THE SCIENCE NAVIGATOR

PreK
Elementary
Middle School
High School
PreK-12 Resources
Home School

Click here for full article

Science Inspiration for Elementary

Science Assessment: Ways To Make It Work In Your Classroom
Written By: Susan M. Abbott

Teaching science at the elementary level is exciting and challenging, exhilarating and exhausting. But, that being said, it is one of the key curriculum areas for which students must gain mastery. Whether you teach the kindergarten level or sixth grade, or any of the grades in between, getting students interested and excited about science is easy to do. Children are naturally curious and inquiry-based science instruction is a method that allows them to explore a wide variety of topics at cognitive levels that are appropriate for each age.

SCIENCE

High School Science Motivation

Assessing Can Be Fun! • Written By: Cyndi Long

"If I could just teach and not have to grade, I'd be so happy." Sound familiar? I've said that a few times in my teaching career. However, assessment is a necessary component of education, and it has to be done to ensure that learning is taking place.

Challenging Your Gifted Students with *CFGE*

The William and Mary Science Curriculum: Assessing Students with Problem-Based Learning • Written By: Ann LaChance

What do you grade on a daily basis? Think about the assessment methods represented by the grades in your grade book. What might students infer about the purpose of science instruction from your choices about what is graded? If your philosophy of good science instruction includes an inquiry-based, problem-solving program, does your grade book reflect that?

Click here for full articles

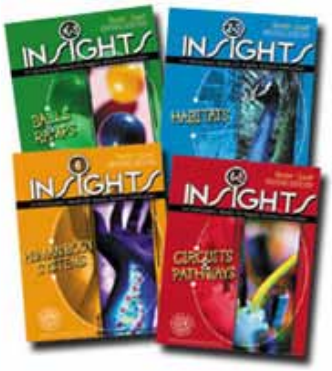
Kendall Hunt News

Click here for full articles

- *Middle School Life Science*: Winner of the People's Choice Award at the Chicago Book Clinic and Media Show
- Professional Development: Consulting Conference Calls Make a Difference

Transform Your Classroom

Kendall Hunt publishing company



www.kendallhunt.com/insights

Science Assessment: Ways To Make It Work In Your Classroom • Written By: Susan M. Abbott, M. Ed., M.A. High School Special Education Teacher Kendall Hunt Consultant

Teaching science at the elementary level is exciting and challenging, exhilarating and exhausting. But, that being said, it is one of the key curriculum areas for which students must gain mastery. Whether you teach kindergarten or sixth grade, or any of the grades in between, getting students interested and excited about science is easy to do. Children are naturally curious and inquiry-based science instruction is a method that allows them to explore a wide variety of topics at cognitive levels that are appropriate for each age.

The ***Insights*** Modules, from *Balls and Ramps*, to *Habitats*, to *Sun, Earth and Moon*, *Circuits and Pathways*, and *Human Body Systems*, all allow students the opportunity to explore science in a hands-on way that promotes questions and explorations within the scope of the curriculum and also allows students to expand inquiry-based thinking in their own ways.

As both a former elementary classroom teacher and science staff development teacher, I was able to use the ***Insights*** curriculum in my own classroom while working with teachers to enhance their own science experience. We all know that teaching science can be intimidating and often is the first subject we "eliminate" when the days grow too full with other areas of curriculum. But, that need may not be the case. Students love to explore and having an opportunity to work through experiences at a pace that is age appropriate and builds on their skills helps all students be successful. How do we know that students are gaining the knowledge we want them to have? In my experience, I have used a variety of assessment tools to ascertain whether my students are gaining the knowledge I want them to have when completing a learning experience. Formal, informal, and written assessments are all part of the curriculum offered in all the ***Insights*** Modules and must be part of the daily routine of science education.

