Best Physics Websites *by Rebecca Wenning*

Evaluation Tool – Websites receive one star per applying criteria (*). Websites of exceptional quality and teacher/student utility are labeled as gems (GEM).

Depth: Information enhances what might be found in a typical textbook
Breadth: Information put into historical or conceptual context
Sponsorship: Site sponsored by a reputable state/national/international organization or institution (not personal pages)
Unique aspect: Site offers a significant aspect not yet found on any other site (idea, professional development, interactivity)
Usability: Most links are working, searches and menus easy to use, utility to physics teachers' everyday life, credible site (Would I use it?)

SITES ARE HIGH-SCHOOL FOCUSED, FREE, and NON-COMMERCIAL

Websites were found via:
The Physics Teacher website column (2004-2006)
Visiting websites from *TPT* and following links pages
Google directory categories

ORIGINAL SOURCE DOCUMENTS/HISTORY

The NIST Reference on Constants, Units, and Uncertainty **GEM** *****
Most recent published values for constants with uncertainty, bibliographic search for original research articles.
http://physics.nist.gov/cuu/Constants/index.html

A Century of Physics Timeline *****
Clickable timeline with brief explanations of historic physics events from 1890 to the present.
http://timeline.aps.org/APS/Timeline/

History Exhibits/Selected Great Papers *****
Online exhibits on Curie, Einstien, Transistors, Lawrence, Heisenberg, Sakharov, Thomson.
Famous papers by Franklin, Joseph Henry, Michelson, Rowland, Gibbs, Millikan, Compton.
http://www.aip.org/history/exhibits.html

Galileo's Battle for the Heavens *****
Biography, online experiments for falling objects, projectiles, inclined planes, pendulums.
http://www.pbs.org/wgbh/nova/galileo/

Galileo Project *****
Biography, information on science of Galileo's day, student projects (click on "Library")
http://galileo.rice.edu/

Einstein's Big Idea *****
Biography, interactive exhibits on time dilation, light speed, science history.
http://www.pbs.org/wgbh/nova/einstein/

Internet Modern History Sourcebook ****
Original documents by Copernicus, Galileo, Bacon, Descartes, Voltaire, Newton, Franklin, Harvey, Vesalius, Preistley. Some links unavailable.
http://www.fordham.edu/halsall/mod/modsbook09.html

Selected Classic Papers from the History of Chemistry ****
Excellent collection of papers about gasses, kinetics, thermodynamics, etc.
http://web.lemoyne.edu/~giunta/papers.html

Contributions of 20th Century Women to Physics ****
Biographies of 86 women physicists, documents regarding women in physics.
http://cwp.library.ucla.edu/

Neils Bohr Library ****
Very comprehensive search engine for original physics documents. Library contents are not loaned out of the building – photocopies can be made at a cost.
http://www.aip.org/history/nblbro.htm

Benjamin Franklin as my Lab Partner ****
Original documents about experiments on electrostatics by Franklin with modern explanation.
http://www.tufts.edu/as/wright_center/fellows/bob_morse_04/06_Franklin_Lab_Part_VI.pdf

"Physics" by Aristotle ****
Original document by Aristotle.
http://classics.mit.edu/Aristotle/physics.html

"The Theory of Sound" by Lord Raleigh ****
Original document by Raleigh. First chapter only.
http://www.measure.demon.co.uk/docs/Theory.html - note1

"Reflections on the Motive Power of Heat" ****
Original document by Carnot.
http://www.history.rochester.edu/steam/carnot/1943/

"On Scientific Method" ***
Excerpt from Percy W. Bridgman's *Reflections of a Physicist,* 1955.
http://hackensackhigh.org/~nelsonb/bridgman.html

GENERAL PHYSICS SITES for Teachers (Curriculum, Tests, Worksheets, Assistive Programs, On-line textbooks, Physics Encyclopedias)

Modeling Instruction Program **GEM** *****
Modeling curriculum: Mechanics, Models of light, Mechanical waves and sound, Microscopic E&M, CASTLE. Some files only accessible with password from workshops.
http://modeling.asu.edu/

