

INSTRUCTIONALModule

Exploratory Learning with a Digital Microscope

INSPIRE

What Is Special About the Digital Microscope?

The digital microscope provides experiential learning at its best, which makes it especially valuable in the classroom. Experiential learning encourages student involvement, enhances understanding, and is effective with a wide range of learners, including English language learners (Northwest Regional Educational Laboratory, 2002). Teachers must use the same criteria for technology integration that they use in evaluating and choosing any other learning tool for their classrooms (NAEYC, 1996).

Taking a close look through a digital microscope engages students and shows them how truly fascinating common objects can be under magnification (Northwest Regional Educational Laboratory, 2002). A digital microscope is well suited for scientists young and old; and most microscopes are simple to manipulate with software that is kid-friendly and fun. Don't be fooled by the ease of use, however ... word has it, some digital microscopes are also used in professional science laboratories!

IN THIS ACTIVITY, WE WILL ANSWER THE QUESTIONS:

- How are digital microscopes being used?
- What are they? What do they do?
- What are people saying about the digital microscope?

HOW ARE DIGITAL MICROSCOPES BEING USED?

Invigorating Science Education with a High-Tech, Low-Cost Tool: Technology Extends Classroom Study

by Lynn Bell and Randy Bell

At the University of Virginia's Curry School of Education, technology is introduced to preservice teachers in the context of teaching science with appropriate pedagogy. The focus is never on technology tools—no matter how "cool" they are—but on how to use those technology tools to better understand science.

One of several technology tools introduced to preservice science teachers is the QX3 digital microscope, a Digital Blue product (The QX3 was once an Intel product). The QX3 has the same capabilities as an optical microscope, including a range of magnifications (10x, 60x, and 200x). But unlike optical microscope output, the digital output is displayed on a computer monitor and can also be recorded and saved on a hard disk or diskette. These features make it possible to import the digitized images into other analysis programs, and to incorporate images into word-processed or PowerPoint® reports. The accompanying software provides the capability to record both real-time and time-lapse movies.

This capability supports scientific inquiry in the classroom, as described in both Virginia's Standards of Learning and the National Science Education Standards. Both these reform-based documents promote science instruction that emphasizes understanding the ways scientific knowledge is developed, as well as understanding scientific content. For example, it's one thing to understand the processes of photosynthesis and respiration but an entirely different matter to understand how scientists developed an understanding of these processes. Activities promoting inquiry skills, including observing, classifying, inferring, predicting, and analyzing, can be first steps toward helping students understand how scientists go about their work. In so doing, students can gain a vision of science as active and evolving, inherently new, and interesting.

Read the entire article: *Invigorating Science Education with a High-Tech, Low-Cost Tool*.

Jumpstart-for-a-Day in San Francisco

More than 500 preschool and kindergarten students came to San Francisco State University for an event called Jumpstart-for-a-Day, a festival of fun and learning for children and their parents. Among the activities offered for the children was a hands-on science and technology corner that included several digital microscopes. The children were fascinated by the objects they saw under the microscope as well as by the chance to look at themselves in ways they'd never experienced before. The digital microscopes were a true hit!

The Maine Lakes Conservancy Institute by Ken Williams

Students of Nobleboro Central School, located in the midcoast region of Maine, work with the Maine Lakes Conservancy Institute as part of their science class. Using a digital microscope, laptop computers and other tools, students of different abilities and interests engage in a multi-disciplinary approach to science education. Ken Williams, their science teacher, was asked to write a summary of his eighth grade lesson (PDF).

Read a related article: *The Maine Event*.

Visit the multimedia presentation "Laptops at the Lake" to see students using the latest scientific tools to monitor the health of their local lake.

WHAT ARE THEY? WHAT DO THEY DO?

The digital microscope is a tool with huge learning potential. It is simple to set up and operate. The microscope can magnify objects at various levels: 10x, 60x and 200x. Some microscopes can be taken off their stands and used in handheld mode for close-ups of real-world objects like hands, eyes, and ears.

General features:

- Magnify specimens up to 200x.
- Take pictures and time-lapse movies.
- Capture images and alter them with drawing, special effects, and sound tools.
- Use on the stand or in handheld mode.

System requirements vary:

- Olympus MIC-D Digital Microscope
- The ProScope™ by Scalar
- QX3™ Plus by Digital Blue™

WHAT ARE PEOPLE SAYING ABOUT THE DIGITAL MICROSCOPE?

"Finally, a high-tech toy that really works. The sturdy, plastic-housed QX3 gives an up-close-and-personal look at bug bits, ants, scabs and kids own freckles, magnified at 10, 60, or 200 times. Images appear instantly on the computer screen and squirm if the specimen happens to be alive."

Parenting, October, 2000

"It's rugged and well designed, with a smoothly rotating barrel that lets you choose among the three magnifications. It's also an electronic tour de force, with a USB video camera in the head. The camera automatically adjusts to a very wide variety of lighting conditions, even to supplemental lighting sources. The software allows further adjustments, so that good images are all but assured."

*Bill Machrone
PC Magazine, September 21, 1999*

As one LabRat put it, "It utterly rocks! ... The beauty of this package is that it introduces kids to a whole new level of reality, while acclimating kids to PC technology and imaging software."

*James L. Kim
ZDTV's Fresh Gear Column
September 10, 1999*

The following Web site(s) appear on this page:

University of Virginia's Curry School of Education: <http://curry.edschool.virginia.edu/>

Virginia's Standards of Learning: www.pen.k12.va.us/VDOE/Superintendent/Sols/home.shtml

National Science Education Standards: www.nap.edu/readingroom/books/nses/html/

Invigorating Science Teaching with a High-Tech, Low-Cost Tool:

www.glef.org/modules/modarticle.php?id=Art_942&mod=el

Ken Williams Summary of Lesson: www.glef.org/modules/EL/pdfs/williams_lesson.pdf

The Maine Event: www.glef.org/modules/modarticle.php?id=Art_1119&mod=el

"Laptops at the Lake" multimedia presentation: www.glef.org/modules/modarticle.php?id=Art_1119&mod=el

Olympus MIC-D Digital Microscope: www.mic-d.com/product/spec.html

The ProScope™ by Scalar: www.theproscope.com/support.html

QX3™ Plus by Digital Blue™: www.playdigitalblue.com/products/qx3/system_req/