform two related functions with respect to information: (a) an observation function and (b) a recall function using information bases as well as memory. In general, students performing in this cognitive area in geography should be able to observe different elements of the landscape and answer questions by recalling, for example, the name of a place or a resource indigenous to a particular country or by finding information about trading patterns among several countries.

II. Understanding—Why is it there? How did it get there? What is its significance? In this area, students attribute meaning to what has been observed and explain an event in their own words. Meaning involves a sense of context, and this, in turn, requires an ability to comprehend, to see connections between diverse bits

[3] The percentages for the cognitive dimension reflect (1) that all three dimensions should be assessed at all three grade levels, and (2) that the distribution should shift somewhat from lower- to higher-order skills at higher grade levels. More specifically, the percentages reflect that the Knowing area will be emphasized at earlier grade levels so that students will be able to accumulate knowledge in order to understand and apply that knowledge to real-life situations. Students at each grade level are able to perform the higher-level thinking implicit in the Applying area. Students in fourth grade, for example, using the simple facts and concepts they have learned, can understand and apply those facts even though they are only in elementary school.

of geographic information, and to use that information to explain existing patterns and processes on Earth. For example, students may understand the concept of differential heating and cooling of air over land and water well enough to explain what is occurring in the atmosphere to cause this phenomenon. Understanding this concept, students can perform tasks that require the use of rules, skills, concepts, and principles. And they can understand, for example, why coastal locations in subtropical latitudes experience onshore winds during the day and offshore winds at night.

III. Applying—How can knowledge and understanding be used to solve geographic problems? Mental functioning in this area involves the student in a range of higher-order thinking skills. Students can classify, hypothesize, use inductive and deductive reasoning, and form problem-solving models. In geography content, these mental processes involve students in formulating solutions to the problem of acid rain, for example, or examining different waste disposal programs to determine which is best suited to the needs of a particular urban center. This area of thinking calls on students to make use of many different tools and skills of geography as they attempt to develop a comprehensive understanding of a problem en route to proposing viable solutions. The ability to function in this area with geography content helps students comprehend and deal with sophisticated contemporary issues. Students can apply their knowledge in a practical manner to real-life situations that influence the world around them. They can analyze, for example, why one site for an airport or a power plant may be more advantageous than another by weighing and considering numerous related and/or competing factors and interests. Or they may plot a route to their neighborhood store or school using analytical skills to solve everyday problems.

Achievement Levels in Geography

Achievement levels describe how well students should perform on the content and thinking levels required by the assessment. They evaluate the quality of the outcomes of students' education in geography at grades 4, 8, and 12 as measured by NAEP.

Three achievement levels—*Basic, Proficient,* and *Advanced*—have been defined for each grade level by the National Assessment Governing Board.

Basic denotes partial mastery of the knowledge and thinking skills, but performance that is fundamental for adequate work in grades 4, 8, and 12. *Proficient* represents solid academic performance and competency over challenging subject matter. If a majority of students performed at the *Proficient* level on this assessment, the framework committees believe they would have learned enough geography to be competent students and productive citizens. *Advanced* performance on this assessment represents performance that is equal to that expected of top students in other industrialized nations—the ability to think critically about geographic issues and be able to integrate knowledge and skills into problem-solving situations.

As *Advanced* performance criteria are defined by the framework committees as world-class, item writers will avail themselves of appropriate materials to equalize expectations of U.S. students with advanced students elsewhere. This concern for world-class achievement reflects the geography community's belief that geography must be as rigorously taught in the United States as it is in other nations that depend on their citizens' knowledge of the world to compete in world economic markets, understand other cultures, and ensure environmental quality.

Descriptions of NAEP Geography Achievement by Grade Level

Grade 4

Basic—Students should be able to use words or diagrams to define basic geographic vocabulary; identify personal behaviors and perspectives related to the environment, and describe some environmental and cultural issues in their community; use visual and technological tools to access information; identify major geographic features on maps and globes; be able to read and draw simple maps, map keys, and legends; demonstrate how people depend on, use, and adapt to the environment; and give examples of the movement of people, goods, services, and ideas from one place to another. In addition to demonstrating an understanding of how individuals are alike and different, they should demonstrate a knowledge of the ways people depend on each other.