Diagnoser Tool **GEM** *****
Physics diagnostic tool with "corrective" lesson suggestions for Description of motion, Nature of forces, Forces to explain motion, and Sound/light/waves. Diagnostic tests very critical thinking-oriented, but displayed results are somewhat difficult to interpret holistically.
http://www.diagnoser.com/diagnoser/

Annenberg Media **GEM** *****
Mechanical Universe 52-part series (videos approximately 20 – 60 minutes long). On-demand video, requires fast computer connection.
http://www.learner.org/resources/series42.html

Internet Archive (Physics B/C) **GEM** *****
Excellent introductory minutes-long videos for most physics subjects. Click on chosen lesson; to start video, click on "Click here to begin lesson" found in upper left corner.
http://www.archive.org/details/ap_physics_b
http://www.archive.org/details/ap_physics_c

National Center for Case Study Science **GEM** *****
Case study teaching method, comprehensive case collection, case ideas, assessment plans, professional development.
http://ublib.buffalo.edu/libraries/projects/cases/case.html

Physics Teaching Resources (Illinois State University) *****
Curriculum, resources. Some searching required, but lots of great resources found embedded in "Methods Courses: Syllabi"
http://www.phy.ilstu.edu/pte/resources.html

ClassNotesOnline.com ****
Free database to create teacher website and grade book.
http://www.classnotesonline.com/index.php

Socratic Dialogue Inducing Labs ****
Inquiry labs in mechanics.
http://www.physics.indiana.edu/~sdi/

Dolores Gende Homepage ****
Personal teacher page with traditional labs, innovative projects (equilibrium mobiles, lawnmower science), and great resources.
http://dgende.homestead.com/

Activity-Based Physics ****
On-line books, alternative (real-world application) homework assignments, thinking problems, estimation problems, problem collection from *The Physics Suite*.
http://www.physics.umd.edu/rgroups/ripe/perg/abp/

The Physics Hypertextbook ***
Online book/workbook under construction. Many topics missing, but what can be found is generally high quality. For practice problems and high quality worksheets, click on "Problem Sets," choose a topic, and browse pages to find "worksheets."
http://hypertextbook.com/physics/

Physics Education Research Group ***
Research information and publications on latest trends in physics teaching.
http://umperg.physics.umass.edu/

How Stuff Works ***
Explanations of how a myriad of things work.
http://www.howstuffworks.com/
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Experiment Problems ***
Real-world inquiry problems easily implemented into classic labs.
http://www.physics.ohio-state.edu/~physedu/index2.html

comPADRE ***
Science partnership information. Search lesson plans, activities, and labs. Search categories very specific, but some results are commercial.
http://www.compadre.org/portal/index.cfm

The Physics Front ***
Search engine from ComPadre. New teacher focus
http://www.thephysicsfront.org/

Physical Science Resource Center ***
Same search engine as from ComPadre. No significant difference from The Physics Front.
http://psrc.aapt.org/

Movie Physics ***
Movie reviews with physics ratings. Physics concepts explained, but few suggestions for teaching.
http://intuitor.com/moviephysics/index.html

Physics Central **
Physics news, Ask a physicist, How things work.
http://www.physicscentral.com/

Physlink.com **
Physics news, Careers, Higher Education, Internet hub, but little information of its own.
http://www.physlink.com/Education/Index.cfm

Physics Teaching Technology Resource **
Videos of traditional demonstrations. Click on side menu after selecting category.
http://paer.rutgers.edu/PT3/index.php

Video Analysis Investigations for Physics and Mathematics **
Videos of traditional demonstrations. Allow time for video to load.
http://www.science.tamu.edu/CMSE/videoanalysis/index.htm

Lecture Demonstrations **
List/diagrams of classic demonstrations.
http://www.mip.berkeley.edu/physics/index.html

PASCO Physics Online Experiments **
Traditional labs to be used with *Pasco* equipment.
http://www.pasco.com/experiments/physics/

Dr. Hoselton's Physics Pages **
Traditional labs, applets, worksheets.
http://faculty.trinityvalleyschool.org/hoseltom/?

