

# PULL-OUT SECTION

## SCIENCE TEACHERS' GRAB BAG



Inside this Convenient Pull-Out Section you will find:

### Freebies for Science Teachers

**In the NGSS Classroom With Kristin Mayer.** These eight videos introduce science teachers to important strategies based on the *Framework for K–12 Science Education* and the *Next Generation Science Standards (NGSS)*. The collection highlights the major shifts in science instruction, explores the new role of the teacher, and demonstrates new instructional strategies in the high school classroom. The videos show what “NGSS looks like in the classroom” and provide related lesson plans. NSTA led the project with funding from Disney; video and lesson development was led by the CREATE for STEM Institute at Michigan State University, in partnership with the Concord Consortium and the University of Michigan. Learn more and access the videos at <http://ngss.nsta.org/ngss-videos.aspx>.

**Bears of the World: Interactive Range Map.** Bear Trust International’s interactive world map shows students and educators in grades 9–12 where eight different species of wild bears live. The map includes photos, facts, and lesson plans for American and Asiatic black bears, brown bears, giant pandas, polar bears, sloth bears, and sun bears. Students can use the resources to develop skills in interpreting and analyzing data, answering questions like these: Which bear species has the widest range? Is this bear species declining, increasing, or stable? Find the map at <http://beartrust.org/bear-basics>.

**News Literacy Model Curriculum in Science.** A collection of science lessons for students in grades 7–12 teaches news literacy through science. In the News Literacy project, professional journalists teamed with educators affiliated with NSTA, the National Council for the Social Studies, the National Council of Teachers of English, and the National Council of Teachers of Mathematics to create a curriculum that develops critical-thinking skills so students can better analyze the reliability of news and information in core subjects and apply these skills in everyday problem-solving. Refer to <http://bit.ly/1KQkXWE>.



BISWARUP GANGULY

**EDC Earth Science.** For teachers seeking materials supporting the NGSS, this activity-driven high school course is aligned with the National Research Council’s *Framework for K–12 Science Education*. In

four sample activities from the curriculum, students analyze climate data, study patterns in surface currents, learn about the Peru Current phenomenon, and examine issues surrounding water shortages in U.S. communities. Each activity is set in a real-world context, involves the use of authentic data, and is designed to build critical data-using skills. See <http://bit.ly/1IfshF7>.

**The Science Game: Electromagnetism.** Unleash your inner Einstein! This app lets high school students learn about electromagnetism by doing—on their tablet! In the app, students explore electromagnetism concepts through challenges involving magnets, dynamos, motors, and more. As they play, helpful hints and guides explain phenomena such as electric currents and fields and how things like microphones, televisions, and electric bells work. Students can reinforce science understanding through quiz questions and probes (i.e., mini-games) that review the concepts and can keep students engaged. An applications section shows examples of how electromagnetism theories are used in real life. The app is available for both iOS and Android platforms at [www.mazalearn.com](http://www.mazalearn.com).

**Citizen Science With SciGirls.** Teachers can access activities for grades 5–8 that involve students in real scientific research. Designed as an accompaniment to the PBS Kids television series *SciGirls* (which focuses on citizen science this season), students can create a food web to model an ecosystem (All Tangled Up); observe and identify neighborhood birds (Bird Is the Word); explore cloud characteristics (Cloud Clues); create a field guide (Out and About); look for phenomenal phenology in the community (Season Seeking), and identify frog calls (Wetland Band). Visit <http://bit.ly/1NMWylX>.

In addition, an online game, *Rule the Roost*, encourages students to participate in monthly citizen science challenges, creating and sub-

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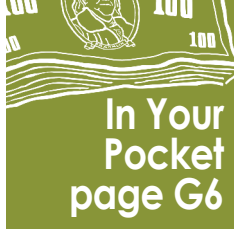
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mitting their own creations as part of the game. Students have created homemade boats, animal sketches, cloud observations, and more. Consult <http://to.pbs.org/1UxD9VT>.

**LinkEngineering.** A new website from the National Academy of Engineering helps preK–12 educators implement engineering education in classrooms and out-of-school settings. With videos, interviews with engineering and education professionals, lessons, links to professional development, and opportunities to connect with fellow engineering education enthusiasts, the website provides teachers with models of engineering instruction in educational settings as well as background information on engineering and engineering design. Visit [www.linkengineering.org](http://www.linkengineering.org).

**Theories of Everything, Mapped.** *Quanta* magazine's recent interactive map of fundamental physics is a resource for high school and AP Physics students. Built by interactive developer Emily Fuhrman, the map provides concise descriptions of highly complex theories relating to quantum gravity (including general relativity and quantum mechanics), dark matter, black holes, and other physics topics, along with proposed solutions to each question. Users can learn more about each theory by exploring the links to dozens of related articles and videos and cast votes for the solutions or ideas they believe to be most elegant or promising. Access <http://bit.ly/1hhoIsy>.