Proficient—Students should be able to use fundamental geographic knowledge and vocabulary to identify basic geographic patterns and processes; describe an environmental or cultural issue from more than one perspective; and read and interpret information from visual and technological tools such as photographs, maps and globes, aerial photography, and satellite images. They should be able to use number and letter grids to plot specific locations, understand relative location terms, and sketch simple maps and describe and/or draw landscapes they have observed or studied. *Proficient* students should be able to illustrate how people depend on, adapt to, and modify the environment; describe and/or illustrate geographic aspects of a region using fundamental geographic vocabulary and give reasons for current human migration; discuss the impact a location has on cultural similarities and differences; and be able to demonstrate how an event in one location can have an impact on another location.

Advanced—Students should be able to use basic geographic knowledge and vocabulary to describe global patterns and processes; describe ways individuals can protect and enhance environmental quality; describe how modifications to the environment may have a variety of consequences; explain differing perspectives that apply to local environmental or cultural issues; and demonstrate an understanding of forces that result in migration, changing demographics, and boundary changes. They should be able to solve simple problems by applying information learned through working with visual and technological tools such as aerial and other photographs, maps and globes, atlases, news media, and computers. They should be able to construct models and to sketch and label maps of their own state, the United States, and the world; use them to describe and compare differences, similarities, and patterns of change in landscapes; and be able to predict the impact a change in one location can have on another. They should be able to analyze the ways individuals and groups interact.

Grade 8

Basic—Students should possess fundamental knowledge and vocabulary of concepts relating to patterns, relationships, distance, direction, scale, boundary, site, and situation; solve fundamental locational questions using latitude and longitude; interpret simple map scales; identify continents and their physical features, oceans, and various countries and cities; respond accurately to descriptive

questions using information obtained by use of visual and technological tools such as geographic models and/or translate that information into words; explain differences between maps and globes; and find a wide range of information using an atlas or almanac. Students should be able to recognize and illustrate the relationships that exist between humans and their environments, and provide evidence showing how physical habitat can influence human activity. They should be able to define a region and identify its distinguishing characteristics. Finally, they should be able to demonstrate how the interaction that takes place between and among regions is related to the movement of people, goods, services, and ideas.

Proficient—Students should possess a fundamental geographic vocabulary; understand geography's analytical concepts; solve locational questions requiring integration of information from two or more sources, such as atlases or globes; compare information presented at different scales; and identify a wide variety of physical and cultural features and describe regional patterns. Students should be able to respond accurately to interpretive questions using geography's visual and technological tools and translate that information into patterns, identify differences in map projections and select proper projections for various purposes, and develop a case study working with geography's analytical concepts. In addition, students should be able to describe the physical and cultural characteristics of places, explain how places change due to human activity, and explain and illustrate how the concept of regions can be used as a strategy for organizing and understanding Earth's surface. Students should be able to analyze and interpret databases and case studies as well as use information from maps to describe the role that regions play in influencing trade and migration patterns and cultural and political interaction.

Advanced—Students should have a command of extensive geographic knowledge, analytical concepts, and vocabulary; be able to analyze spatial phenomena using a variety of sources with information presented at a variety of scales and show relationships between them; and use case studies for spatial analysis and to develop maps and other graphics. Students should be able to identify patterns of climate, vegetation, and population across Earth's surface and interpret relationships between and among these patterns, and use one category of a map or aerial photograph

to predict other features of a place (such as vegetation) based on climate or population density based on topographic features. Students should also be able to relate the concept of region to specific places and explain how regions change over time due to a variety of factors. They should be able to profile a region of their own design using geographic concepts, tools, and skills.