During an exploration, I walk around and speak to students as they work through an experience. Simple conversations allow the students and the teacher to delve deeper into concepts in a non-threatening way. Student notebooks, not journals, are another tool I use regularly, even now as I teach high school science, as a means to assess student understanding. The notebook is where students keep track of the experiments and write down questions they have about what they experience. As science knowledge builds, notebooks allow students' work to be organized in a fashion that allows them and the teacher to go back and check what they have done and questions they have had in previous experiences. Scientific drawings develop sophistication as students develop cognitively. Teachers can assess student understanding through these drawings and writings in the notebook. The science notebook gives students an opportunity to see their own growth and development as the year progresses. I have chosen to use bound notebooks, continuing today, as opposed to wire bound notebooks, since the pages are not easily torn out.

Formal written assessments are important as well. Teaching students to answer questions, for example, including part of the question in the answer, is critical in this day and age of systemic testing. Students need multiple opportunities to answer formal questions both in a testing format and through the science notebook. Should all of this be overwhelming for a teacher? No, but initially it can seem so. Simply being organized and observant allows a teacher to assess student knowledge in an ongoing format through conversation, notebook assessment and formal written assessments. Science is fun and students gain incredible knowledge and perceptions through inquiry-based science exploration.

As a teacher formally afraid to teach science, afraid that my lack of a science background would hinder my students gaining the knowledge they need in this 21st century global marketplace, using inquiry-based science curriculum is a natural progression. I am now working in an alternative high school for students with special needs and I am the science teacher. I love the opportunity to see my students, from freshmen to juniors, explore and grasp concepts through inquiry. I am using many of the strategies I used in the elementary grades and they work at this level as well.

Return to Main Page

Click here for a full listing

SCIENCE

Assessing Can Be Fun! • Written By: Cyndi Long High School Science Teacher • Kendall Hunt Consultant

"If I could just teach and not have to grade, I'd be so happy." Sound familiar? I've said that a few times in my teaching career. However, assessment is a necessary component of education, and it has to be done to ensure that learning is taking place. Still, regularly assessing student learning can be daunting and difficult. Multiple-choice tests are easier to grade, but I never feel like I have a true understanding of if my students "got it".

Thankfully, there are a couple of programs that already include assessments that are fantastic for assessing student learning, engaging student interest, and assisting me as I pour through the work of 150 students.

I've used both ***BSCS Biology: A Human Approach (AHA)*** and ***BSCS Science: An Inquiry Approach***. Both programs contain a variety of assessment types in the "Evaluate" section of each 5-E learning cycle (BSCS / Bybee) and throughout each chapter.

Critter, one of my favorite assessments, is woven throughout ***AHA***. Students create their own critter that must have adaptations that allow it to survive in a habitat, such as a tropical rain forest or a coral reef. Students rely on what they have learned about evolution to discuss how an adaptation arises in a population and how the species of their critter came to be. They also add details such as a scientific name and the kingdom to which it belongs.

More than any other assessment I've given, students take ownership over this project. The critter becomes their creation … they design it, they develop its home, they bring it to life while applying concepts they've learned such as homeostasis and reproduction. I've had students make 3-dimensional critters in ceramics class or sew stuffed critters. I've had struggling students make posters of their critter. Students that have graduated come back to visit and talk about the critter they made in biology class. Because of the ownership and pride students take in this assignment, they invest more time, energy, and thought into the learning process. The effort they put forth to understand the concepts increases.

Engaging students in assessment, or giving them the opportunity to really care about their work, is very important. It is also important to vary the types of assessments. Both programs, ***BSCS Science: An Inquiry Approach*** and ***BSCS Biology: A Human Approach***, provide many different assessments, or "Evaluates." Students have different strengths. I have found that by varying the assessments throughout the year, I can offer at least a couple of assessments that really work for each student. Most students seem to be successful on the Critter assessments. For Analyzing data and writing an explanatory paragraph, Evolution in Action ***(AHA)***, contains an "Evaluate" that works for many students. This "Evaluate" project helps students describe the use of antibiotics and how that selective pressure results in antibiotic-resistant bacteria. Answering essay questions, taking multiple-choice quizzes, developing brochures or posters, and giving presentations are some of the varied assessments that allow students to demonstrate their knowledge.

