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WHAT WORKS
in GEOGRAPHY EDUCATION




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What Works in Geography Education

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What Works in Geography Education:

Evidence for Improving Geographic Literacy and Teacher Quality

Improving Geographic Literacy to Enhance America's International Competitiveness and Strengthen Community Citizenship

What Works in Geography Education

Introduction

Studies conducted over the past twenty years consistently show that Americans possess a poor understanding of geography. This fact stands in stark contrast to the leadership role America plays in the rapidly globalizing and interconnected world of the 21st century.

The studies presented here show that we know how to improve geographic understanding across the United States. These studies serve as examples of the many effective and promising practices in geography education. They point toward ways by which we can increase the geographic literacy of the American people in order to enhance our economic competitiveness, strengthen community citizenship, and promote global understanding.

The term geographic literacy refers to crucial competencies in geography that help us understand the contemporary world. Geographic literacy encompasses knowledge and understanding of places, peoples, cultures, environments, and their interconnections. It also includes proficiency with the skills needed to use maps and other geographic tools and technologies to make decisions and function in the world. Important workforce training is part of geographic literacy as well—training that can lead to productive and rewarding careers.

The studies presented in *What Works* are not isolated cases: they represent a large body of practice in geography education. Many additional high-quality programs exist in geography education and could easily have been selected to appear in this publication. These studies illustrate one or more of the following key components of high-quality geography education: a strong focus on geography content; potential for replication and scaling-up; a strong evaluation component that measures the effectiveness of the program; the use of technology; demonstration of the usefulness of geography for jobs and careers; explicit involvement of women and minorities.

Political, business, and educational leaders need geographic understanding to effectively deal with such obviously global issues as terrorism, foreign policy, national security, and our country's economic prosperity. But even individual Americans need increasingly greater geographic understanding to keep pace with a world that is changing rapidly, both abroad and right here at home.

The key message of this publication is that we know what works in geography education. Certainly, evaluation and improvement in geography education continue to lead to better practices and programs. But the foundation is strong and the directions to proceed are clear. The case studies presented in *What Works in Geography Education* highlight the means by which we can improve geographic literacy in the United States and contribute to the important leadership roles that our country plays in the contemporary world.

"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 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."

Geography Framework for the 1994 and 2001 National Assessment of Educational Progress
National Assessment Governing Board
U.S. Department of Education

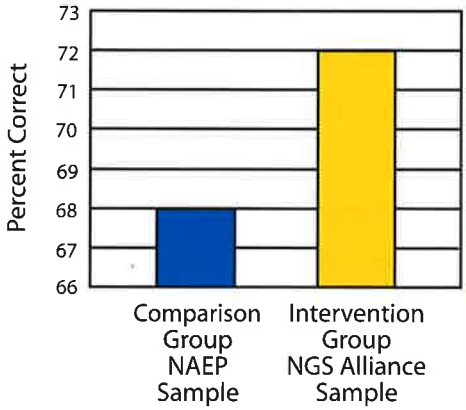
Research Base

Research studies evaluating the effectiveness of efforts to improve geographic literacy and teacher quality

Teacher Professional Development Results in Significant Improvements in Student Achievement in Geography

National Study

Achievement of students whose teachers participated in geography professional development versus comparison group



	NAEP	NGS	Significance
Mean	0.68	0.72	
Standard Deviation	0.19	0.19	
Sample Size	986	878	
t Statistic			3.63
Significance			$p<0.001$
Effect Size*			0.21

** This effect size converts into an eight-point percentile difference between the two groups, so the average NGS student would be equivalent to the 58th percentile of the NAEP sample.*

▶ Knowledge of geography is needed in all economic sectors including agricultural, resource, industrial, and service.

A nationwide study by Mid-continent Research for Education and Learning (McREL) compared student achievement in geography, as measured by the 2001 National Assessment of Educational Progress (NAEP), between intervention and comparison groups of eighth-grade students.

The intervention group consisted of 878 students whose sixty-two teachers were actively involved in several types of National Geographic Society Alliance Network professional development training that increases teachers' geography subject matter knowledge (content knowledge) and specific geography-related teaching strategies (pedagogical content knowledge). These students were tested on their geography knowledge using a set of items released from the 2001 NAEP geography assessment.

The comparison group contained a sample of 986 students from 100 classrooms that was drawn from the NAEP 2001 geography assessment database and whose demographics were closely matched to the intervention group in respect to school location (urban, rural, suburban), type of school (public and private), and a range of socioeconomic indicators (e.g., ethnicity, free and reduced student lunch).

Mean scores of students in the intervention group were significantly higher than those in the comparison group (Figure). In addition, student scores were combined with a calculation of effect size and produced results indicating an **eight-point percentile difference** between the two groups. In other words, the average intervention group student score would be the equivalent of the 58th percentile of the comparison group sample.

Background information for intervention group teachers was merged with their students' scores in a regression analysis. Findings revealed that **teacher involvement in Alliance Network activities was the only variable that was a statistically significant predictor of increased student achievement.**

References:

Mid-continent Research for Education and Learning. 2002. *National Geographic Society Alliance Study*. Aurora CO: Mid-continent Research for Education and Learning.

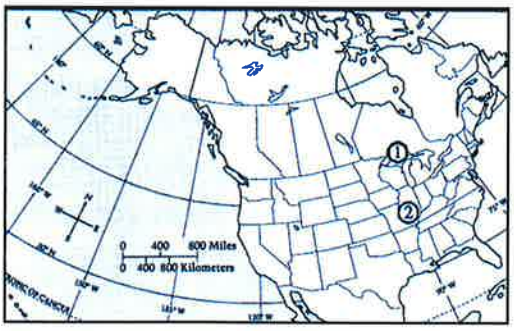
Englert, Kerry and Zoe Barley. 2003. National Geographic Society Alliance Study. *Journal of Geography* 102 (2): 80–9.

Sample test items, student average scores, and difference between Alliance sample (comparison group) and NAEP sample (intervention group)

Test Items (as numbered on the Mid-continent Research for Education and Learning test)		NGS	NAEP	Difference
2. The number 1 on the map shows (Use Map A)	A. Hudson Bay B. The Great Salt Lake C. Lake Superior D. The Gulf of California	85.3	80.3	+5.0
3. The number 2 on the map is on the (Use Map A)	A. Colorado River B. Columbia River C. Mississippi River D. Delaware River	90.1	85.0	+5.1
4. About how much of South America has a growing season of over 240 days? (Use Map B)	A. 10% B. 25% C. 75% D. 100%	90.7	90.8	-0.1
5. The information on the map shows that (Use Map B)	A. Brazil has a shorter growing season than Argentina has. B. New York has a longer growing season than Chicago has. C. Alaska can grow a greater variety of crops than Florida can. D. Colombia can grow a greater variety of crops than Canada can.	54.2	52.8	+1.4
8. Which two nations are most likely to have a conflict over resources? (Use Map C)	A. Nation A and Nation B B. Nation A and Nation C C. Nation A and Nation D D. Nation C and Nation D	60.9	58.7	+2.2