Grade 12

Basic—Students should possess knowledge of concepts and terms commonly used in physical and human geography as well as skills enabling them to employ applicable units of measurement and scale when solving simple locational problems using maps and globes. They should be able to read maps; provide examples of plains, plateaus, hills, and mountains; and locate continents, major bodies of water, and selected countries and cities. They should be able to interpret geographic data and use visual and technological tools such as charts, tables, cartograms, and graphs; know the nature of and be able to identify several basic types of map projections; understand the basic physical structure of the planet; explain and apply concepts such as continental drift and plate tectonics; and describe geography's analytical concepts using case studies. Students should have a comprehensive understanding of spatial relationships including the ability to recognize patterns that exist across Earth in terms of phenomena, including climate regions, time zones, population distributions, availability of resources, vegetation zones, and transportation and communication networks. They should be able to develop databases about specific places and provide a simple analysis about their importance.

Proficient—Students should have an extensive understanding and knowledge of the concepts and terminology of physical and human geography. They should be able to use geographic concepts to analyze spatial phenomena and to discuss economic, political, and social factors that define and interpret space. They should be able to do this through the interpretation of maps and other visual and technological tools, the analysis of case studies, the utilization of databases, and the selection of appropriate research materials. Students should be able to design their own maps based on descriptive data; describe the physical and cultural attributes of major world regions; relate the spatial distribution of population to economic and environmental factors; and report both historical and

contemporary events within a geographic framework using tools such as special purpose maps, and primary and secondary source materials.

Advanced—Students should possess a comprehensive understanding of geographic knowledge and concepts; apply this knowledge to case studies; formulate hypotheses and test geographic models that demonstrate complex relationships between physical and human phenomena; apply a wide range of map skills; develop maps using fundamental cartographic principles, including translating narratives about places and events into graphic representations; and use other visual and technological tools to perform locational analysis and interpret spatial relationships. Students should also be able to undertake sophisticated analysis from aerial photographs or satellite imagery and other visuals. *Advanced* students should be able to develop criteria assessing issues relating to human spatial organization and environmental stability and, through research skills and the application of critical-thinking strategies, identify alternative solutions. They should be able to compile databases from disparate pieces of information and from these data develop generalizations and speculations about outcomes when data change.

Conclusion

This framework will bring a better understanding of geography's scope and depth to those interested in students' knowing more about their own country as well as about places around the globe. Geography is both integrative and speculative as it provides for an understanding of how people perceive, utilize, and modify their physical and cultural settings. Such a breadth of focus is essential not only for comprehending contemporary issues and their environmental significance but also for providing a basis for an understanding of human development as it relates to resources, land use, movement, and environmental perception.

Geographic inquiry is spatial and concerned with the ways in which people interact from place to place. The patterns, processes, and places that are shaped by such spatial interaction form the essence of this assessment framework. Students who master the materials outlined within this document will have a greater sense of and appreciation for the productive and creative roles they can play as citizens of the 21st century.

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Appendix A

The Framework Development Process

The Framework Development Process

The Geography Framework Project ran from July 1, 1991, to June 30, 1992, but the bulk of the committee work took place between September 1991 and April 1992. The National Assessment Governing Board monitored the framework development process through its standing committee and the close attention of its technical staff.

I. The National Assessment Governing Board's Charge

A. Develop a national consensus on the major components of an assessment in geography, involving key groups and individuals as set forth in law.

This process calls for the active participation and involvement of stakeholders in geography education. Members of both the steering and planning committees reflect this mandate:

- The steering committee was made up of 23 representatives of associations representing private and public education, parents, state government, curriculum development, school administration, business, industry, and unions. This committee met three times in Washington, D.C., to oversee and guide the planning committee's framework development.
- The planning committee was made up of 19 noted geography content and cognitive development experts; geographic educators; skilled teachers at the elementary, junior, and senior high school levels; an assessment specialist; state and district social studies supervisors; and users of geography from the travel and publishing industry. The planning committee, which also had seven ex officio members representing education interests, met six times to identify the goals and objectives of the framework.
- Input was received through testimony at three public hearings: October 26, 1991, St. Paul, Minn.; November 24, 1991, Washington, D.C.; and February 25, 1992, Washington, D.C. More than 60 teachers; educators; policymakers; and representatives of the public interest, business, and industry testified to the need for improved geography instruction and cited aspects they believed to be essential to assessment.

