



WebSights

Dan MacIsaac, Column Editor
Physics Department, SUNY-Buffalo State College
Buffalo, NY 14222; macisadl@buffalostate.edu

WebSights offers a selection of sites appropriate for teaching a standard-topic year-long introductory physics survey course. Next month will feature sites for teaching introductory circuits. All sites are copyrighted by the authors. This column is also available as a web page at <http://PhysicsEd.BuffaloState.Edu/pubs/WebSights/>. If you have successfully used a site to teach physics that you feel is outstanding and appropriate for *WebSights*, please email me the site and how you use it for possible inclusion in the column. The person submitting the best site monthly will receive a T-shirt.

Web Resources for Teaching Introductory Electric and Magnetic Fields

The Mechanical Universe. Fifty-two half-hour university physics lessons streamed as video-on-demand free of charge, <http://www.learner.org/progdesc/series42.html>. Programs 28–31 address static electricity, electric fields, potential and capacitance, voltage, energy, and force; programs 34 and 35 address magnetism and the magnetic field, and program 37 addresses electromagnetic induction. A great review reference for teachers before teaching a topic, or as enrichment or a makeup assignment for high-ability students.

More electric fields. Following last month's column, Bruce Sherwood emailed me that he maintains a website for teaching calculus-based E&M that includes free software at <http://www4.ncsu.edu/~rwchabay/mi>. Ruth Chabay and Bruce advocate an unusual sequence for teaching E&M, described on this site under "Articles, Errata and Other Links." Relevant articles and a link in this site leads to <http://galaxy.cofc.edu/circuits.html>, N. Preyer's Simulation of Charges in Simple Circuits, which provides a fascinating and insightful visualization of the time-dependent linkages between static electric charges on the surfaces of wires and the resulting charge flow through those wires. These simulations describe the operation of simple circuits in terms of static electric mechanisms. See also his related articles in the *American Journal of Physics* from the same site.

—Suggested by B. Sherwood

Movies of electrostatics experiments. Under humid conditions, it can be hard to obtain reliable data from electrostatic experiments. One alternative is to use movies of phenomena to make measurements or observations. The second semester Modeling Physics E&M materials include such videos under "E1: Coulomb's Law Movies" at <http://modeling.asu.edu/Curriculum.html>, and a complete downloadable curriculum is found nearby at that site. At Rutgers the ISLE project uses similar videos of such phenomena in a complete sequence of learning experiences leading to the function of an electroscope starting at <http://paer.rutgers.edu/pt3/experimentindex.php?topicid=10&cycleid=50>. Etkina, van Heuvelen, and Brookes at Rutgers have placed several such cycles of video-supported inquiry online at <http://paer.rutgers.edu/pt3>.

—Suggested by L. Dukerich and E. Etkina

Building electric motors. Building and analyzing electric motors is a worthwhile and highly motivating activity, and two interesting simply [DAN: or simple?] motor designs are the Johnson Electric motor at <http://physicsed.buffalostate.edu/SeatExpts/EandM/motor/> and the Chiaverina motor featured in the December 2004 issue of *The Physics Teacher* (featured articles are freely downloadable from <http://www.aapt.org/tpt>).

—Suggested by J. Yap

400 years of W. Gilbert's De Magnete. The 400th anniversary of the A.D. 1600 publication of this early physics work inspired D.P. Stern of the NASA Goddard Space Flight Center to create a site devoted to teaching about magnetism at <http://www.phy6.org/earthmag/demagint.htm>. This site includes several translations of the original work, and resources, references, lecture notes, and demonstrations for teachers of geomagnetism. Stern has produced related sites, notably *The Exploration of the Earth's Magnetosphere* at <http://www.phy6.org/Education/Intro.html>. A site of lovely auroral pictures and links can be found at <http://www.geo.mtu.edu/weather/aurora>.

The MIT TEAL Physics 8.02 Electricity & Magnetism Project. An unparalleled collection of visualization materials for learning calculus-based E&M is at <http://evangelion.mit.edu/802TEAL3D>. These include animations, course notes, Java and Shockwave simulations for teaching about vector fields, electrostatics, magnetostatics, Faraday's laws, and light. Exceptional visualization material for playing in class, though it can take some time to download over a slow link.

Two non-E&M-specific website announcements recently sent to *WebSights* include:

The CoolStuff Physics Demo Archives at Arbor Scientific by Chris Chiaverina (of motor fame above) and other colleagues, <http://www.arborsci.com/CoolStuff/Archives.htm>. A collection of graphics, pictures, videos, and explanations of cool demos for K-20 students.

—Suggested by L. Adair

The Skyserver Archive of the Sloan Digital Sky Survey, <http://skyserver.sdss.org>. Free access to all data from the Sloan Digital Sky Survey, nearly 150 million stars and galaxies. The site includes a set of easy-to-use tools for viewing and searching the data, as well as 'Projects,' lesson plans for students from elementary school through college." [DAN: not sure about the quotations marks here]

—Suggested by J. Raddick and R. Sparks