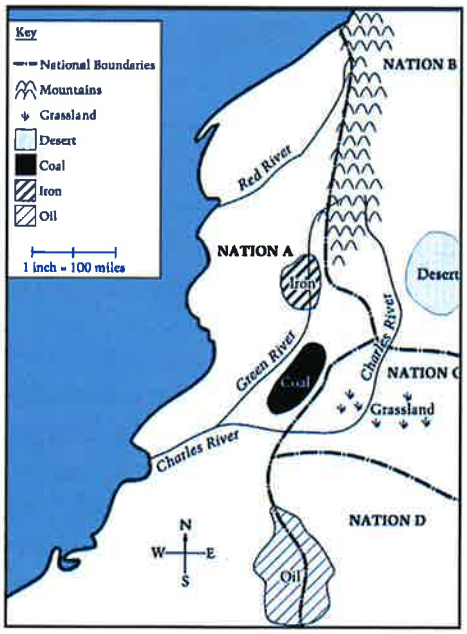
Correct Answers: 2C; 3C; 4C; 5D; 8C

A



B

C

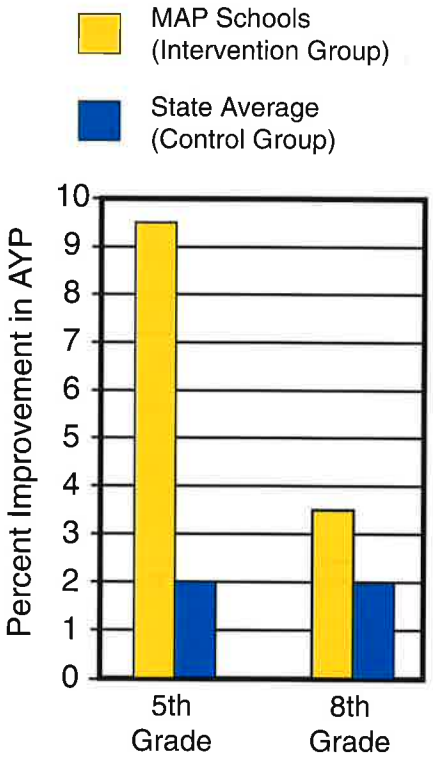


(Maps reduced in size from original test)

Geographic Alliance Activities Produce Significant Gains in Student Average Yearly Progress on Geography/Social Studies Achievement Tests

Michigan

Comparison of Average Yearly Progress (2001 to 2002) in geography/social studies achievement between Michigan Achievement Project and control group schools



Total number of students impacted by the MAP program

1999-2000	1,450
2000-2001	4,137
2001-2002	12,223

▶ Improving students' average yearly progress in academic subjects means that all young people have greater access to the opportunities offered in the 21st-century workplace.

Results of a 1999-2002 study showed that average yearly progress (AYP) of students' geography achievement improved significantly when teachers participated in National Geographic Society Alliance–sponsored teacher professional development.

The Michigan Achievement Project (MAP) trains teachers to (1) administer practice geography tests to students, (2) evaluate and interpret the results from these tests in order to generate diagnostic feedback, and (3) implement improvement efforts for both teacher practice and student learning of geography that are targeted to the specific areas of need for each classroom.

Evaluation of the effectiveness of the program was conducted by comparing AYP of student achievement on statewide tests between intervention and control groups. The intervention group consisted of 5th and 8th grade students whose teachers had received MAP training. The control group consisted of the entire population of 5th and 8th grade students in Michigan.

Statistically significant results indicate that students of teachers in the MAP program (intervention group) showed greater improvement in geography/social studies scores than the improvement for the state average (control group). The study showed that the **intervention group improvement averaged 7.2% (5th grade) and 1.32% (8th grade) higher than the control group improvement average** (Figure).

The study also found that **even students with relatively low reading and mathematics skills can show greater increases in achievement on the geography/social studies test through MAP activities.**

References:

Libbee, Michael. 2001. Assessment as a diagnostic tool. *Journal of Geography* 100 (4): 175–8.

Libbee, Michael. 2003. *The Michigan Achievement Project: Politics, Performance, and Professional Development*. Paper presented at the Biennial GeoNexus Conference: Research in Geographic and Environmental Education, May 2003, Texas State University–San Marcos, TX.

Integrating Mathematics and Geography Instruction Significantly Improves Student Achievement

Arizona

In a project entitled "GeoMath," teachers and university researchers collaborated to develop and evaluate lesson materials for grades K–8 that integrate geography and mathematics. The goal was to improve learning of both geography and mathematics by simultaneously incorporating both subjects into applied instructional tasks.

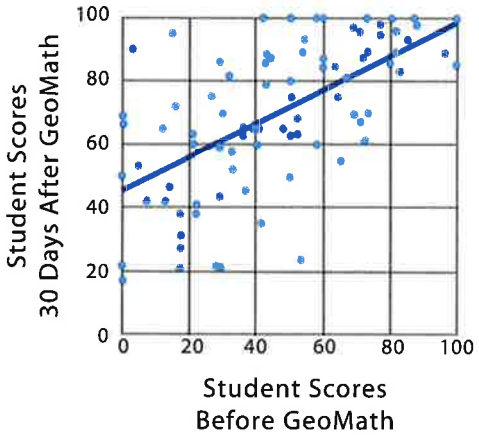
Eighty-five lessons were developed that present standards-based geography content and teach a complete range of mathematics concepts and skills (e.g., data analysis, probability, operations, geometry, number sense, measurement).

Two forms of evaluation produced the following results:

(1) A carefully constructed and validated student test was administered one month after the teaching of mathematics concepts and skills that were aligned to the test. Comparison was conducted of student achievement between a large intervention group of geography classrooms (n = 113) that received instruction using GeoMath lessons and a carefully matched but smaller comparison group of classrooms (n = 6) that received similar instruction without using the GeoMath lessons. Descriptive statistics show **intervention group scores were substantially higher than comparison group scores.** The analysis showed **statistically significant improvement in student retention of mathematics learning** (Figure). In addition, a regression model analysis compared intervention group scores on a pretest administered prior to instruction using GeoMath and the posttest that was administered one month after the lessons were presented.

(2) A mix of performance-based and selected response assessments demonstrated that **68% of treatment group students mastered geography subject matter with scores of 80% or higher.**

Improving Trend in Student Math Achievement



After establishing the baseline that the intervention group (GeoMath instruction) had substantially higher scores than the comparison group (non-GeoMath instruction) on the posttest, math achievement gain in the intervention classrooms (GeoMath instruction) was measured by comparing pretest and posttest scores using a regression analysis (R^2 = 0.34, $p<0.001$).

Reference:

Douglass, J., R.I. Dorn, G. Olp Ekiss, B. Trapido-Lurie, M. Comeaux, R. Mings, R. Eden, C. Davis, E. Hinde, and B. Ramakrishna. 2004. *Learning Geography Promotes Learning Math: Results and Implications of Arizona's GeoMath Grade K–8 Program*. Manuscript accepted for publication in the *Journal of Geography*, Fall 2004. http://alliance.la.asu.edu/azga/ (last accessed 26 April 2005).

▶ Geography offers outstanding opportunities to teach and apply essential math skills.

Teacher Workshops in Geography Prepare Highly Qualified Teachers

Colorado

Subject matter knowledge and professionalism in geography education:

- High level of subject matter content knowledge
- Proficiency in the use of the national content standards in geography
- Expertise with a broad range of teaching strategies in geography
- Ability to conduct geography lesson development

Commitment to ongoing professional development:

- Pursuit of advanced degrees in geography
- Membership and contributions to national professional organizations in geography and education
- Attendance and contributions to professional conferences
- Leadership and participation in training other teachers

▶ This study demonstrated that Alliance-trained teachers had superior levels of expertise and proficiency in the characteristics of a highly qualified teacher that lead to improved student learning.

This study assessed the effectiveness of National Geographic Society Alliance Network teacher professional development activities as measured by characteristics that help define a highly qualified teacher.

Two major categories of characteristics were addressed:

1. Subject matter knowledge and professionalism in geography education, and
2. Commitment to ongoing professional development.

