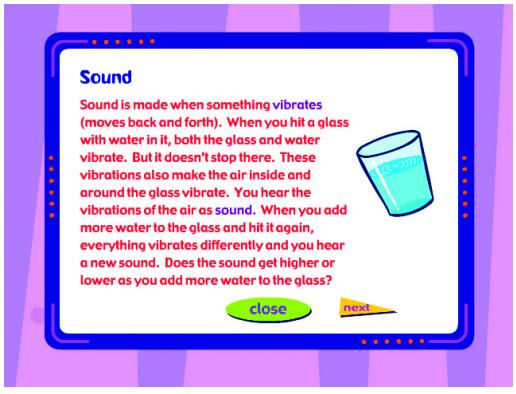
PUTTING PUBLIC TELEVISION TO WORK FOR YOU



by Karen Barss

Groups of students huddle together around a table, struggling to adjust water levels in glasses and test the results. They are tired, water is all over the classroom, and there might even be a broken glass or two littering the floor. As each group shares the sloppy design of their drinking-glass xylophone, the teacher stumbles through a discussion of patterns and sound waves, leading to a final summary of the science concepts they each discovered through their investigations.

Does this sound like your classroom? If you have ever experimented with drinking-glass xylophones—once you overcame the challenge of collecting enough glassware to satisfy the needs of all your students—you probably saw your students' frustration as they tried to carefully control the water levels in order to reproduce specific sounds. However, by logging on to the ZOOM website (*www.pbskids.org/zoom*, see "Tunes and Spoons"), students can create virtual glass xylophones using a computer model to help them experience and visualize complex concepts that may be difficult to reproduce in the classroom.

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This is just one example of how PBS programming and its supplemental resources can be used to enhance classroom instruction.

Teachers have used PBS programming in their classrooms for decades. PBS's mission to stimulate education, culture, and citizenship, facilitated the creation of many teacher resources that are easily accessible. Some of these resources include: professional development services like *Mathline* and *Scienceline*; station outreach activities in the community; tips on how to effectively teach with technology; television programs with extended taping rights; online shopping for PBS videos; recommended books and websites; interdisciplinary teaching suggestions; and much more.

Programs for the classroom

Since PBS's *NOVA* television series premiered almost 30 years ago, public television has been a destination for science teachers to bring real-life science experiences into their classrooms. PBS producers create an array of materials to supplement their programs, and these resources offer a wealth of free, or low-cost, tools for teachers and students. A few of these programs are described below, and a more complete list is available at *www.pbs.org/neighborhood/science*.

NOVA

Seen in more than 100 countries, *NOVA* is the most watched science TV series in the world, and the most watched documentary series on PBS. It has won every major television award, most of them many times over. Why is it so successful? *NOVA* believes science is neither sacred lore nor secret ritual, but rather, curious people exploring interesting questions. To further support educators, *NOVA* also produces a robust website (*www.pbs.org/nova*) with a searchable database and a semi-annual teacher's guide, accessible on the website or available in print.

ZOOM

For younger students, ZOOM is an interactive television series and state-of-the-art website that challenges students to "turn off the TV and do it!" Created by kids and for kids, each 30-minute program features a cast of seven kids playing games, performing plays, tackling science experiments, telling stories, solving brainteasers, whipping up recipes, and having a good time with science. But ZOOM is much more than lively television. Behind all the fun is a science and math curriculum developed by leading educators. Each show promotes hands-on science and math activities, as well as modeling science process skills—how to ask questions, make predictions, record observations, and share results. You can encourage your students to watch ZOOM at home or you can show the program in the classroom by accessing instructions to all the ZOOMsci science and math activities through the website (*www.pbskids.org/zoom*).