National Science Digital Library *
Web search, General science focus.
http://nsdl.org/

Discovery *
Search for upcoming TV shows about physics (check Mythbusters)
http://www.discovery.com/

Low Cost Physics Activities *
Traditional labs and worksheets for the low-budget teacher.
http://www.science.tamu.edu/CMSE/LowCostPhysicsActivities.htm

IB Physics *
Step-by-step visuals of traditional labs, accompanying questions.
http://www.saburchill.com/physics/practicals/contents.html

GENERAL PHYSICS SITES for Students (Interactive Applets, On-line Activities, Tutorials)

Physics Education Technology **GEM** *****
Free simulation programs (Circuit Construction, Masses & Springs, Radio Waves and Electromagnetic Fields, Wave on a String, Balloons & Static Electricity, Gas Properties, Balloons and Buoyancy, The Moving Man, Sound, Projectile Motion).
http://www.colorado.edu/physics/phet/web-pages/index.html

Physics.org **GEM** *****
Physics Life interactive program to discover physics in the everyday world, Physics Evolution clickable map, Equation toolbox, Common questions, Careers.
http://www.physics.org/

The Physics Classroom *****
Tutorials, On-line textbook.
http://www.physicsclassroom.com/

Nobelprize.org *****
List of Nobel prize winners by year. Click under winner's name in lower right corner to access other resources, including online tutorials and games regarding the winner's work.
http://nobelprize.org/nobel_prizes/physics/laureates/

Hyperphysics ****
Extremely thorough concept map encyclopedia, calculators for common physics problems.
http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html

Fear of Physics **
Visual physics, homework help, answers to common questions. Be wary about giving this link to students – the "homework help" section has calculators for multiple common physics problems, possibly resulting in cheating. It may be a good review or problem checking tool, however.
http://www.fearofphysics.com/

Virtual Physics Laboratory (I) **
Most comprehensive applet site so far (traditional physics phenomena)
http://www.phy.ntnu.edu.tw/java/indexPopup.html

Concept Simulations **
Audio with applets (traditional physics and applications)
http://www3.interscience.wiley.com:8100/legacy/college/cutnell/0471151831/concepts/

Flash Animations for Physics **
Very catchy flash applets (physics and mathematical processes)
http://www.upscale.utoronto.ca/GeneralInterest/Harrison/Flash/ - misc

Computer Animations **
Applets of physical processes and famous experiments. Not seemingly appropriate for showing to entire class – images not big enough.
http://physics.nad.ru/Physics/English/index.htm

SPECIFIC PHYSICS CONTENT

Mechanics and Energy

US Department of Energy: Energy Efficiency and Renewable Energy *****
Grade-appropriate worksheets about types of energy and conservation
http://www.eere.energy.gov/education/science_projects.html

Amusement Park Physics ****
Tutorials about roller coasters, carousels, bumper cars, free fall, pendulums, and ride safety. Activities include Design a Roller Coaster (and receive a safety and fun rating), and Colliding Cars prediction quiz.
http://www.learner.org/exhibits/parkphysics/

Roller Coaster Physics (Virginia Instructors of Physics) ****
Roller coaster science articles, labs, and tests.
http://www.vast.org/vip/book/HOME.HTM

Beginner's Guide to Aerodynamics ****
Physics of airplanes, activities, lessons, assessments.
http://www.lerc.nasa.gov/WWW/K-12/airplane/bga.html

Exploratorium (Skateboarding) ****
Conceptual physics behind skateboarding tricks
http://www.exploratorium.edu/skateboarding/

Forces, Accelerations, and Car Crashes ****
Impressive car crash videos showing various seat-belt and no-belt scenarios.
http://regentsprep.org/Regents/physics/phys01/accident/

The Math and Physics of Soccer ***
Humorous site with short articles describing physics of soccer.
http://www.oceansiderevolution.com/EINSTEIN.HTM

Animated Engines ***
Applets of internal combustion, steam, and stirling engines.
http://www.keveney.com/Engines.html

