Physics and Astronomy

Resources for Teaching Physics and Astronomy

**Mazur Group** (Harvard University).
A Harvard research group that includes education research as well as physics research. The site offers links to ongoing research into peer instruction, gender and physics, the value of classrooms demonstrations, and technology and education. The link below is to the portion of their website on Learning Science.
http://mazur.harvard.edu/education/educationmenu.php [1]

**University of Washington Physics Education Group.**
Home of the Physics by Inquiry Curriculum, this site links to information on research, curriculum development, and instruction.

**Teaching Astronomy.**
A blog devoted to teaching astronomy, with links to physics and astronomy education journals, newsletters and magazines, resources for teaching, professional organizations, current articles, and classroom materials.
http://teachingastronomy.blogspot.com/ [3]

**Web Sites for College Astronomy Instructors** (Astronomical Society of the Pacific).
Designed to assist instructors of introductory astronomy courses for non-majors, this site offers links to sites that instructors around the country have found useful.

**Astronomy Teaching & Education Resources.**
Exercises, software, resources, and lectures for teaching astronomy.

Astro and Physics links, news, weather, and information.

**Educational Resources in Physics, Astronomy, and Related Fields** (Sonoma State University, Dept. of Physics and Astronomy).
A large collection of relevant sites, including material from research scientists, favorite physics and astronomy sites, institutions, organizations, gateways, and resources specifically for college instructors.
Science and Physics Education Homepages (University of Maryland Physics Education Research Group, PERG). Links to science and physics education research groups in universities throughout the U.S. and worldwide.

National Science Digital Library (NSDL): Teaching Physics & Astronomy in Higher Ed. Annotated links to almost 500 sites with resources for teaching, including lectures, articles, assignments, gateways, and tutorials. Also links to some unexpected sites such as “Science Fiction Stories with good Astronomy and Physics” and “Contributions of 20th Century Women to Physics.”
https://nsdl.oercommons.org/browse [9]

“Challenges in Teaching and Learning Introductory Physics” by Roger A. Freedman, UC Santa Barbara. Discusses the challenges of refuting students’ misconceptions and presents an active learning model for physics to replace the traditional lecture and discussion sections.

Physics World (Institutes of Physics, UK). A comprehensive physics site with articles about teaching physics plus lots of information useful for the classroom.

Back to top

Syllabi and Course Materials in Physics and Astronomy

LON-CAPA Learning Online Network with a Computer-Assisted Personalized Approach. This site offers thousands of online teaching resources for physics instructors, including 140,000 individualizing homework problems, lecture notes, and much more. Supported by NSF; initial funding for CAPA provided by Sloan and Mellon Foundations.
http://www.lon-capa.org/ [12]

Physlets. Online simulations of physics concepts.
http://webphysics.davidson.edu/Applets/Applets.html [13]

http://webphysics.davidson.edu/ [14]

VPython: 3D Programming for Ordinary Mortals. A programmable simulation environment for physics.
http://vpython.org/ [15]

OpenSource Tutorials in Physics (Maryland Adaptable Tutorial Project). Openly available tutorials and recitation exercises for introductory physics, integrated with professional development materials. Supported by a grant from NSF.
http://www2.physics.umd.edu/~elby/CCLI/index.html [16]
Just-in-Time Teaching (supported by an NSF grant).
Includes many examples in physics of web-based study assignments and an active learner classroom in undergraduate education.
http://jittdl.physics.iupui.edu/jitt/ [17]

ComPADRE—Resources for Physics and Astronomy Education (sponsored by NSF grants; part of the National Science Digital Library).
A digital library of free online resources supporting faculty, students, and teachers in Physics and Astronomy Education. Resources for teaching include courses, lectures, articles, assignments, gateways, and tutorials.
http://www.compadre.org/ [18]

MERLOT Physics Portal (Multimedia Educational Resource for Learning and Online Teaching).
Offers teaching and learning materials, a physics community, and other useful information.
https://www.merlot.org/merlot/Physics.htm [19]

MIT OpenCourseWare: Physics (Massachusetts Institute of Technology).
Curriculum, courses and course material for MIT’s undergraduate and graduate physics program are available on this site, open for anyone to use.
http://ocw.mit.edu/courses/physics/ [20]

See also Web Sites for College Astronomy Instructors listed above for links to additional course syllabi and descriptions.

Physics Education Associations

American Association of Physics Teachers (AAPT).
Conferences, programs, publications, and membership information. See the Teaching Resources section http://www.aapt.org/Resources/ [21] for material to help teachers of physics, astronomy, and physical science at high school level and in higher education.
http://www.aapt.org [22]

American Institute of Physics (AIP).
“Promotes the advancement and diffusion of knowledge of physics and its application to human welfare.” See the Physics Education section of this site for information useful for teaching physics http://tconnell.devcloud.acquia-sites.com/student-programs [23]
http://www.aip.org/ [24]

American Physical Society (APS).
See the Students and Educators section of this website http://www.aps.org/studentsandeducators/index.cfm [25] for K through graduate school information of interest to Physical Science educators, and also see PhysicsCentral: Learn How Your World Works http://www.physicscentral.com/ [26] for the most up-to-date information on physics as part of our world; physics in action and in the news.
http://www.aps.org/ [27]
Journals in Physics and Astronomy Education

The Physics Teacher (American Association of Physics Teachers).
This print and electronic journal (TPTO) publishes papers on the teaching of physics at the introductory level. Includes such topics as contemporary physics, applied physics, pedagogy and curriculum, book reviews, and the history of physics. Subscription required for full text of articles but some special features online are open to non-subscribers.
http://scitation.aip.org/content/aapt/journal/tpt [28]

American Journal of Physics (American Association of Physics Teachers).
Publishes papers on physics topics at the undergraduate and graduate level such as suggestions for instructional lab equipment and demonstration, better teaching methodologies, resources for teaching different areas of physics, and book reviews.
Subscription required for both print and online versions; abstracts from a searchable database are available for non-subscribers.
http://scitation.aip.org/content/aapt/journal/ajp [29]

Physical Review Special Topics—Physics Education Research (Sponsored by The American Physical Society, the American Association of Physics Teachers, and the APS Forum on Education).
A free peer-reviewed e-journal covering the full range of experimental and theoretical research on the teaching and/or learning of physics.
http://journals.aps.org/prstper/ [30]

Physics Education.
An international journal from the UK for those teaching physics up to introductory undergraduate level. Articles offer information on the latest teaching developments and methods. Available in print and online. Subscription required. For non-subscribers, a selection of articles from the latest issue is available.
http://iopscience.iop.org/0031-9120 [31]

Astronomy Education Review.
Contains new ideas and resources for teaching astronomy and space sciences at all levels. A free online journal with full text available for present and back issues.

Back to top

Physics Program Evaluation

AAPT Guidelines for Two-Year College Physics Programs, 2001. Downloadable PDF.
http://www.aapt.org/Resources/tycguidelines.cfm [33]

AAPT Guidelines for Undergraduate Physics Programs, 2005. Downloadable PDF.
http://www.aapt.org/Resources/ugguidelines.cfm [34]

Report of the Joint APS-AAPT Task Force on Graduate Education in Physics, October 2005 Report and June
Michigan State University Resources in Physics and Astronomy

MSU Physics and Astronomy Department.
http://www.pa.msu.edu/ [36]

These resources were compiled and annotated by Lois Rosen, Ph.D., Instructional Consultant for the Office of Faculty and Organizational Development, Michigan State University.