- To widen the framework process, a task force of teachers and geographers assembled by the subcontractor, the National Council for the Social Studies, reviewed the draft framework in February and reported its results at the third steering committee meeting in March.
- Finally, the draft framework was circulated for comment in March to more than 500 state superintendents, state social studies supervisors, state assessment directors, teachers, geographers, and all public hearing witnesses.

B. Propose the best possible assessment design to measure geography achievement with a possible state-by-state assessment application.

- To develop item specifications that are appropriate and challenging, the items specifications subcommittee of the planning committee and the items specifications subcontractor, the American Institutes for Research (AIR), reviewed a number of state and district curricula and those of Australia, Canada, Great Britain, and the International Baccalaureate. They also reviewed the scope and sequence documents, *K-6 Geography: Themes, Key Ideas, and Learning Opportunities* and *7-12 Geography: Themes, Key Ideas, and Learning Opportunities,* published by the Geographic Education National Implementation Project in association with Rand McNally. Similar materials were provided to the 1994 NAEP assessment development contractor to assist in item development.

C. Produce a clear, meaningful assessment framework and test specifications to guide test and item development. These documents are critical to the process of translating the framework recommendations to the item development contractor.

The framework was developed with the cooperation of an extremely active and conscientious planning committee. Planning committee meetings were conducted by two co-chairs (one of whom was a specialist in content, and one of whom was a specialist in cognitive learning). The material developed through the planning committee was then organized and developed by the project coordinator and sent, in an iterative process, back to the planning committee for comment. Drafts were also circulated to the Governing Board, hearing witnesses, and the steering committee for comment at their meetings.

A subcommittee of the planning committee developed the item specifications (beginning its work after the planning committee had adjourned its third meeting), working with staff from the subcontractor, AIR.

D. Recommend key instructional and background variables and reporting formats to improve the form and use of NAEP.

Two subcommittees of the planning committee developed the background variables and reporting formats documents. Initial drafts were immediately sent for review to the steering committee and to the more than 500 people who reviewed the framework in March. These documents were finalized at the planning committee meeting in April and were presented to the Governing Board in June.

E. Develop an assessment amenable to setting achievement levels.

Planning committee members developed criteria for setting achievement levels at all three grade levels for *Basic, Proficient,* and *Advanced* achievement. *Advanced* achievement is equivalent to the achievement expected of top students in other industrialized nations. (See chapter four of the framework.)

F. Incorporate alternative assessment strategies, technologies, etc., in assessment design, special studies, and related research recommendations.

Alternative assessment techniques were carefully considered. A teacher specializing in education technology participated on the planning committee, and two leaders in the manufacture of computers and the production of education software and innovative materials participated on the steering committee. In addition, alternative assessment items were solicited from state agencies for review and consideration.

II. Steering Committee Recommendations

The planning committee adhered to the following directives developed by the steering committee at its first meeting:

- Develop a comprehensive and coherent framework even if it reaches beyond current practice.
- Encompass higher-order knowledge such as analysis and evaluation skills and capabilities.

- Give educators information on the framework prior to the assessment.
- Consider conditions under which the content is or will be learned.
- Use the 1984 *Guidelines for Geographic Education* and 1988 *NAEP Objectives* as starting points.
- Consider possible negative effects of the framework's recommendations and how to manage them.
- Develop strategic reporting for key agencies.
- Analyze what information will guide program improvement; think through and recommend how change can be achieved.
- Consider and account for test administration time.
- Break out background variables.
- Consider geography as a discipline first, then relate it to other disciplines.
- Set content and learning goals first, then determine appropriate and valid assessment methods.
- Develop an assessment of the highest quality, incorporating appropriate innovations for both mid- and long-range use.
- Ensure that the framework leads instruction appropriately.
- Ensure that the assessment is outcome-based, not tied to any instructional scope and sequence.
- Ensure that a high standard can be set through an achievement-level setting.
- Incorporate the concept of "world-class standards" as defined for geography in the framework.
- Ensure that what is valued is assessed.
- Ensure that consensus includes outside groups.

Appendix B

NAEP Geography Framework Project Team, Steering Committee Members, and Planning Committee Members

NAEP Geography Framework Project Team

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