**DIY Lake Science.** Let young scientists investigate lakes and other freshwater ecosystems at home or school, or anywhere they go! Produced by University of California, Berkeley's Lawrence Hall of Science with National Science Foundation funding, and targeted for upper-elementary and middle level students, this app presents 12 hands-on indoor and outdoor "field adventures" using everyday items; videos; and a simulation exploring how lakes change. Sample activities include making a viewscope to look for underwater plants and animals, and crafting a Secchi disc to measure



WING-CHI POON

water clarity. The app is available for iPhones and iPads, iOS 7 and above. See <http://bit.ly/1LJqik9>.

#### **How-to Guide for Schoolyard Habitats.**

Learn how to create and maintain a successful and sustainable wildlife garden on school grounds with this online guide from the National Wildlife Federation. Divided into seven sections, the guide walks educators of all ages through the entire process of creating a schoolyard habitat and provides K–12 lesson plans. Teachers will find information about the benefits of having a wildlife garden on campus, gardening basics, tips for choosing an appropriate outdoor learning site, guidance for ensuring continued success at the space, and more. Refer to <http://bit.ly/1JsufWN>.

#### **Essential Lens: Analyzing Photographs Across the Curriculum.**

This multidisciplinary professional development resource for middle and high school teachers from the Annenberg Foundation explores photography's role in documenting history, change, and hidden worlds. Through videos, curated photograph collections, background information, and thematic classroom lessons, teachers (and their students) analyze photographs to understand the different ways images can impact our lives and views of the world. Climate change, environmental issues, microbiology, Earth and space science, and history are among the subjects investigated through the photograph collections. Visit <http://bit.ly/1La2foP>.

**InterestID.** This tool from NextLesson.org can encourage differentiated instruction in the classroom by helping teachers discover students' interests and providing standards-supported les-

sons on topics students love. Through the online tool, students share favorite interests within categories such as sports, books, movies, food, music, and gadgets. Teachers view a results summary displaying the top categories, most popular interests within those categories, and recommended lessons from NextLesson based on student interests. Teachers can view summaries for individual students or classes as a whole, and track changes over time. Check it out at <http://bit.ly/1MVrgZm>. (Free teacher registration is required.)

#### **The American Association of Physics Teachers ComPADRE Digital Library.**

This network of resource collections supports physics and astronomy education at all levels. The collections are organized by user group and course (e.g., K–12 Physics, Faculty Resources, and Higher Education Resources) and contain many resources within each category. For example, the Open Source Physics collection offers tips, activities, and curriculum for using computer models and simulations in physics. The Interactive Video Vignette collection presents short, online tutorials exploring introductory concepts like projectile motion, Newton's Laws of Motion, centripetal force, and electric charges—ideal for use in flipped classrooms or as online assignments. Refer to [www.compadre.org/index.cfm](http://www.compadre.org/index.cfm).



MARTIN DAVIS

**Progressive City Planners.** In this interdisciplinary science and social studies lesson, middle level students create imaginary cities, deciding where to place amenities such as parks and libraries, and deal with drawbacks such as environmental hazards. Then students compare their imaginary cities to the real world, where resources and hazards often aren't distributed

fairly and certain areas and populations suffer disproportionately from environmental burdens. The lesson promotes discussion about the issue of environmental racism and empowers students by having them propose solutions. Access <http://bit.ly/1La2q3u>.

**MakerBot's Thingiverse.** In this thriving design community for discovering, making, and sharing 3D printable things, educators of all levels are encouraged to get on a 3D modeling program or 3D scanner and create, construct, and innovate! Build something, then upload the file to Thingiverse and tell the community about it. The Thingiverse community has uploaded more than 100,000 3D models. See [www.thingiverse.com](http://www.thingiverse.com).

**Space Girls Space Women.** A new app for iOS and Android devices produced by the European Space Agency and Sipra Press features "the stories of girls and women passionate about space, all around the world." Designed as part of a multimedia component to a traveling museum exhibition of the same name, the app allows users to create their own Space Girls profile and test their knowledge of space. The app also includes video profiles and interviews with a variety of women studying and working in space science and technology, making it a tool to inspire middle and high school students and others to pursue careers in the science, technology, engineering, and mathematics (STEM) fields. Download the app and learn more at <http://bit.ly/1h5DbI7>.

**The Radix Endeavor.** Motivate middle and high school students and supplement STEM learning with this massively multiplayer online game. In *The Radix Endeavor*, students enter the fictional world of Ysola ruled by evil, science-hoarding overlords, the Obfuscati. Students encounter Ysola's citizenry and embark on various STEM quests, such as finding a cure for a deadly disease or using math to reinforce weak buildings, while avoiding the Obfuscati. Access the game at [www.radixendeavor.org](http://www.radixendeavor.org).