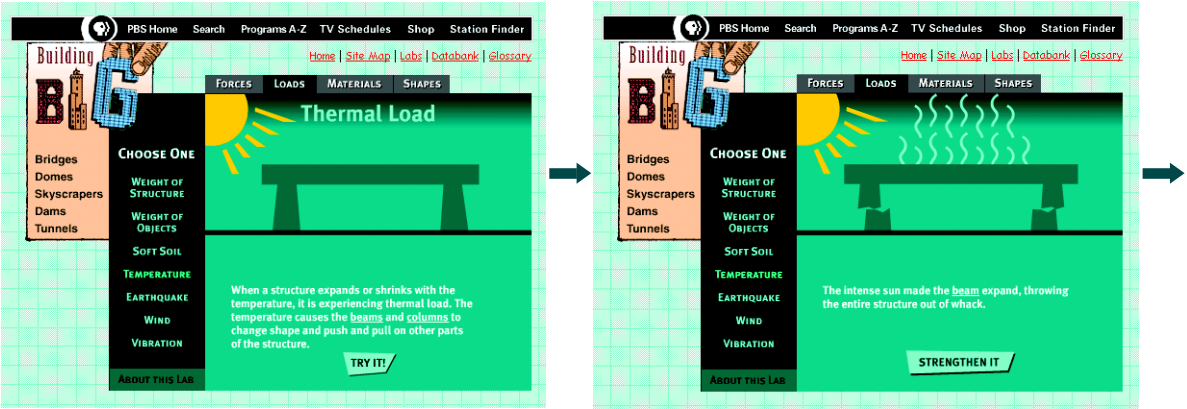
Evolution

The *Evolution* project—a seven-part, eight-hour series, and website (*www.pbs.org/evolution*) with extensive educational resources—explores evolution, a simple yet remarkable theory that ranks as one of the greatest breakthroughs in the annals of science. Originally broadcast in Fall 2001, the series is scheduled to be rebroadcast nationwide this year (check local listings). Available educational resources include a free teacher's guide; online student lessons tied to science standards and high school biology curricula; short videos available on VHS or the website; four, 15-minute teacher methodology videos (online or VHS); access to more than 100 multimedia resources; and an eight-session online professional development course for science teachers.

In Evolution, *natural selection is applied towards understanding human diseases such as Ebola.*

Building Big

Bridges, domes, skyscrapers, dams, and tunnels are the primary focus of *Building Big*, a five-part miniseries on mega-structures, hosted by successful author and illustrator, David Macaulay. *Building Big* explores the history



behind some of the world's greatest engineering feats and the ingenuity of the engineers, architects, and builders who designed and built them. The accompanying website (*www.pbs.org/buildingbig*) provides in-depth content and engaging activities, including interactive simulations of engineering principles and Macaulay's sketches and field notes. The accompanying activity guide (accessible online) provides fun, inquiry-based activities using household materials to experience engineering challenges. In addition, short educational videos are available that explore the process of engineering design and showcase hands-on building activities.

A Science Odyssey

Originally broadcast in Winter 1998, this series follows five different scientific areas through the twentieth century: medicine and public health, physics and astronomy, human behavior, technology, and Earth and life sciences. Accompanying the series is a rich website (*www.pbs.org/aso*) which offers simulations and activities, biographies, and detailed information on science concepts to help users experience the ups and downs of 100 years of science, technology, and discovery. In addition, six short videotapes are available that provide provocative questions and gripping stories, packaged with an activity guide for middle school classrooms.