Differences in these two categories were compared between middle school teachers who had obtained the professional inservice training required to qualify as Teacher Consultants in the Colorado Geographic Alliance (intervention group, n = 81) and middle school teachers who had not received Alliance training (comparison group, n = 294). The two groups of teachers were carefully matched and showed no systematic differences in respect to 87 of 90 background and demographic characteristics.

Teachers in both groups completed a self-report survey that used a comprehensive selection of objective and perceptual indicators to compute total scores on the two categorical indicators of a highly qualified teacher.

Statistically significant results showed that **Alliance-trained teachers** (intervention group) **had higher scores than the non–Alliance-trained teachers** (comparison group) **in both categories of characteristics that define a highly qualified teacher.**

References:

Hill, A. David and Emily Lockyear Collop. 1998. Valuing Professional Development in the Creation of the Best Geography Teachers. *International Research in Geographical and Environmental Education* 7 (2): 142–145.

Lockyear, Emily J. 1997. *Assessing a Professional Development Program for Geography Teachers in Colorado.* Unpublished Masters thesis, Department of Geography, University of Colorado at Boulder.

Student Achievement and Motivation Are Improved by Environment-Based Geography Education

National Study

This study compared student achievement and motivation in forty schools across the nation. These schools employed educational practices that use the environment as an integrating context (defined by the State Education and Environment Roundtable as the EIC Model™). Results indicate that **students learn more effectively within an environment-based context than in a traditional educational framework, achieving more across a range of disciplines.**

Schools in the study represented a wide range of socioeconomic indicators, geographic location, school size, and school setting (urban, suburban, rural). A range of measures were employed at the various schools to measure student achievement and motivation, including standardized tests, performance evaluations, attendance, etc.

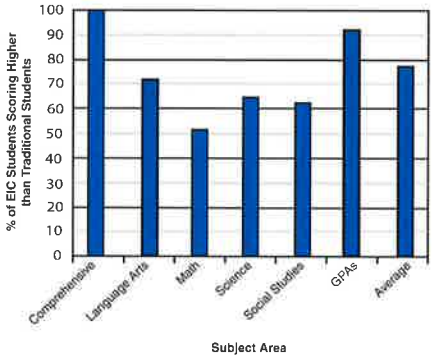
Descriptive statistics and extensive case studies showed substantial improvements in student achievement for the intervention group across the subject areas of reading, language arts, spelling, mathematics, science, and social studies. In addition, **students in the intervention schools showed substantially higher attendance rates and lower disciplinary problems than students in the comparison group.**

Geography education as promoted by Alliance professional development involves the teaching practices found in the EIC Model.™ Consequently, the EIC Model™ in this study is comparable to the geography education in respect to similar disciplinary knowledge (content knowledge) and similar place-based, problem-solving instructional practice (pedagogical content knowledge).

Reference:
State Education and Environment Roundtable. 2003. Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning. San Diego, CA: State Education and Environment Roundtable. Further information available at http://www.seer.org.

Percent of EIC Students Scoring Higher than Traditional Students

The graph below represents 370 data sets. Overall, students in the EIC Model™ programs outperformed students in traditional programs in 70% of the cases.



Provided courtesy of the State Education and Environment Roundtable

Photo: National Geographic Society

▶ Students achieve better in all subjects when high-quality geography education provides the context.

Geographic Information Systems Improve Achievement for Women and Minorities

California

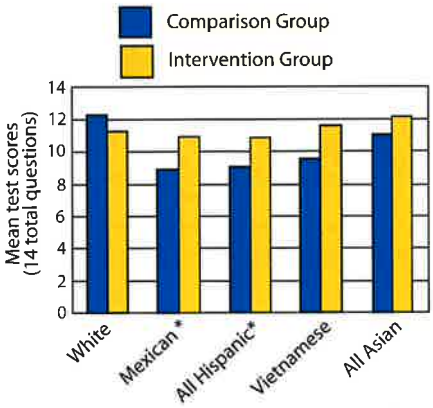
National Geographic Alliance Network professional development seeks to improve the geography subject matter knowledge (content knowledge) and the geography-related instructional practice (pedagogical content knowledge) of K–12 teachers. This study tested similar knowledge and practice using two groups of randomly selected students in a university geography course.

The experiment compared student achievement in geography using two instructional strategies. Geographic Information Systems were used with a small-group instructional strategy (the intervention group, n = 65) and lecture instruction was delivered to a second group (the comparison group, n = 78). Both groups had comparable demographic characteristics and similar achievement scores on a geography pretest. Curricular materials were carefully matched so that students in both groups received the same explanations and supporting graphics. Student achievement was tested for both groups using questions on a standard, previously developed midterm exam.

Results show the following statistically significant improvements in student achievement: (1) all women and people from underrepresented minorities (both genders) achieved at a level equivalent to white males when using the computer-aided strategy but scored 10–18% lower when receiving lecture instruction; (2) the computer-aided strategy, as compared to the lecture instruction, provided a 12% improvement in overall student achievement at the cognitive level of comprehension but showed no difference at the cognitive level of factual knowledge acquisition.

A substantial literature review corroborates study findings that **small group, problem-solving instructional strategies provide a more equitable learning environment for women and minorities than does lecture instruction.**

Student achievement compared after lecture instruction (comparison group) or small-group instruction using computers (intervention group) in geography education



* indicates statistically significant at $p < 0.05$.

▶ Educating an increasingly diverse population requires the inclusion of high-quality geography teaching.

References:

Rutherford, David and William J. Lloyd. 2001. Assessing a computer-aided instructional strategy in a world geography course. *Journal of Geography in Higher Education* 25 (3): 341–55.

Rutherford, David. 1999. Final report: Computer aided instruction in geography. In *Self Study for Reaffirmation of WASC Accreditation, Appendix B,* edited by the Self Study Steering Committee. Fullerton, CA: California State University Fullerton. Available at http://www.fullerton.edu/wasc/AppendixB/Rutherford.htm (last accessed 5 May 2005).

Highly Qualified Geography Teachers Are Leaders Among Their Colleagues

Rocky Mountain Region (CO, KS, NE, OK, SD, UT, WY)

This study explored the extent to which teachers developed the characteristics of highly qualified teachers within 6 months of completing 2-week teacher professional development institutes sponsored by the National Geographic Alliance Network.

Institutes were held across seven states during the summer of 1992. Data were collected from the 254 teachers who participated in the institutes through exit surveys (n = 254), returned follow-up surveys (n = 130 or 51%), and follow-up telephone interviews from a randomly selected sample of participants (n = 75).

Results indicated:

1. Participants made substantial improvements in their knowledge of geographic content (content knowledge).
2. Participants made substantial improvement in the teaching practices they employ to communicate the content knowledge to students (pedagogical content knowledge).
3. **Ninety-five percent of participants diffused the knowledge they learned at the institutes to other teachers through one or more inservice activities they conducted in their own schools and school districts.**
4. **The inservice activities conducted by participants were of high quality in respect to transferring content knowledge and pedagogical content knowledge.**

Overall Results of the Professional Development Activities

These teachers became school district leaders, valuable resource people to whom others looked for leadership and advice for the teaching and learning of geography.

Actions of a Highly Qualified Teacher That Were Fostered Through the Professional Development Training

- Changes and improvements in assessments of student geographic achievement
- Increased sophistication in pedagogical content knowledge
- Greater tendencies to integrate geography across other disciplines such as science, literature, and social studies
- Increasing use of hands-on activities
- Changes in teaching materials used, such as increasing student use of maps and atlases
- Involvement in fostering change in curriculum and instruction at district and state levels
- Conducting high-quality inservice professional development activities for teachers in their own schools and districts

References:

Cole, David B. and Jeanne Ellis Ormrod. 1995. Effectiveness of teaching pedagogical content knowledge through summer geography institutes. *Journal of Geography* 47 (1): 427–33.