BSCS Science: An Inquiry Approach gives students opportunities to create a sports drink, write stories, and design investigations. Using varied assessments captures the creativity of students and gives them opportunities to show what they know while also giving the teacher a more interesting journey as he or she begins the grading process.

Through the use of each program, the challenge of grading becomes a part of the teaching. I gain important insight into not only what students know, but also different strategies each student can use to show their knowledge. So, while most of us would agree that teaching is great, I know that grading can be interesting too.

Return to Main Page

The William and Mary Science Curriculum: Assessing Students with Problem-Based Learning • Written By: Ann LaChance

Kendall Hunt Consultant • Retired UAH Science Specialist for AMSTI (Alabama Math, Science, Technology Initiative)

What do you grade on a daily basis? Think about the assessment methods represented by the grades in your grade book. What might students infer about the purpose of science instruction from your choices about what is graded? If your philosophy of good science instruction includes an inquiry-based, problem-solving program, does your grade book reflect that? If you are grading only paper and pencil tests, you are not getting a clear picture of student learning. Implementing problem-based learning like the PBL science curriculum units in *The College of William and Mary* curriculum is a new experience for many of us. Assessment needs to be ongoing and not be limited to traditional paper and pencil tests at the end of the unit.

When implementing Problem-Based Units, there are many ways to assess your students. Teacher observation of students participating in large and small group activities is one opportunity for ongoing assessment. Use a checklist with a list of objectives to check off when observing students, such as "on task, following directions, demonstrates the measurement process, uses equipment properly, initiates questions and/or solutions, completes data/observation chart," etc. Performance-based assessment is recommended for gifted students. The students can even participate in planning the assessment and establishing the criteria by which their work is judged.

The PBL Units instruct students to design and conduct their own investigations. There is a good "Experimental Design" Checklist in most of the units. You can also assess what your students record in their Science Notebooks using a rubric for "Student Investigation." Give possible points for each component of the investigation, such as "Problem, Hypothesis, Plan/Procedure, Observation/Data/Results, Conclusion (What I Learned), and Next Steps/New Questions." Have descriptors listed for each component. Allow the students to help you decide on possible points for each. Students can do a self-assessment or pass notebooks around in their group for a peer assessment. This is strictly for feedback purposes with you, the teacher giving the final score.

Student learning improves when assessment is a regular part of classroom practice. As you give a variety of assessments throughout a unit of study, everything does not have to be graded. However, some type of feedback should be given to your students. Feedback is the most powerful modification in improving student learning. For more feedback, send a rubric home for parents to review their child's science notebook. Have parents circle the description in each category they feel best describes the notebook entry being reviewed. Categories can be effort, neatness, and organization. Students can help decide on the descriptors for each category.

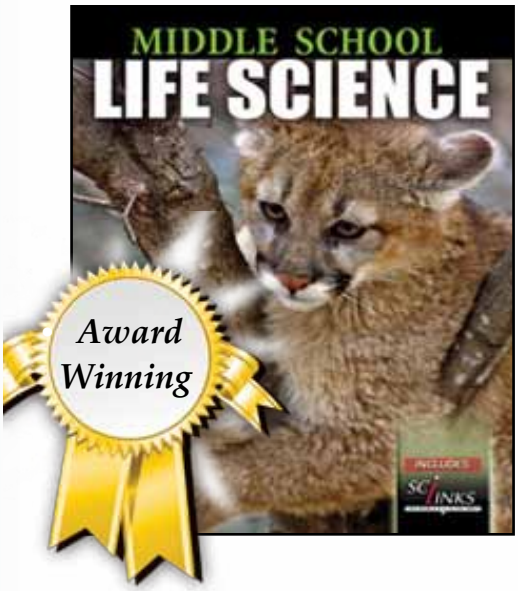
Instead of assessing every component of the investigation, for example, you may want to just assess the graph. In Lesson 10 of the PBL Unit, *Acid, Acid Everywhere*, students are asked to design a data table. Assess students using a rubric with the following categories: "type of graph, putting a title on the graph, appropriate intervals to number x, y-axis (2's, 3's, 5's, 10's, 100's, etc), label x, y axis, graph is clear," etc. Students need to glue the rubric into their notebook so they can refer to it each time they are asked to complete a graph. When students know what aspects of a skill or concept will be assessed, they are more likely to complete assessments.

