The background of the cover is a collage of various maps. At the top, there's a map of a city grid with streets like Broadway, Central St, and 72nd St. To the right, a map shows a coastline with 'ISLAND COUNTY' and 'U.S. CAN.' labels. At the bottom, there's a map of 'MASSACHUSETTS' with cities like Westfield and Springfield, and another map showing 'Victoria BC' and 'CANTON ISLAND'.

Editors
Daniel C. Edelson
Richard J. Shavelson
Jill A. Wertheim

A ROAD MAP FOR 21st CENTURY GEOGRAPHY EDUCATION Assessment

Recommendations and Guidelines for Assessment in Geography Education

A Report from the Assessment Committee of the Road Map for 21st Century Geography Education Project



Road Map for 21st Century Geography Education Project

Assessment

Recommendations and Guidelines for Assessment in Geography Education

Editors

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National Geographic Society
Washington, DC

**A Report from the Assessment Committee of the
Road Map for 21st Century Geography Education Project**



This report was created by the Road Map for 21st Century Geography Education Project.

Road Map for 21st Century Geography Education Project

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The Road Map for 21st Century Geography Education Project is a collaboration between the National Geographic Society, the Association of American Geographers, the National Council for Geographic Education, and the American Geographical Society. The views expressed in the report are those of the authors and do not necessarily reflect the views of these organizations.

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Information about the project and copies of reports are available at <http://natgeoed.org/roadmap>.

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The **Association of American Geographers** (AAG) is a nonprofit scientific, research, and educational society founded in 1904. Its 11,000 members from more than 60 countries share interests in the theory, methods, and practice of geography (including GIScience, geographic education, and geographic technologies). The AAG pursues its mission through its many conferences, scholarly publications, research projects, educational programs, topical specialty groups, and its extensive international network of colleagues and organizational partnerships, which encompass professionals working across public, private, and academic sectors all around the world.

The **National Council for Geographic Education** (NCGE) works to enhance the quality, quantity, and status of geography teaching and learning in primary, secondary, university, and informal educational settings. It develops and promotes curricular materials and two journals, fosters best practices in pedagogy and geotechnology, connects educators through online communication and through its annual conference, supports research in geographic education, recognizes exceptional supporters and teachers of geography, and collaborates with other organizations that have similar goals.

The **American Geographical Society** is an organization of professional geographers and other devotees of geography who share a fascination with the subject and a recognition of its importance. Most Fellows of the Society are Americans, but among them have always been a significant number of Fellows from around the world. The Society encourages activities that expand geographical knowledge, and it has a well-earned reputation for presenting and interpreting that knowledge so that it can be understood and used not just by geographers but by others as well—especially policy makers. It is the oldest nationwide geographical organization in the United States. Its priorities and programs have constantly evolved with the times, but the Society’s tradition of service to the U.S. government, business community, and nation-at-large has continued unchanged.



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Executive Summary

Introduction

Student assessments typically are viewed simply as indicators of educational progress, but this report is based on the recognition that the utility of assessments can extend far beyond this role in education. For example, the results of student assessments can provide critical information for decision making in education policy and practice. In addition, what is being assessed and how it is assessed becomes a means to communicate goals and priorities to teachers, students, and other stakeholders in K–12 education.

This report explores how changes and improvements in assessment practices can support efforts to improve K–12 geography education. The report is one of three reports developed as part of the National Science Foundation-funded Road Map for 21st Century Geography Education Project, a collaboration of four national associations committed to improving geography education—the National Geographic Society, the Association of American Geographers, the American Geographical Society, and the National Council for Geographic Education. The other two project reports focus on geography education research and on instructional materials and professional development for geography.

This report begins by laying out a set of issues critical for the design of assessments that support instructional improvement and by reviewing current assessment frameworks and practices in K–12 geography education. The second half of the report contains a proposal for a new approach to assessment in geography that will

enable assessment developers to address the critical issues in assessment design. As with the other Road Map Project reports, this one places a particular emphasis on how to move geography education toward a balance between developing geographic knowledge and learning to engage in geographic practices. Specifically, this report follows the balanced approach to geography education called for in the second edition of *Geography for Life: National Geography Standards* (Heffron & Downs, 2012), the national standards document that also was developed through a collaborative effort of the four Road Map Project partners.

Background

The four partners launched the Road Map Project because they share a concern that the poor state of geography education in America is a threat to our country's well-being, and by extension, to the well-being of the global community. The partners share the belief that geography education is essential for preparing the general population for careers, civic lives, and personal decision making in contemporary society. They also believe it is essential for the preparation of specialists capable of addressing critical societal issues in the areas of social welfare, economic stability, environmental health, and international relations. They fear that by neglecting geography education today, we are placing the welfare of future generations at risk.