Ormrod, Jeanne Ellis and David B. Cole. 1996. Teaching content knowledge and pedagogical content knowledge: a model from geographic education. *Journal of Teacher Education* 47: 37–42.

▶ Teachers emerged as leaders among their colleagues for the teaching and learning of geography.

Professional Development for Teachers Helps Them Know and Teach to the Geography Standards

Fifteen States Across the Country

The Six Essential Elements of the National Standards in Geography

#1. The World in Spatial Terms
Geography studies the relationships between people, places, and environments by mapping them into a spatial context.

#2. Places and Regions
The identities and lives of individuals and peoples are rooted in particular places and in those human constructs called regions.

#3. Physical Systems
Physical processes shape Earth's surface and interact with plant and animal life to create, sustain, and modify ecosystems.

#4. Human Systems
Human activities help shape Earth's surface; human settlements and structures are part of Earth's surface; and humans compete for control of Earth's surface.

#5. Environment and Society
The physical environment is modified by human activities and human activities are influenced by Earth's physical features and processes.

#6. The Uses of Geography
Knowledge of geography enables people to understand the relationships between people, places, and environments over time—what Earth was, is, and might be.

Standards-based education is a cornerstone of contemporary educational improvement efforts, including the No Child Left Behind Act. Disciplinary content standards constitute the basis for holding students and teachers accountable for student achievement.

This study surveyed teachers in intervention and comparison groups in order to assess teacher knowledge and implementation of the subject matter content found in the national standards in geography.

The intervention group (n = 94) consisted of teachers who had received training as Teacher Consultants through the National Geographic Society Alliance Network professional development summer institutes. The comparison group (n = 235) consisted of teachers who had not received such training.

Quantitative methods were used to evaluate data from surveys that asked teachers to self-report their teaching practice as related to standards-based geography curriculum and instruction.

Alliance-trained teachers showed a significantly higher level of knowledge and implementation of geography standards.

The study cited additional literature that corroborates this finding that Alliance professional development activities enhance teachers' geography subject matter content knowledge and contribute to the development of highly qualified teachers.

Map Image: Robert Stacey, WorldSat International, Inc., "Satellite World" is a blend of Landsat and NOAA AVHRR data; relief from ETOPO-2 data.
Photos: David J. Rutherford, used with permission.

References:

Gandy, S. Kay and Darrell P. Kruger. 2004. An Assessment of Influences on the Implementation of the National Geography Standards. *Journal of Geography* 103 (4): 161–70.

Gandy, S. Kay. 2002. A study of the Implementation of the National Geography Standards and their Alignment with Classroom Instruction in United States PK-12 schools. Unpublished Ph.D. dissertation, Dissertation Abstracts International 63, no. 07A (2002) p. 2444.

Teacher Professional Development Improves Student Achievement and Other Outcomes in Science and Geography

Chesapeake Bay Region (DC, DE, MD, NY, PA, VA, WV)

The Chesapeake Bay Foundation's Chesapeake Classrooms Institute (CCI) provides professional development for teachers in the District of Columbia and 6 states that lie wholly or partly within the Chesapeake Bay watershed. The goal of the CCI is to involve K–12 teachers and students in a multistate commitment, formalized in the Chesapeake 2000 Agreement, which seeks to improve the health of the Bay and remove it from the U.S. Environmental Protection Agency's Impaired Waters List.

The CCI offers teachers a variety of professional development courses that range from one day to a yearlong program. These programs increase teacher content knowledge of science and geography related to the Chesapeake, and they improve educator practice in teaching this content to students. The CCI model has five core components:

(1) a focus on student learning;
(2) research-validated practices;
(3) ongoing, focused professional development;
(4) alignment with state standards, assessment, and curriculum;
(5) promotion of collaborative exchange among teachers.

Various evaluations have demonstrated that **the CCI program yields positive increase in a range of outcomes for both teachers and students, including knowledge, engagement, and teaching practice.**

One comprehensive study evaluated the impact of increasing amounts of teacher professional development on student learning of subject matter related to the environment and geography of the Chesapeake Bay. Statistically significant improvements in student achievement were found as teacher emphasis upon CCI curriculum and instruction increased from low to average and from average to high ($p<0.05$).

Effect sizes were also computed in order to determine the practical significance of the differences in student achievement. In all cases, **the improvement from low to high produced a large effect size.** In all cases the effect size from low to average and from average to high was at least medium, and in some cases was high as well.

Comparison of student achievement among teachers with differing emphasis upon Chesapeake Classrooms Institute (CCI) curriculum and instruction. All differences are statistically significant ($p<0.05$). Effect sizes are medium where differences are ±3 and large where differences are ±5.

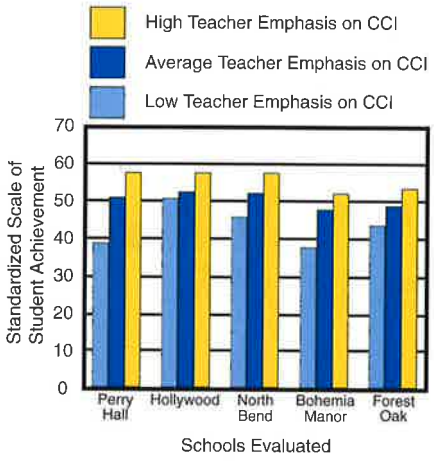


Photo: John S. Ballay

Reference:
Von Secker, Clare. 2004. *Bay Schools Project: Year Three Summative Evaluation.* Annapolis, MD: Chesapeake Bay Foundation

Integration of Geography and Literacy Instruction Significantly Improves Student Achievement

Arizona and Michigan

The GeoLiteracy program created a K–8 curriculum that integrates the teaching and learning of reading, writing, and geography as described in state content standards for those subjects.

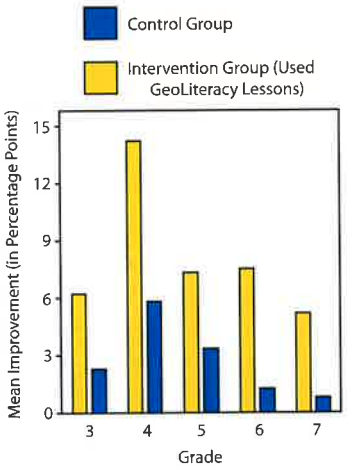
Following randomized controlled testing guidelines specified by the U.S. Department of Education (Whitehurst, 2003), **students in grades 3 through 7 who were instructed using GeoLiteracy lessons were found to have statistically significant gains in reading comprehension compared to students who did not use GeoLiteracy.** The evaluation was carried out in public schools in Arizona and Michigan. Study design held constant the overarching reading program of the schools and similar socioeconomic backgrounds of the students, but varied the instructional intervention.

More than 80 GeoLiteracy lessons use quality literature along with maps, graphs, charts, and other graphic organizers to teach children geographical concepts and skills while reinforcing reading comprehension and writing. The master teachers who created them were trained not only in how to construct lessons, but also in how to assess learning based on standardized assessments. Lessons are written onto a CD that contains all the materials needed to teach them: lesson plans, maps, readings, worksheets, answer key, and other supplemental materials. Literature materials include those produced by the National Geographic Society's School Publishing Division.

In addition to yielding quantitatively strong evidence, qualitative surveys reveal that teachers who use GeoLiteracy report that integration helps them to teach geographical concepts and enhances their teaching of reading comprehension. Teachers emphasize that their students enjoy social studies (particularly geography) when integrated lessons spice up the curriculum.

