

WebSights features announcements and reviews of select sites of interest to physics teachers. All sites are copyrighted by their authors. This column is available as a web page at PhysicsEd.BuffaloState.Edu/pubs/WebSights/. If you have successfully used a physics website that you feel is outstanding and appropriate for WebSights, please email me the URL and describe how you use it to teach or learn physics. macisadl@buffalostate.edu.

Teaching Physics with Personal Response Systems or “Clickers”

Stephanie Chasteen of the Science Education Initiative at the University of Colorado (colorado.edu/sei) and the Carl Wieman Science Education Initiative at the University of British Columbia (www.cwsei.ubc.ca/) forwards links to resources for using clickers in science teaching, featuring examples from physics instruction. Notably, these include a set of high-quality videos giving an inside look at clickers being used in the classroom, teacher and student opinions about clicker use, an instructor's guide, and a resource website:

1. **Clicker Videos, STEMvideos.colorado.edu:** This page houses a suite of short, well-produced videos on the rationale for using clickers, the details of how to use them effectively, and the research supporting their use. Videos are 5-15 minutes long. These also live on YouTube at, www.youtube.com/user/geekgirl54.
2. **The Instructor's Guide to Effective Use of Personal Response Systems, http://www.cwsei.ubc.ca/resources/files/Clicker_guide_CWSEI_CU-SEI.pdf:** A comprehensive guide discusses pedagogical aspects of clickers in a great amount of detail.
3. **A resource website on clicker use, STEMclickers.colorado.edu:** This page contains many helpful links, including quality clicker question banks, articles, and the videos.

ConcepTests are an important predecessor to clicker questions made famous in physics education by Eric Mazur of Harvard University Physics Department in his book *Peer Instruction* and are well-reported (both content and associated research) at his website (mazur-www.harvard.edu/education/education-menu.php). ConcepTests are usually used as clicker questions. Mike Jabot of SUNY Fredonia Science Education also has directed me to the website polleverywhere.com/, which enables students with cell phones to respond to polls that can be physics class clicker questions, free of cost for classes of 30 students and less. Using cell phones to send text messages creates issues of access, and the site is certainly more cumbersome than dedicated clickers. DOI: 10.1119/1.3362006

Einstein-Online, a website about Einstein's theories of relativity, <http://www.einstein-online.info/>

Chasteen also recommends a website by the Max Planck Institute for Gravitational Physics (Albert Einstein Institute) of Munich, Germany. This site contains illustrated exposi-

tion sections dedicated to special and general relativity, gravitational waves, black holes, cosmology, and relativity and quantum physics, as well as spotlights on research and application of these ideas, and a guide to links and further reading.

Suggested by Dr. Stephanie Chasteen of the University of Colorado Science Education Institute. Chasteen maintains a blog, www.sciencegeekgirl.com

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NASA Rocket disrupts a Sun Dog, apod.nasa.gov/apod/ap100223.html

The well-known Astronomy Picture of the Day (APOD) website post of 23 February of this year featured a striking photograph showing an Altas V rocket launching the Solar Dynamics Observatory satellite and producing an atmospheric disturbance that disrupted a nearby sun dog. The event was also video recorded and can be viewed at the 1:40 mark of the YouTube video at www.youtube.com/watch?v=SsDEfu8s1Lw.

APOS photo suggested by PHYS-L contributors; video suggested by Brittni Barr of SUNY- Buffalo State Fine Arts.

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Science Bag from University of Wisconsin Milwaukee, www4.uwm.edu/lets/sciencebag/videos/phys.cfm

Robert Greenler of the University of Wisconsin-Milwaukee is a well-known figure in the field of the physics of atmospheric phenomena and has produced a number of books and science outreach flash videos in a UWM video series known as “Science Bag.” These videos are now freely available on the web, and one of the videos under the category labeled atmospheric science presents some of Greenler's research and observations from Antarctica, including the classroom demonstration recreation of the physics of halos, sun dogs, and related phenomena created by atmospheric ice crystals. The other videos are also well worth while examining, particularly those on physics and atmospheric science.

Contributed by Chris Chiaverina, of New Trier H.S. Physics (retired). Chris maintains a website, www.discoveriescience.com, with many resources for teaching physics (particularly optics) and both edits and contributes regularly to the Arbor Scientific CoolStuff website at www.arborsci.com/CoolStuff.

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