One way to find out if the student understands the content and vocabulary is to have the students write a letter to someone (can be to you, another teacher, family member, friend, movie star, sport star, President, etc). In the letter, students explain to the person in which they are writing what they have learned about a certain concept studied in science. The student will explain what they learned as if they were teaching the concept to that person. Grade content, vocabulary and creativity using a rubric.

Using a wide variety of classroom assessments gives you a better picture of student learning. Assessment can include a variety of options that are performance-based, which may be a product, performance, or process. Some examples are research reports, portfolios, journals, oral presentations, projects, models, graphic organizers, teaching a lesson to others, conducting an interview, learning logs, writing and presenting a play, etc. Have the end goal in mind before teaching the unit. Plan assessments that will help you know if you are being successful in reaching that goal. The PBL Units provide many helpful assessment opportunities that can be used to monitor student progress.

Problem Based Curriculum Units prepare students to become scientifically literate thinkers and doers. If your students are "doing" science, then you need a variety of ways to determine what students are thinking, how they are reasoning, and what your next instructional steps should be.

Return to Main Page



Middle School Life Science Wins "Peoples Choice Award" at the Chicago Book Clinic and Media Show

Kendall Hunt's innovative middle school science program, ***Middle School Life Science***, garnered the coveted People's Choice Award, voted on by show attendees, at the recent 2009 Chicago Book & Media Show. The annual event honors excellence in the planning, supervision, and execution of the physical and visual aspects of publishing media.

"Receiving the People's Choice award for ***Middle School Life Science*** is a great honor and I am very proud of our team," said Charley Cook, Kendall Hunt's Vice President of PreK-12 Publishing. "This recognition by the Chicago Book Clinic and our colleagues is a great honor for our PreK-12 team and for all of the employees at Kendall Hunt Publishing Company."

Middle School Life Science is a full-year middle school program emphasizing depth rather than breadth, concentrating on fundamental concepts in greater depth for better understanding. Organized around a three-step learning cycle, concepts are introduced with hands-on learning experiences, and then developed through discussions, min-lectures, and/or readings.

About the Chicago Book Clinic

Founded in 1936, the Chicago Book Clinic encourages excellence in publishing by providing a platform for educational, social & professional interaction of our members. Members are professionals in book and media publishing, printing, editorial, design, and all business aspects of our industry. The Chicago Book Clinic accomplishes its mission through a variety of educational programs, publications, and special events designed to promote the publishing media industry and its members.

For more information, visit http://chicagobookclinic.org/news/2009-book-media-show-winners-and-honorable-mentions/.

Visit our website at www.kendallhunt.com/msls to further discover our award-winning ***Middle School Life Science*** program.

Return to Main Page

Kendall Hunt Professional Development

www.kendallhunt.com/staffdevelopment

Consulting Conference Calls - New Option for Support

We understand that professional development is an ongoing process, not a single event. To further support you, Kendall Hunt offers convenient conference calls with our expert consultants.

Conference calls can consist of any topic in regard to Kendall Hunt's science programs and implementation. We can set up a time for you and an expert consultant to have your conference call. Conference calls are charged at a per hour rate. For more information or to schedule your conference call, please contact Jamie Becker at 800-542-6657 ext. 1058.

Return to Main Page