Using this integrated method of instruction, GeoLiteracy has a positive achievement effect on reading achievement among third through seventh graders.

MEAN IMPROVEMENT IN READING SCORES



Student achievement of nonfiction reading skills was compared between control group teachers who taught the normal social studies curriculum and intervention group teachers from the same school who taught GeoLiteracy lessons. Students in grades 3 through 7 all showed statistically significant improvement ($p<0.05$) in reading scores in the intervention group, whereas the control group showed minimal improvement that was not statistically significant.

▶ Geography excites students by applying critical reading skills to help them understand their world.

References:

For more information about the GeoLiteracy project, see the following Web site: http://alliance.la.asu.edu/geoliteracy/general.html

Whitehurst, G.J., 2003. *Identifying and Implementing Educational Practices Supported by Rigorous Evidence: A User Friendly Guide*, Coalition for Evidence-Based Policy, Washington D.C.

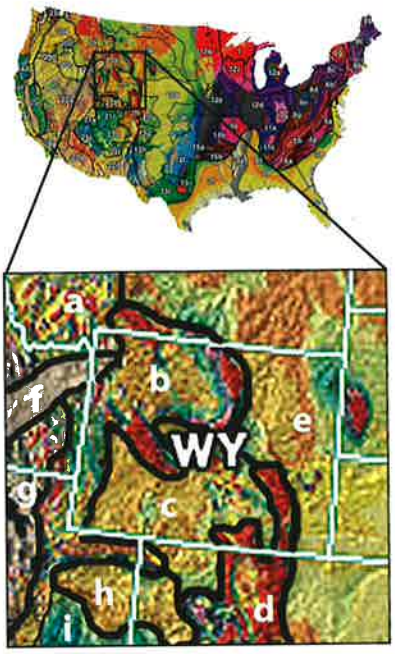
Promising Practices

Case studies of projects and initiatives that show the potential of geographic literacy

Community Mapping Builds Student Skills and Strengthens Community Partnerships

Colorado, Montana, Utah, Wyoming

Physiography of the Wyoming Area



a. Northern Rocky Mountains
b. Middle Rocky Mountains
c. Wyoming Basin
d. Southern Rocky Mountains
e. Great Plains Province
f. Snake River Plain
g. Great Basin
h. Uinta Basin
i. Canyonlands

(After U.S. Geologic Survey, Available at <http://tapestry.usgs.gov/physiogr/physio.html>)

The goal of the Western Community Mapping Initiative (CMI) is to facilitate students' understanding and application of geospatial relationships, geotechnologies, and decision-making skills that will enhance geographic literacy and the understanding of place. Initial efforts focus on Colorado, Montana, Utah, and Wyoming.

CMI projects link students and their teachers with the community through geographic study in which students work directly with community members on authentic issues that have included

- the levels of residential radon in Farmington, Utah;
- vehicular crime in Denver, Colorado;
- business location trends in Cheyenne, Wyoming;
- riparian nutrient filtering capability and stormwater outfall impacts along the Big Thompson River in Loveland, Colorado;
- a Community Resource Guide in Denver, Colorado, that profiles businesses, community services, and cultural/aesthetic resources to help evaluate interactions between the high school and surrounding neighborhood.

Through community mapping, students are able to see a direct correlation between the skills they learn in school and the application of those skills in the real world. Students also contribute information needed to understand and/or resolve difficult issues faced by the community.

For example, a graduating high school senior named Michael received a paid summer internship following his involvement in the Big Thompson River project in Loveland, Colorado. One of the CMI project partners, Big Thompson Watershed Forum, hired Michael to apply his geography and geotechnology skills to a problem that was of great concern to the community. Michael also had the opportunity to learn a geospatial analytical tool called CommunityViz, a sophisticated 3D–visualization tool developed by The Orton Family Foundation to assist communities in making complex planning decisions.

▶ Students study real-world issues affecting their local communities.

References:
The Orton Family Foundation Web site. Available at <http://www.orton.org/> (last accessed 28 February 2005).
The National Geographic Society Education Foundation Web site. Available at http://www.nationalgeographic.com/foundation/ (last accessed 28 February 2005).

Minority High School Students Learn About Higher Education and Career Opportunities in Geography

Texas

The Summer Academy for Minority Scholars brings student/teacher teams to Texas State University for an eight day/seven night, summer workshop that immerses participants in hands-on, problem-solving, place-based geography education.

Participant teams consist of no more than three students accompanied by one teacher or school administrator. Students must be entering 10th or 11th grade and be members of historically underrepresented groups (e.g., African Americans, Hispanics, Native Americans, and women).

The workshop gives participants a variety of experiences that present a full range of the subject matter and skills that characterize geography in the contemporary world. These include

- field-based instruction in both physical and human geography;
- classroom instruction by geography content experts and exemplary geography teachers;
- training in the use of geographic tools and techniques including Geographic Information Systems (GIS), Global Positioning System (GPS), map use and interpretation, and remote sensing images.

The Academy has multiple goals:

- to increase awareness of the content, skills, technologies, and applications of geography in the contemporary world;
- **to demonstrate the utility of an education in geography for jobs and careers;**
- **to motivate and encourage minority high school students to pursue higher education in geography;** and
- to develop a corps of teachers and administrators in the high schools who understand contemporary geography and direct students toward higher education in the discipline.

This program provides formal educational experiences (field-based and classroom) along with informal education opportunities between students, teachers, and program staff. This all occurs in a fun, camp-type atmosphere that builds relationships and a sense of community.

Student–teacher teams learn to use and apply GPS technology. *Photo: National Geographic Society*

Students learn to conduct water sampling and interpret the results. *Photo: National Geographic Society*

▶ Student/teacher teams learn about opportunities for higher education and careers in contemporary geography.

Reference:

The Gilbert M. Grosvenor Center for Geographic Education. 2004. *Grants and Projects.* Department of Geography, Texas State University San Marcos. Available at <http://www.geo.txstate.edu/grosvenor/grant.html> (last accessed 18 March 2005).

Museums and Geographers Collaborate to Provide Teacher Professional Development and Community Outreach

Massachusetts

This project forged collaborations between the Massachusetts Geographic Alliance (MGA) and local museums to develop geo-historical educational materials and programs that are used for teacher professional development and a wide range of outreach efforts to parents, students, and community members.

Each of the MGAs five regional service centers partnered with one or more of the following local museums:

- John F. Kennedy Library and Museum
- New England Science Center/Ecotarium
- Tsongas Industrial History Center and Museum
- New Bedford Whaling Museum
- Holyoke Children's Museum
- The National Heritage Museum
- Peabody-Essex Museum
- Blackstone River Valley Museum and National Park
- Storrowton Village Museum

The Geography Alliance/Museum collaboration serves primarily to highlight geography within the Massachusetts History and Social Science Framework. The project shows how **geography can be taught both as a separate strand within the state Framework and as a subject that can be effectively integrated into other areas of the social studies—especially history.**

A second purpose of the project is to raise the awareness of the general public about the importance of geography in understanding both historical and contemporary conditions and processes of change in land and water resources, cultures, economies, and societies at local and global scales.

The project's purposes were achieved through a variety of activities that included teacher professional development workshops, public lectures by professors and museum professionals, field trips, development of lesson plans, and publication of articles, newsletters, flyers, and brochures (Sidebar).