While inspiring examples of highly effective geography education can be found in nearly every part of the United States, for the overwhelming majority of students, the amount of geography instruction they receive, the preparation of their teachers to teach geography, and the quality of their instructional materials are inadequate to

prepare students for the demands of the modern world. Assessments of geographic concepts and skills expose the failure of our educational system in geography, confirming that a vast majority of American students are geographically illiterate. The 2010 National Assessment of Educational Progress (NAEP), known as “The Nation’s Report Card,” found that fewer than 30% of American students were proficient in geography, meaning that more than 70% of students at fourth, eighth, and 12th grades were unable to perform at the level that is expected for their grade (National Center for Education Statistics, 2011). At 12th grade, more than 30% of students scored below “basic,” indicating that they had not mastered even foundational geographic concepts or skills.

The Value of Assessment for Improving Geography Education

This report takes the position that the primary purpose of educational assessment should be for making informed decisions. Because they typically regard assessment as a separate activity from instruction, educators, students, parents, and policy makers often overlook invaluable ways assessments can support and improve teaching and learning. The report describes four ways that assessment results can contribute to improvements in teaching and learning by providing evidence that guides critical decisions.

1. The results of assessments can inform teachers' instructional decisions. When assessments are integrated into instruction, they can improve its effectiveness by enabling the teaching and learning process to be tailored to students' specific needs.



1. The results of assessments can be used to inform decisions about students' academic programs. Assessments introduced at appropriate intervals can be used to measure a student's proficiency against benchmark goals for that student at that point in his or her academic career. The results of these assessments can be used to inform decisions about that student's academic program.
2. The results of assessments can be used to inform decisions about the function and effectiveness of educational programs. Aggregated results of student assessments can be used as part of program evaluation. Used in this way, assessments can inform decisions about program selection, program implementation, and other aspects of instruction. They also can be used in evaluations of the performance of classes, schools, and larger units that might reveal challenges that need to be addressed; likewise, they can be used to inform decisions about where to focus resources.
3. The results of assessments can be used to build a knowledge base for future decision making. Assessment results used for research enable examination of broader questions than those revealed by the performance of a specific student or program. They can be used to examine general questions about teaching and learning geography, such as what makes one approach more effective than another, or how students develop spatial learning skills. The results of these studies can inform efforts to improve education over longer time scales.

Considerations in the Design of Assessments

Designing accurate and useful assessments is extremely

challenging. Four of the key decisions in the design of assessments are:

1. **Selection of goals:** What are the specific content and practices required for the competencies being assessed?
2. **Item characteristics:** What are the characteristics of the item that will be used to assess a competency (e.g., task type, response mode, scoring system)?
3. **Item quality:** How will the technical quality of the item be measured (e.g., validity, reliability, fairness)?
4. **Cost effectiveness:** How much time and resources are required to create, administer, and score the assessment?

In making these design decisions, assessment developers must carefully consider the *nature of the content and practices* to be assessed, the *context* in which they will be administered, the *population* whose competencies will be assessed, and the *purposes* for which the results will be used.

One way developers of assessments minimize the challenge of addressing these considerations is through assessment frameworks. An assessment framework plays the role of an outline in writing or a functional specification in engineering. Frameworks provide guidelines for making decisions in the development of an assessment.

Contemporary assessment frameworks use a two-dimensional framework to lay out the content and cognition targets for an assessment, their relative importance, and item characteristics. A comprehensive

assessment framework also provides guidance on item quality and cost constraints.

Because of the role assessment frameworks can play in guiding the design of assessments, this report focuses on the development and dissemination of new assessment frameworks as a means to guide the development of high-quality assessments that evaluate 21st century knowledge and skills.

Assessment in Geography Today

To determine how well current assessment projects are aligned with the goals of geography education, as described in *Geography for Life*, this report examines the nature of existing assessment frameworks and current assessment practices in K–12 geography education.

Assessment Frameworks in Geography Education Today

There are currently three prominent assessment frameworks being used in K–12 geography education in the United States:

- **National Assessment of Educational Progress in Geography (1994, 2001, 2010).** The NAEP geography framework is the basis for assessments that are used in a national evaluation of geography education outcomes at grades 4, 8, and 12.
- **Advanced Placement Human Geography (2000).** The framework for Advanced Placement Human Geography (APHG) guides the design of the examination used by the College Board to determine if high school students who have completed an AP course in human geography have achieved a level of mastery equivalent to successful completion of an undergraduate course in the subject.

- **National Assessment of Educational Progress for Science (2008).** The NAEP Science framework is the basis for assessments that are used in a national evaluation of science education outcomes at grades 4, 8, and 12. It includes concepts and practices that are included in *Geography for Life*, such as, Earth processes, ecology, human-environment interaction, data analysis, and communication.

This report concludes that these three frameworks place too little emphasis on geographic practices to accurately assess students' mastery of the goals outlined in *Geography for Life*, although the NAEP Science framework serves as a model of how to assess other scientific practices.

