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Atlas of Science Literacy Completes Mapping of Science-Learning Pathways

ST. LOUIS, MO – As K-12 teachers prepare to help students meet new science-learning requirements this Fall, two of the world’s largest science and science education organizations today joined forces to release a set of maps showing how science literacy can develop over time.

Maps in the two-volume *Atlas of Science Literacy* offer teachers a grade-by-grade guide to science learning from kindergarten through 12th grade. *Atlas* maps show the interconnected ideas and skills that are essential for building students’ understanding of important science, mathematics, and technology topics such as weather and climate, computation and estimation, health technology, and reasoning.

“Our conceptual strand maps chart the ideas and skills that students are expected to learn, when they might be able to learn them, and how the set of ideas and skills fit together to support science literacy,” explained Jo Ellen Roseman, director of Project 2061, the science-education reform initiative at the American Association for the Advancement of Science (AAAS). “By laying out sensible learning progressions, the *Atlas* maps can help teachers in their day-to-day classroom decisions, while also paving the way for long-term, serious research.”

Atlas 2 -- jointly released today by AAAS Project 2061 and the National Science Teachers Association (NSTA) at a national conference in St. Louis -- and its companion *Atlas 1* now map concepts related to all of the K-12 science-learning goals recommended in Project 2061’s well-respected *Science for All Americans* and *Benchmarks for Science Literacy*.

By providing a visual display of the *Benchmarks* learning goals, Roseman noted, “It’s much easier for teachers and others to see the rich relationships among ideas. The *Atlas* maps emphasize the importance of these connections and how they contribute to students’ science literacy.”

The ultimate goal, according to *Atlas 2*, is to help all Americans “form a coherent understanding of the world and how it works.” Otherwise, *Atlas 2* authors wrote: “Students may be left with nothing more than unrelated, poorly understood and quickly forgotten facts, algorithms, and technical terms.”

Atlas maps were well-received by St. Louis-area K-12 teachers who took part in an Earth Systems class co-taught by the St. Louis Zoo’s Sharon Kassing, coordinator of the Center for Inquiry in Science Teaching and Learning. During the course at Washington University, Kassing said, she asked teachers to compare *Atlas* maps with grade-level learning expectations displayed in a chart format. “They really liked the *Atlas* maps,” she reported. “The way the information is arranged, and the notations about how and when related topics can be addressed with students were popular features among the teachers.”

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The release of *Atlas 2* coincides with new challenges for teachers and a renewed interest in U.S. science education, said NSTA President Linda Froschauer, an eighth-grade teacher in Weston, Connecticut. Beginning with the 2007-2008 school year, for example, the No Child Left Behind Act will require school districts to test students in science at least once in each of three grade spans: 3-5, 6-9 and 10-12, Froschauer explained.

In St. Louis, for example, the new federal requirement will mean that two of three existing science tests for students will be given later -- at the fifth and eighth grades, rather than the third and seventh grades, according to Elizabeth Petersen, a science teacher at Ladue Middle School and past president of the Science Teachers of Missouri. Meanwhile, an exit exam following high-school science classes also is being considered as an alternative to science tests that currently take place at the tenth grade.

As a result, Petersen said, teachers may be challenged to adjust the timing of science instruction on various topics. "The *Atlas* maps are an enormously powerful tool to help teachers choose the most important science concepts at each stage," she added. "The maps also underscore the fact that teachers at every grade-level have such an important role to play in promoting science literacy."

Science literacy is central to understanding and addressing some of the nation's most pressing problems, Roseman said, and helping all Americans achieve science literacy is Project 2061's mission.

To follow the global climate-change issue, for example, individuals need to understand key physical and social-science concepts; appreciate the benefits and risks of various energy resources and technologies; and be aware of the need to support claims and arguments with sound evidence. These concepts -- and their relationships to each other -- appear on maps in both *Atlas 1* and *Atlas 2*, first in relatively simple forms in the early grades, then in more sophisticated forms in the middle- and high school grades.

A Weather and Climate map, provided with this news release, shows how ideas relevant to global climate change relate to each other, both within and across grade levels. (Like other maps in the *Atlas* volumes, the Weather and Climate illustration draws upon useful ideas from the National Research Council's National Science Education Standards, reflecting a strong consensus between AAAS and the prestigious National Research Council regarding essential science-literacy concepts.)

Maps published in the *Atlas of Science Literacy, Volume 2*, focus on 44 new topics, and in particular:

- The nature of science, including the scientific world view and science and society;
- The nature of mathematics;
- The nature of technology and its relationship to science;
- The physical setting, from weather and climate, to electricity and magnetism;
- The living environment, including the diversity and interdependence of life;
- The human organism, from human identity and development, to basic functions of the human body;
- Human society, including group behavior and political systems;
- The designed world from materials science to health technology;
- The mathematical world of numbers, shapes and reasoning;
- Historical perspectives, from the Copernican revolution to the Industrial Age;
- Common themes that cut across disciplines such as constancy and patterns of change; and
- Literacy skills including computation and estimation, communication, and detecting flaws in arguments.

Project 2061 was launched in 1985 – the year Halley’s Comet was last visible from Earth – and its name is a reminder of the importance of science, mathematics, and technology to those who will come of age before the Comet’s return in 2061.

In 1989, Project 2061 released *Science for All Americans*, describing the knowledge and abilities required for adult science literacy. *Benchmarks for Science Literacy*, the landmark description of student-learning goals in science, mathematics and technology at various grades, followed in 1993.

Project 2061’s *Benchmarks of Science Literacy* and *Science for All Americans* are now freely available online at <http://www.project2061.org>. Print copies of these books also can be ordered from the publisher, Oxford University Press (go to <http://www.us.oup.com/us/>). For information on ordering the new *Atlas of Science Literacy, Volume 2* as well as *Atlas 1*, please log onto <http://project2061.org>.

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The American Association for the Advancement of Science (AAAS) is the world’s largest general scientific society, and publisher of the journal, *Science* (www.sciencemag.org). AAAS was founded in 1848, and includes some 262 affiliated societies and academies of science, serving 10 million individuals. *Science* has the largest paid circulation of any peer-reviewed general science journal in the world, with an estimated total readership of one million. The non-profit AAAS (www.aaas.org) is open to all and fulfills its mission to “advance science and serve society” through initiatives in science policy; international programs; science education; and more. For the latest research news, log onto EurekAlert!, www.eurekalert.org, the premier science-news Web site, a service of AAAS.

The Arlington, VA-based National Science Teachers Association (NSTA) is the largest professional organization in the world promoting excellence and innovation in science teaching and learning for all. NSTA’s current membership includes more than 55,000 science teachers, science supervisors, administrators, scientists, business and industry representatives, and others involved in science education.

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