SAMPLE OF PROGRAMS DEVELOPED

"The Blackstone River Valley: Exploring Changes in America's Agrarian and Industrial Landscapes" *examines unique valley landscapes and the landscape changes brought about by the Industrial Revolution and current environmental and land-use challenges.*

"President Kennedy's Creation of the Peace Corps" *highlights experiences of actual volunteers who have served in Africa, Asia, and Latin America.*

"Water: A Most Precious Local and Global Resource" *examines the role that water plays in many diverse arenas from several disciplinary approaches, including science, geography, history, and economics.*

"Migration and Place in the Urban Growth of the United States" *studies the effects of 19th century migration on the urban landscapes of Lowell and surrounding areas.*

"The Changing Cultural and Economic Landscapes of Southeastern Massachusetts" *fosters understanding of the historical geography and present conditions of this region and the impact of the whaling industry on urban development.*

"Milltowns and Hilltowns: The Rise, Fall, and Rise of Megalopolis" *explores the growth and expansion of America and the recent revitalization of different types of urban centers.*

"Salem and the Golden Age of Maritime Trade" *uses historic artwork, maps, manuscript letters, logbooks, and nautical charts to focus on key subject matter in U.S. and world geography and history.*

"Circumnavigating the Globe: Accounts by Mariners, Traders, Missionaries, and Whalers" *studies the development of cultural and economic exchanges over time.*

Reference:
Massachusetts Geographic Alliance. 2005. *Museum Collaboration Project.* Winchester, MA: Massachusetts Geographic Alliance. Available at <http://www.massgeo.org/museucompl.htm> (last accessed 10 March 2005).

Geographic Information Science Provides Careers for Minority High School Students and Benefits to Minority Communities

Arizona

As part of the *Research Experiences for High School Students* program, this project offers minority students in Arizona a place- and research-based educational experience, and introduces opportunities for college and careers in geography.

The program trains students and teachers to use Geographic Information Systems (GIS) and apply those technologies to the study of their communities within a changing regional context. (e.g., rapid population growth, land-use changes, loss of habitat, limited water supply, high immigration, cultural diversity). **Geography education focused on regional issues enriches students' abilities to address problems they will face as adults, and to productively address real-world issues of local and regional significance.**

Students receive intensive, discovery-based science research experiences and are immersed in cutting-edge research, investigating original questions for which answers are unknown.

Native American and Hispanic students make up nearly 40% of all students in Arizona, but represent only 20% of students enrolled in post-secondary education. Most who pursue higher education attend two-year rather than four-year institutions.

This program provides students with information, skills, and inspiration to pursue education beyond high school, specifically in geography-related disciplines. Students learn how GIS leads to careers that can be practiced in, and for the benefit of, their own communities. They also discover the possibility of attaining professional proficiency in GIS through community colleges that do not require four years of higher education.

The program also addresses a need specific to American Indian tribes. Tribes control a significant portion of Arizona's land and resources, but often turn to outsiders to manage those resources because the necessary expertise is lacking within the tribe. The program has the potential to enhance tribal self-reliance in planning and resource management by opening doors for young Native Americans to receive training in the technological and scientific basis for planning and resource management.

Reference:
Southwest Center for Education and the Natural Environment. 2004. *Research Experiences for High School Students.* Tempe, AZ: Southwest Center for Education and the Natural Environment. Available at <http://scene.asu.edu/hschool.html> (last accessed 10 March 2005).

A changing regional context of population growth and land use change provides the focus for research and learning. *Photo: David J. Rutherford, used with permission.*

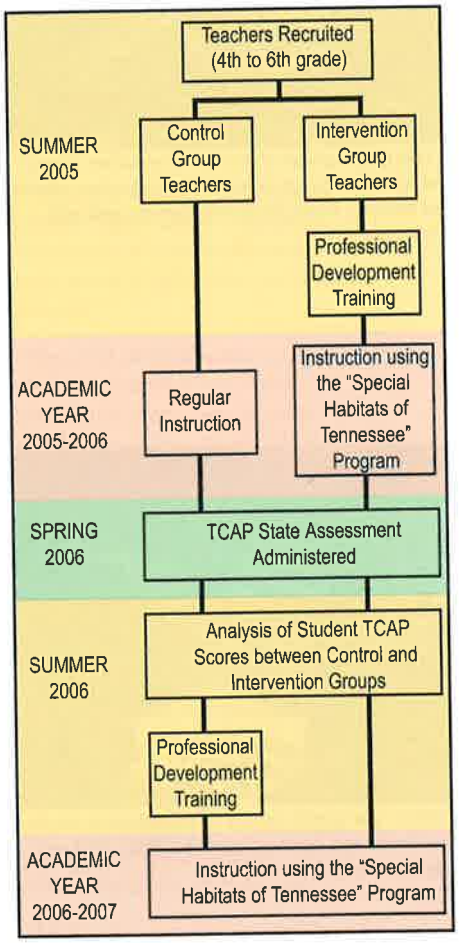
Students use a wide variety of resources to study local issues and develop solutions. *Photo: National Geographic Society*

▶ Discovery-based, scientific research on changes occurring in the local community improves students' abilities to address problems they will face as adults.

Geography Helps Students Understand Important Local and Regional Issues

Tennessee

Schedule for teacher training, program implementation, and randomized/control evaluation of student achievement.



▶ Innovative use of technology and a rigorous evaluation of program outcomes provide key elements of a model program.

This program, entitled "Special Habitats of Tennessee," encourages the study, enhancement, and management of habitats including backyard and schoolyard habitats, local parks and natural areas, and terrestrial and aquatic ecosystems. The program differs from many similar ones in the extent to which Web-based tools and data are used to conduct geographic inquiry. It makes available to teachers and students the power of online mapping and access to data assembled from a variety of data sources by the National Biological Information Infrastructure (NBII). NBII is a public–private partnership created to improve access to data and information about the nation's biological resources.

The Southern Appalachian Information Node (SAIN) of the NBII dedicated a special area of its Web site to this innovative program. SAIN is developing a set of user-friendly tools that allow students to enter their observations into a database, plot them on maps, and analyze them in the context of other local and regional ecological information and historic records. Teachers throughout the state can receive professional development training to use SAIN in standards-based activities for students. Additional interactive tools allow students to work with peers from other schools to compare their results and gain new insights and a deeper understanding of the web of life by applying a geographic perspective. The availability of these tools will facilitate replication and scaling up to the national level.

The program also provides a model evaluation component designed to produce rigorous scientific evidence regarding the extent to which the program affects student academic achievement. **Curricular materials and activities are closely aligned to state science and social studies standards, and scores on the state-wide Tennessee Comprehensive Assessment Program (TCAP) will identify changes in student academic achievement attributable to the program.** Teachers applying to the program in 2005 will be randomly assigned to the Control Group or the Project Group (Figure). Overall performance in each of the subject areas tested will be analyzed, along with assessing impacts on achievement gaps between economically disadvantaged and non–economically disadvantaged students.

References:

See the Web sites for SAIN at http://sain.nbii.gov/ and NBII at http://www.nbii.gov/, and the project Web site at http://SpecialHabitats.net/.

Students Learn Geography and Assist Local Communities Through Asset Mapping

Maryland

The Prince George's Information Commons is a partnership of high school students, university staff and faculty, and other community members that explores the past and present of Prince George's County, Maryland. The partnership is involved with various projects, including an assets mapping project.

Asset mapping produces neighborhood-level geographic information that can be used to benefit local communities (Thompson 2002). It involves identifying an area of small geographic extent, conducting research to produce an accurate inventory of the local assets, and generating a computer-based cartographic representation of such assets as tangible properties, government services, skills and knowledge of citizens, and ad hoc networks of neighborhood residents.