Assessment Practices in Geography Today

This report includes the findings of a study, commissioned for the report, of existing K–12 geography assessments. The study was conducted to gather information about how well current assessment practices reflect the goals of *Geography for Life*, and how well they implement the principles of effective assessment design described above.

The study found the content evaluated by current assessments is unevenly distributed across the goals described in *Geography for Life*. For example, 40% of all items across both large-scale and classroom assessments evaluated knowledge from only three out of the 16 content standards, and far fewer items assessed content from the *Environment and Society* category compared with any other content area. The study also found that geographic practices are not being widely assessed. Only 30% of large-scale geography assessment items required

that students use any geographic practices at all. *Analyzing geographic information* was assessed in 21% of all large-scale items, but other geographic practices were rarely assessed (Figure 1).

The study found that assessments are largely failing to probe deep understanding. More than half of the large-scale assessment items required only declarative knowledge (e.g., *knowing that*), often at the level of recognizing a definition. Only 28% assessed students' procedural knowledge (e.g., *knowing how*), which includes reading and gathering information from maps, graphs, and texts. And, only 17% of geography items required schematic knowledge (e.g., *knowing why*), which includes explaining an unfamiliar context by drawing on general geographic principles or models.

Finally, the study revealed widespread problems with item quality. Of the items studied, 60% were judged to have problems that could impede students' ability to accurately represent what they know and what they can do with their geography knowledge.

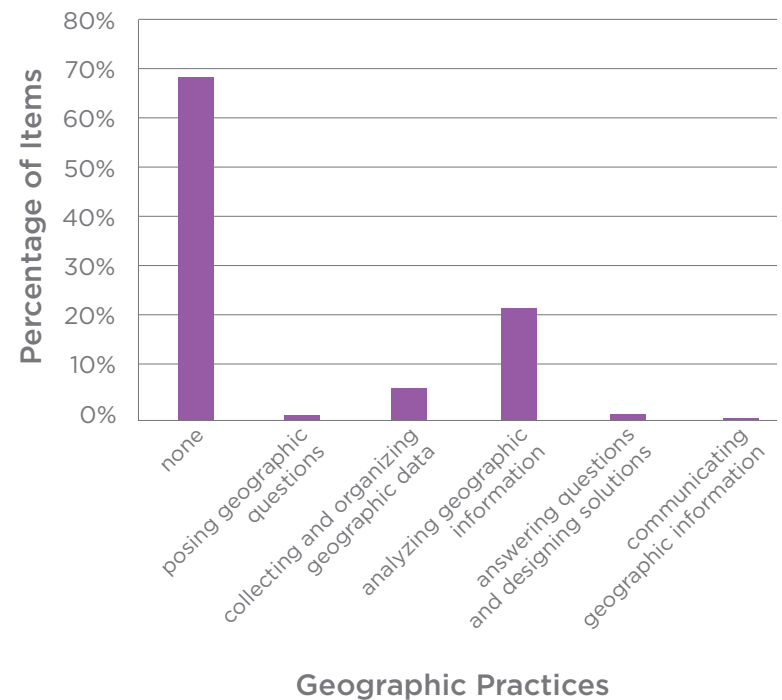
The report's review of current assessment practices reveals that both assessment frameworks and actual assessments do not reflect the balance between assessing what students know and their ability to apply their knowledge that is required to evaluate the development of 21st century geography competencies. Even within knowledge and practices, the review of assessment items reveals a large imbalance, as well.

A 21st Century Assessment Framework for the Geographical Sciences

This report introduces a new assessment framework to serve as a blueprint that guides the development of a new generation of geography assessments. Called a *21st Century Assessment Framework for the Geographical Sciences* (AFGS21), its goal is to support the design of assessments that are aligned with the goals of the national geography standards.

AFGS21 was designed to be a general assessment

Figure 1. Frequency Distribution of Large-Scale Geography Assessment Items That Target Each Geographic Practice





framework that would cover all of K–12 geography, with the idea that it will be a template for more specific assessment frameworks for specific contexts, audiences, and purposes. The report also lays out a process for creating specific assessment frameworks from AFGS21 and for using those frameworks to develop assessments.

The two dimensions of AFGS21 are designated as *content* and *cognition*. The categories in the content dimension are defined by the content standards in *Geography for Life*. The categories in the cognitive

dimension are divided into *knowing and understanding* and *geographic practices*. The geographic practices, in turn, are divided into six categories. A central feature of the framework is a matrix that is used to blend the two dimensions systematically, articulating the specific performance expectations to be assessed. The contents of a cell within the matrix might describe a geographic concept that students would be expected to know or understand, or a cell might refer to the application of a geographic practice using a particular concept.

The report describes a process for developing specific assessment frameworks from AFGS21 that begins with defining the subset of content and cognition to be assessed, and the detailed process continues through the stage of specifying the desired distribution and characteristics of items. The assessments developed through this process and implemented by teachers, program and material developers, and researchers have the potential to be powerful tools for advancing the goals of geography education reform.