Choosing a segment

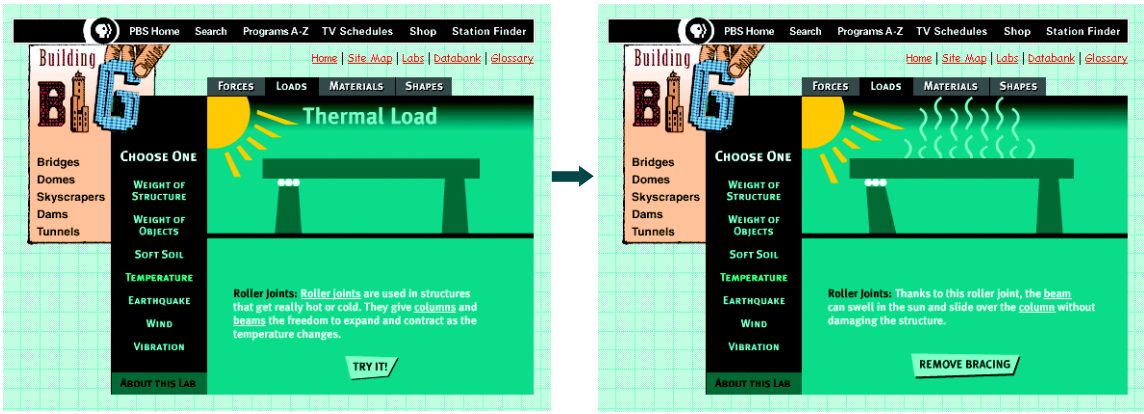
Just because a program has rich content doesn't automatically mean it's a useful classroom tool. The key to getting the best classroom material out of public television programs is your VCR and the pause button. In general, a 10- to 15-minute program segment will ensure that you keep your students' attention and have time for focused discussion about the video clip. As a side-note, public television series generally have one year of off-air taping rights. You can double-check by looking on their websites, which can be accessed through *www.pbs.org* or by referring to any print materials you have received from them, such as teacher's guides, posters, or pre-broadcast brochures.

Video can create a common experience from which all students begin an investigation, a stimulating start to a class discussion, a visual example of what the class has been studying, or a reference for individual student research projects. For example, *Building Big*, a series on mega-structures, illustrates key concepts relating to engineering challenges that could introduce a unit on bridges.

In addition to the television programs, PBS producers create shorter classroom videos that may be more appropriate for your classroom, such as *Building Big*'s "Thinking Big" and "Building Small" videos or the streaming videos on the *Evolution* website. These videos are edited, re-narrated, and often include additional footage (sometimes featuring real students) that is more closely aligned with science standards and curriculum objectives than the general audience series.

Tapping into teacher's guides

To help teachers use television broadcasts, most public television science series offer free teacher's guides. *NOVA*'s guide comes out twice a year and covers most of the new programs in that season (be aware that schedules can change



at the last minute). Getting on the mailing list to receive guides before programs air will help you plan how to incorporate the video into your teaching (see Resources). Guides often feature hands-on activities and strategies for using the programs, which you can adapt to meet your specific educational objectives.

For example, when sixth-grade social studies teacher Tim Matthews decided he wanted to teach an interdisciplinary unit on ancient civilizations, he used the *NOVA* teacher's guide to jump-start his thinking. The Spring 1997 guide featured lessons to accompany the four-part series *Secrets of Lost Empires* and focused on the use of simple machines to raise massive objects such as Stonehenge's trilithons or the Egyptian obelisks.

Matthews worked with fellow science, mathematics, and English teachers at Day Middle School in Newton, Massachusetts to devise a plan: The teachers would introduce their 90 students to simple machines, scale and measurement, Egyptian history, and hieroglyphics. In this project, which came to be titled, "Operation Obelisk: How Will We Raise the Obelisk," the teachers asked students to use any of six simple machines they learned about to develop a plan for raising a wood-frame, eight-meter obelisk in the school courtyard. Teachers expanded on the *NOVA* teacher's guide lessons to create his unit.

Using multimedia resources

Working with the available Internet resources, Patricia Franzen from Madison Junior High School in Naperville, Illinois used the "Short Trips" classroom videos and the *Science Odyssey* website databank to create a unit called "An Odyssey through Time and Society," in which students investigated a scientist who represented or had a connection to each student's ethnicity or culture. Students chose their scientist and used the online databank and other resources to research how historical events influenced the scientist's work and to identify a contemporary career that was advanced as a result of this scientist's work.