Northwestern High School students, in partnership with staff and faculty from the University of Maryland, are taught to research and map local community assets in a process that involves:

- visiting and interviewing people, businesses, projects, or places in the community;
- acquiring maps and data from government sources in order to produce base-maps of streets, buildings, properties, boundaries of neighborhoods, place names, etc.;
- making field observations using GPS receivers and PDAs to verify and update existing data;
- using various software packages, most importantly GIS, to generate asset maps;
- integrating of the maps with text, photographs, and/or tables to communicate and "tell the story" of the assets;
- displaying findings of the research in electronic form that is available to the community.

Goals of Asset Mapping:

- *Teach students geography using local, place-based contexts*
- *Teach students to conduct geographic research*
- *Strengthen local communities by providing a resource that encourages networking and capacity-building*

Asset mapping produces neighborhood-level maps of such things as:

- *Tangible properties*
- *Government services*
- *Community services*
- *Skills and knowledge of citizens*
- *Services provided by individuals*
- *Ad hoc networks of neighborhood residents*

The students of Northwestern High School have currently mapped and/or are working on:

- *Commercial areas of Mt. Rainier, MD*
- *Cultural, historic, and commercial sites in Hyattsville, MD*
- *Cultural and commercial sites in College Park, MD*
- *Northwestern High School, MD*
- *Community health, food sources, and walkability in Hyattsville, MD*

References:

In Reach, Inc. 2003. Community Connection: Prince George's Information Commons. *Revealed* 1 (2): 3. Available at <http://www.princegeorges.org/Asset_Maps/index.htm> (last accessed 15 April 2005).

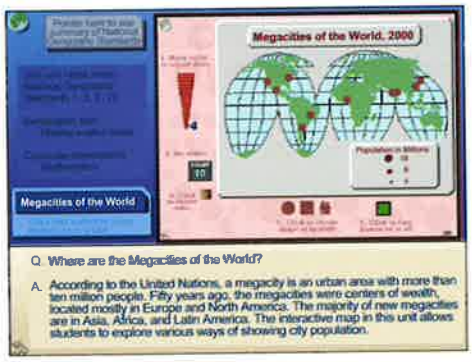
Prince George's County Information Commons. ND. *Home Page*. Available at <http://www.princegeorges.org/> (last accessed 15 April 2005).

Thompson, Derek. 2002. *Asset Mapping for Prince George's County, Maryland: Contextual Review and Ideas for a Potential Implementation*. College Park, MD: Institute for Philosophy and Public Policy. Available at <http://www.princegeorges.org/Derek%20Thompson%20report.pdf> (last accessed 15 April 2005).

▶ Students learn geography, conduct research, and improve communities and civil society through geography education.

National Science Foundation Grant Generates Interactive Geography Education Resources

National Project



ARGWorld stands for "Activities and Resources for the Geography of the World"—a comprehensive set of interactive curriculum activities developed by the Association of American Geographers with support from the National Science Foundation. These activities and resources are based on the national standards in geography, and they enhance education in the K–12 study of geography, history, earth science, and the social studies.

The ARGWorld materials consist of 11 "Global Units" and more than 70 instructional activities that were developed using four curricular dimensions that

(1) identify and present important geographical concepts;

(2) teach the key geographical concepts by using real places on the Earth where the concepts are best represented;

(3) identify geographical skills that can be appropriately taught along with the concepts and places selected for each activity, and incorporate instruction of those skills into the activity; and

(4) address important issues that make it relevant and worthwhile to learn the concepts, skills, and facts about the places that are presented in each activity.

A few examples of important geographic concepts include cultural adaptation, environmental gradient, the friction of distance, transportation chokepoints, urbanization, and the legacies of previous land uses and occupations. Using the concept of urbanization as an example, an ARGWorld unit studies how the global pattern of large cities is changing, with less developed countries taking the lead in urban growth. India is used as a case study to explore these processes of urbanization. Skills that accompany this activity include constructing and analyzing different types of point symbol maps, and using diagrams, graphs, and data tables to aid in interpretation. Finally, the issue of urbanization in less developed countries incorporates important considerations such as population change, ways of earning a living, and human health among others.

For more information:
See the ARGWorld section of the Web site of the Association of American Geographers at http://www.aag.org/Education/argnew/argworld.htm (last accessed 28 April 2005).

NASA Collaborates with Leading Nonprofits to Create *Mission Geography*

National Project

Mission Geography is a set of curriculum-support materials that link the content, skills, and perspectives of *Geography for Life: National Geography Standards* with the National Aeronautics and Space Administration's (NASA) missions and results. *Mission Geography*'s goals are to educate and excite learners about geography, NASA's research and missions, and the world in which they live.

***Mission Geography* focuses on the ways that NASA scientists use spatial analysis and other geographic skills to solve real world problems.** These experiences are translated into learning modules at three grade levels: kindergarten–Grade 4; Grades 5-8, and Grades 9-12. All *Mission Geography* investigations meet two requirements. First, they teach interesting and meaningful geography content by modeling geographic thinking and problem solving. Second, they involve learners in real-world contexts. The key skills and techniques of geography and other sciences are used in each module to model the approaches used by scientists to explore Earth from the ground and from space. Key interdisciplinary links are featured throughout the modules to illustrate the close connections between and among geography and other sciences, mathematics, and technology.

Mission Geography is the result of a collaboration among many education stakeholders including NASA and the geography education community represented by the Geography Education National Implementation Project (GENIP); the science, technology, mathematics, and geography communities through the *Mission Geography* Advisory Board; and experienced geography educators, master geography classroom teachers, university-based Earth scientists, and members of NASA's Aerospace Education Services Program (AESP) on the writing teams.

Mission Geography is distributed in two formats: on CD-ROM available from NASA through the Central Operation of Resources for Educations (CORE) at http://education.nasa.gov/edprograms/core/home/index.html or online at http://missiongeography.org. The project is supported by a network of trained educators and by the *Mission Geography* Web site.

For additional information contact:
Sarah Witham Bednarz, Principal Investigator, Mission Geography
Department of Geography, Texas A&M University
College Station, TX 77843-3147
e-mail: s-bednarz@tamu.edu

Satellite Image of Las Vegas, Nevada

Topographic map of Las Vegas, Nevada

▶ ***Mission Geography* links geography education to NASA missions and results.**

Resource Guide References

References to studies evaluating the effectiveness of geography education (includes studies found in What Works *and additional studies)*

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Englert, Kerry and Zoe Barley. 2003. National Geographic Society Alliance Study. *Journal of Geography* 102 (2): 80–9.

Gandy, S. Kay and Darrell P. Krueger. 2004. An Assessment of Influences on the Implementation of the National Geography Standards. *Journal of Geography* 103 (4): 161–70.

Gandy, S. Kay. 2002. A study of the Implementation of the National Geography Standards and their Alignment with Classroom Instruction in United States PK–12 schools. Unpublished Ph.D. dissertation, *Dissertation Abstracts International* 63, no. 07A (2002) p. 2444.

Hill, A. David and Emily Lockyear Collop. 1998. Valuing Professional Development in the Creation of the Best Geography Teachers. *International Research in Geographical and Environmental Education* 7 (2): 142–145.

Libbee, Michael. 2001. Assessment as a diagnostic tool. *Journal of Geography* 100 (4): 175–8.

Lieberman, Gerald A., Linda L. Hoody, and Grace M. Lieberman. 2000. California Student Assessment Project: The Effects of Environment-based Education on Student Achievement San Diego, CA: State Education and Environment Roundtable. Available at http://www.seer.org/pages/csap.pdf (last accessed 26 April 2005).

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Ormrod, Jeanne Ellis and David B. Cole. 1996. Teaching content knowledge and pedagogical content knowledge: a model from geographic education. *Journal of Teacher Education* 47: 37–42.

