An occasional newsletter about Birmingham science

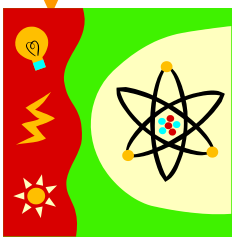
Newtonian News

Volume 1, Issue 1

August 2011

Edited by Jennifer Gottlieb, Science Coordinator

248-203-3781 jg15bps@birmingham.k12.mi.us



Conceptual Framework for New Science Education Standards Released

On July 19, 2011, the NRC (National Research Council) released *A Framework for K-12 Science Education.* This framework identifies the key scientific practices, concepts, and ideas that all students should learn by the time they complete high school.

One significant aspect of the framework is the recommendation that new standards integrate three key dimensions: practices needed to engage in scientific inquiry and engineering design, content that includes a limited number of core ideas in four disciplinary areas, and cross-cutting concepts that bridge both the sciences and engineering.

Also noteworthy is the Framework's inclusion of engineering which focuses on how science is utilized through the engineering design process, and the distinctions and relationships between engineering, technology and applications of science. "This framework emphasizes the importance of engaging students more deeply in the process of doing science, not just learning content," said NSTA Executive Director Dr. Francis Eberle.

Science/Engineering Classroom Practices

1. *Asking questions (for science) and defining problems (for engineering)*
2. *Developing and using models*
3. *Planning and carrying out investigations*
4. *Analyzing and interpreting data*
5. *Using mathematics and computational thinking*
6. *Constructing explanations (for science) and designing solutions (for engineering)*
7. *Engaging in argument from evidence*
8. *Obtaining, evaluating, and communicating information*

Now that the framework is complete, Achieve, a nonprofit organization based in Washington, will work with states and outside experts to craft a set of what's being billed as "next generation" science standards for elementary and secondary education, expected out by fall 2012. Organizers say they hope that states from coast to coast will ultimately choose to adopt the standards to replace existing ones. These "next generation" science standards will then be reviewed by the Michigan Department of Education to determine the extent of the revision of our High School Content Expectations and Grade Level Content Expectations. It is anticipated that new assessments (to replace the MEAP and MME) will be administered during the 2016-17 school year.

So what does this mean for us in Birmingham? I am hopeful about the emphasis of depth over breadth, and excited about the impact this could have on our students' learning. As long as we continue to follow (and develop and share) great instructional practices in our science classrooms (see box to the left), our students will be ready for any new assessments that come in 2016.

Source: http://www.nsta.org/publications/news/story.aspx?id=58735

Teacher Resources

Visit http://itsisu.portal.concord.org/activities for links to open source high quality inquiry activities that are ready to use with your students.

The Concord Consortium

Teaching with Topographic Maps

U.S. Geological Survey (USGS) has created a website with links to more than 25 lesson plans and ideas using topographic maps. Through the activities, students explore how Global Positioning Systems work, how to analyze map scales, and how to create their own three dimensional models of a topographic map. Visit http://on.doi.gov/lRXxqm.

EcoTipping Points Project

Access case studies and lesson plans exploring successful environmental projects around the world at http://bit.ly/ls0jQO. Each study includes a video, PowerPoint presentations, narratives, student worksheets, and teacher keys. Topics include restoring a coral reef fishery in the Philippines, harvesting rainwater in India, revitalizing a community garden in New York City, and others.

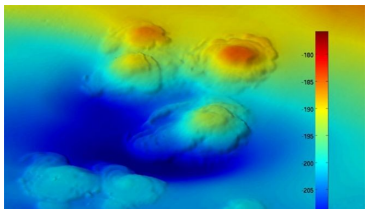
Earth Math

To think quantitatively about climate change, students must become fluent in working with Celsius and Fahrenheit temperature scales. Students also should understand the differences among watts, kilowatts, and kilowatt hours; tons and gigatons; and BTUs. All of these units appear in news stories about climate change and human impacts on the environment. NASA's Earth Math Teaching Guide, for students in grades 6—12, introduces the quantitative skills students will need to make sense of climate change through problems in basic mathematics, algebra, and geometry. Access the guide at http://1.usa.gov/jOjwJp.

This Month in the Science Journals

Science Scope

- ***Twenty Ways to Assess Students using Technology.*** To ensure students are fully engaged in the learning process, educators must explore every available path for assessment. This article provides a list of ideas and programs/ websites that can be used in any combination for formative and summative assessments.
- ***Using Technology in the Classroom.*** The author describes how she has come to use technology in her classroom over the years. Her main topics include using the internet, experiencing podcasts, using technology for assessment, and recording results from science research.

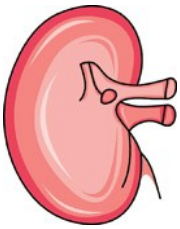


- ***Exploring Seafloor Volcanoes in Cyberspace.*** Seafloor exploration being done by scientists is an ideal way to introduce students to technology as a tool for inquiry. The same technology that allows scientists to share data in near real time can also provide students the tools to become researchers. NOAA's Ocean Explorer Explorations website is a rich research data bank that can be used by inquisitive middle school students to ask their questions and use the same data scientists do to find answers.
- ***Cloud Study Investigators: Using NASA's CERES S'COOL in Problem-Based Learning.*** During a problem-based learning activity, middle school students conduct authentic scientific research by observing and recording information about clouds and contribute ground truth data to NASA's Clouds and the Earth's Radiant Energy System (CERES) experiment.

The Science Teacher

- ***Chromonoodles: Jump into the Gene Pool.*** The authors use pool "noodles" to model chromosomes in the biology classroom. Students gain a greater appreciation of the interdependence of DNA and inherited traits.

- ***Hydrogel Beads: The New Slime Lab?*** Students experience an inexpensive inquiry activity on chemical bonding, properties, and replacement reactions. In this activity, students synthesize a cross-linked polymer: hydrogel.
- ***Simulating Science.*** Students use manipulative models and small-scale simulations that promote learning of complex biological concepts. The authors have developed inexpensive wet-lab simulations and manipulative models for "Diagnosing Diabetes" "A Kidney Problem?" and "A Medical Mystery."



- ***It's Elemental!*** Using Periodic Table Live! pushes students to think critically and helps them learn the period trends in properties.
- ***Science 2.0: PD on a Shoestring.*** This column shares web tools that support learning. This month's issue describes inexpensive or free professional development opportunities by listing webinars, videos, podcasts, and more that are available online.

This Month in the Science Journals!

This is a small sample of the articles and features in the NSTA journals this month. If anything looks interesting, let me know and I'll send you a copy!

Jennifer Gottlieb

jg15bps@birmingham.k12.mi.us