Like Patricia, many teachers have discovered that the websites accompanying public television series can provide a wealth of material that goes far beyond the actual program. The *ZOOM* website, for example, offers instructions for all the hands-on activities, some as printable activity sheets. The *Science Odyssey* website includes simulations that help students understand change over time. The *Evolution* site features an ambitious multimedia databank as well as many interactive features. The *NOVA* website features a wide array of resources for each program—from background articles, interviews with scientists, and "hot science" interactive experiences, to online field trips (check out the trip to Antarctica to create the documentary about the Shackleton expedition) and a special teachers' site that tells you what is available on the website each week and offers a searchable database of classroom resources.

The companion website to *NOVA*'s program *Cracking the Code of Life* is used in the seventh grade at the Heath School in Brookline, Massachusetts for a unit on genetics. Students watch parts of the program online and summarize the content. They analyze survey questions, such as "Should we be able to patent genes?" or "Who, if anyone, should have access to your genetic information?" Students also can choose to enhance their studies of genetic engineering through the

"Manipulating Genes" feature or delve deeper into genetics using other portions of the site.

According to Chris Whitbeck, K–8 science and health curriculum coordinator for the Brookline Public Schools, having access to this website allows teachers to guide students into areas that they would not normally study, given only a textbook or newspaper article. The site also allows students to apply their understanding of the material learned in class. Teachers serve as guides and help students navigate the site as well as answer questions if material presented becomes too complex.

Building community partnerships

In addition to resources like teacher's guides, websites, and classroom videos, public television can also offer opportunities for building community partnerships. These partnerships may link schools, public television stations, and museums, for example, to work together on collaborative projects that use a public television series as a springboard.

For example, Beth O'Shea, coordinator of the Metropolitan Nashville Public School's Encore program for gifted and talented students, reports an exciting project that took place in Nashville, Tennessee last year. Working with their local public television station, WNPT, and the local chapter of the American Society of Civil Engineers (ASCE), the Nashville Public Schools incorporated *Building Big*'s educational resources into their Encore program. Encore students met for a half-day each week for 9 to 16 weeks (depending on grade) to learn from the *Building Big* activity guide's hands-on activities and lesson plans and the "Thinking Big" and "Building Small" short classroom videos. Teachers also sent notices home to parents, asking them to watch the PBS series with their children.

As students moved through the curriculum, engineers from the local chapter of the ASCE and the Tennessee Society of Engineers were invited for class visits. Over 20 teams of engineers worked with students to expand on the more complex engineering principles presented in the *Building Big* materials. For example, students built straw bridges, and the engineers performed load-bearing tests on students' work, helping to identify the strengths and weaknesses of each structure. The engineers also identified ten "local wonders," or structures that are interesting to students because of appearance, uniqueness, or historical and social impact, in and around the greater Nashville area that students visited on field trips.

By identifying and briefing (or, in the case of *Building Big*, actually training) national outreach partners like the ASCE, public television producers help encourage potential community partners to build bridges to the classroom. A similar relationship has been established with National Engineers Week (which represents many more engineering disciplines than simply civil engineering). National Engineers Week asked WGBH to create "ZOOM into Engineering," an outreach program for engineers that trains them to introduce students to engineering using hands-on activities based on the popular PBS show ZOOM.

So many resources, so little time

While public television producers are scattered across the country, PBS offers a centralized resource called PBS TeacherSource (*www.pbs.org/teachersource*). Many websites will offer you the opportunity to get email newsletters about upcoming programs, or they will tell you how to receive their printed teacher's guide. You may also want to contact the community outreach department at your local public television station to find out about outreach programs they have for teachers.

Resources

If you would like to receive print materials connected to WGBH programs (e.g., the *NOVA* teacher's guide which comes out every September and January), send your name, address, and the grades and subjects you teach to Educational Programming and Outreach, WGBH, 125 Western Avenue, Boston, MA 02134; or sign up online at *www.pbs.org/nova/teachers/guidesubscribe.html*. You will receive upcoming science-related guides produced by WGBH. If you're interested in receiving guides that were previously distributed (e.g., materials accompanying *Evolution* or *A Science Odyssey*), send your request to the above address (supplies are limited).

Internet reference

Public Broadcasting Service (PBS): *www.pbs.org*