Mid-continent Research for Education and Learning. 2002. National Geographic Society Alliance Study. Aurora CO: Mid-continent Research for Education and Learning.

Rutherford, David and William J. Lloyd. 2001. Assessing a computer-aided instructional strategy in a world geography course. *Journal of Geography in Higher Education* 25 (3): 341–55.

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Resources for Conducting Evaluations of Educational Practices

Directorate for Education and Human Resources National Science Foundation. 1997. *User Friendly Handbook for Mixed Method Evaluations.* Arlington, VA: National Science Foundation. Available at http://www.ehr.nsf.gov/EHR/REC/pubs/NSF97-153/pdf/mm_eval.pdf (last accessed 30 November 2004).

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Major Geography and Geography Education Journals

Annals of the Association of American Geographers. Produced four times yearly, this journal publishes original, timely, and innovative peer-reviewed articles that advance knowledge in all facets of geography. In addition to addressing significant research problems and issues, the *Annals* publishes integrative and cross-cutting papers, commentaries, review articles, forums, book reviews, and occasional map supplements.

International Research in Geographical and Environmental Education. Produced four times yearly by the Commission on Geographical Education of the International Geographical Union. With a focus on geographical and environmental education, the journal publishes quality research studies; promotes an expanded international interest; provides a forum for the critique of research studies and the discussion of relevant research; encourages the international dissemination of research; and demonstrates the relevance of research studies to good professional practice. All papers are anonymously peer-reviewed by a minimum of two experts.

Journal of Geography. Produced six times yearly by the National Council for Geographic Education. This journal provides a forum for educators and scholars to present results from teaching and research that advance the understanding and practice of geographic education from pre-Kindergarten through post-graduate levels. All papers are anonymously peer-reviewed by a minimum of two reviewers.

Journal of Geography in Higher Education. Produced three times yearly by editorial offices in the United Kingdom. Devoted to geography teaching in all institutions of higher education throughout the world, this journal provides a forum for geographers and others, regardless of their specialisms, to discuss common educational interests, to present the results of educational research, and to advocate new ideas. All submitted articles are peer-reviewed.

The Professional Geographer. Produced four times a year by the Association of American Geographers. This journal publishes short, peer-reviewed articles on academic or applied geography, emphasizing empirical studies and methodologies, as well as book reviews. These features may range in content and approach from rigorously analytic to broadly philosophical or prescriptive. The journal provides a forum for new ideas and alternative viewpoints.

Research in Geographic Education. This international peer-reviewed journal of research in geography education is produced twice yearly by the Grosvenor Center for Geographic Education. The focus is on significant research-based manuscripts in all areas of geography education, such as spatial cognition, map learning, learning theory, curriculum, distance learning, environmental psychology, environmental education, and teaching methodologies.

The Geography Alliance Network

Since 1986 the National Geographic Society has helped to build a state-based, national network of K–12 teachers, college geographers and educators, school administrators, and others dedicated to improving geography education, called "Geography Alliances."

Each Alliance is based in a university/college geography department or state education department. The Alliances link academic geographers with K–12 teachers throughout the state to improve geographic education through teacher professional development workshops, geography conferences, field trips, outreach events, provision of resources such as lesson plans and maps, and an array of other activities. In addition, the Alliances advocate for geography education in forums that range from community groups, local school districts, state education agencies, and state and federal legislatures.

In total, the Geography Alliance Network has provided training for more than 100,000 teachers, an accomplishment achieved through the volunteer efforts of Alliance members across the country. The case studies presented in *What Works in Geography Education* provide illustrative examples of the programs that the Alliance Network has provided for almost twenty years.

Alabama Geographic Alliance
http://www2.una.edu/geography/aga/

Alaska Geographic Alliance
marcelloj@mail.ssd.k12.ak.us

Arizona Geographic Alliance
http://alliance.la.asu.edu/azga/

Arkansas Geographic Alliance
gthanson@ualr.edu

California Geographic Alliance
http://www.humboldt.edu/%7Ecga/

Colorado Geographic Alliance
http://www.du.edu/coga/

Connecticut Geographic Alliance
http://www.ctgeoalliance.org/

Delaware Geographic Alliance
rees@udel.edu

D.C. Geographic Alliance
http://www/dcga.org

Florida Geographic Alliance
http://fga.freac.fsu.edu/

Georgia Geographic Alliance
http://www.gageography.org/

Hawaii Geographic Alliance
http://www.hawaii.edu/hga/

Illinois Geographic Alliance
http://coe.ilstu.edu/iga/

Geography Educator's Network of Indiana
http://www.iupui.edu/%7Egeni/

Geographic Alliance of Iowa
http://www.uni.edu/gai/

Kansas Geographic Alliance
http://www.fhsu.edu/kga/

Kentucky Geographic Alliance
http://www.kga.org/

Louisiana Geography Education Alliance
http://www.nsula.edu/lagea/

Maine Geographic Alliance
http://www.carrabec.sad74.k12.me.us/MGA home.html

Maryland Geographic Alliance
http://www.mdcss.org/html/mga.html

Massachusetts Geographic Alliance
http://www.massgeo.org/

Michigan Geographic Alliance
http://www.wmich.edu/mga/

Minnesota Alliance for Geographic Education
http://www.macalester.edu/~geograph/mage/

Mississippi Geographic Alliance
http://user.intop.net/~junehollis/mga_index.html

Missouri Geographic Alliance
http://mga.drury.edu/

Montana Geographic Alliance
jag@selway.umt.edu

Geographic Educators of Nebraska
http://www.ngsednet.org/

Geographic Alliance in Nevada
cryan@unr.edu

New Hampshire Geographic Alliance
http://www.keene.edu/orgs/geogranite/

New Mexico Geographic Alliance
opmatt@unm.edu

New York Geographic Alliance
http://www.buffalostate.edu/orgs/nyga/

North Carolina
http://www.ngsednet.org/ncga

North Dakota Geographic Alliance
http://www.ndgeographic.org/index.html

Ohio Geographic Alliance
Smith.70@osu.edu

Oklahoma Alliance for Geographic Education
http://www.ou.edu/okage/

Oregon Geographic Alliance
http://geog.pdx.edu/oga/

Pennsylvania Geographic Alliance
trifonof@husky.bloomu.edu

Rhode Island Geographic Alliance
http://www.ri.net/RIGeo/rigea/home.html

South Carolina Geographic Alliance
http://www.cas.sc.edu/cege/index.htm

South Dakota Geographic Alliance
Charles_Gritzner@sdstate.edu

Tennessee Geographic Alliance
http://web.utk.edu/~tga/

Texas Alliance for Geographic Education
http://www.geo.txstate.edu/tage/

Utah Geographic Alliance
cbcraig@cc.usu.edu

Vermont Geographic Alliance
http://academics.smcvt.edu/vtgeographic/

Virginia Geographic Alliance
http://www.runet.edu/%7Egeogweb/alliance/vga.html

Washington Geographic Alliance
rpapritz@grcc.ctc.edu

West Virginia Geographic Alliance
manzoj@concord.edu

Wisconsin Geographic Alliance
http://www.snc.edu/wiga/

Wyoming Geographic Alliance
http://uwadmnweb.uwyo.edu/geog/wga/

As the world becomes more interconnected through technology and global economic, political, social, and environmental concerns, the need for geographic knowledge increases.

For more than twenty years Americans have consistently demonstrated poor understanding of geography.

Studies show that we know what works to improve geographic literacy and teacher quality.

Evaluation and improvements in geography education continue to lead to better practices and programs.

The foundations of geography education are strong, and the directions to proceed are clear.

The case studies presented in What Works in Geography Education *show how to improve geographic literacy across the United States.*

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