Babe Ruth Problem
Babe Ruth home run problem. ***
http://168.229.236.6/~rkc1/p4.pg73.n63.html

Mr. Fizzix Trebuchet Project ***
Integrated lessons on trebuchet physics.
http://mrfizzix.com/trebuchet/index.htm

Physics of Medieval Archery **
Basic archery physics, historical background
http://www.stortford-archers.org.uk/medieval.htm

Archery Physics **
More complex archery physics
http://www.student.utwente.nl/%7Esagi/artikel/bas/archghh.html

Physics of Weight Training **
Physics of weight lifting, click on "Part 2" etc. for more information
http://www.bodybuilding.com/fun/becker2.htm

Electricity and Magnetism

Transistorized *****
Tutorials, Build a Transistor game.
http://www.pbs.org/transistor/

Exploring Electric Fields ***
Map electric fields by placing charges and finding lines of electric field.
http://www.gel.ulaval.ca/~mbusque/elec/

Light and Vision

Atmospheric Optics (I) ****
Photographs of atmospheric optics with conceptual physics explanations.
http://www.atoptics.co.uk/light.htm

Atmospheric Optics **
Photographs categorized by physics phenomena, but no physics explanations.
http://www.weather-photography.com/gallery.php?cat=optics

Optical Illusions **
Fun optical illusions with explanations, but not much physics.
http://www.michaelbach.de/ot

Wave Optics **
Applet (Interference experiment)
http://vsg.quasihome.com/interf.htm

Sound and Hearing

Music Acoustics *****
Physics of various instruments, hearing test.
http://www.phys.unsw.edu.au/music/

Soundry ****
Tour the ear, Physics of music, History of sound
http://library.thinkquest.org/19537/Main.html

Modern Physics

RadTown USA *****
Clickable city showing common sources of radiation.
http://www.epa.gov/radtown

Particle Physics *****
Tutorials on particle physics.
http://particleadventure.org/particleadventure/

Cosmic Evolution *****
Clickable timeline, movies, activities.
http://www.tufts.edu/as/wright_center/cosmic_evolution/

Nuclear Pathways ****
Hub for sites with digital libraries, Hiroshima remembered
http://nuclearpathways.org/

Nuclear Energy Institute ****
Article resources. For lessons, click on "Science Club"
http://www.nei.org/

Antimatter ****
Tutorials, physics news, history of antimatter.
http://livefromcern.web.cern.ch/livefromcern/antimatter/

Understanding Radiation in Our World ***
Free kit for teachers.
http://www.nsc.org/ehc/rad/radbroch.htm

General Atomics Fusion Education ***
Curriculum workbooks, posters.
http://fusioned.gat.com/classroom.html

PROFESSIONAL ORGANIZATIONS/JOURNALS

American Association of Physics Teachers *****
Professional development opportunities, *The Physics Teacher, American Journal of Physics*.
http://www.aapt.org
http://www.aapt.org/tpt
http://www.aapt.org/ajp

Physics Teacher Education Coalition *****
Professional development opportunities, national science education reports (Go to "Links"), curricula (Go to "Links").
http://www.phystec.org/

Illinois State University Physics Teacher Education *****
Journal of Physics Teacher Education Online
http://www.phy.ilstu.edu/jpteo

National Science Teacher Association *****
Professional development with general science focus. *The Science Teacher*.
http://www.nsta.org

American Institute of Physics *****
Career information, online history of physics exhibit hall, *Physics Education*
http://www.aip.org/
http://www.iop.org/EJ/journal/PhysEd

American Physical Society ****
Career information, physics news, *Physics Education Research*
http://www.aps.org
http://prst-per.aps.org

Phys-L (Online Community) ***
Forum – physics teacher talk about a variety of subjects.
https://carnot.physics.buffalo.edu/

PROFESSIONAL STANDARDS

National Science Education Standards *****
National Science Education Standards
http://www.nap.edu/readingroom/books/nses/html/

Inquiry and the National Science Education Standards *****
Inquiry and the NSES (Click on "Read this Book Online, Free!")
http://newton.nap.edu/catalog/9596.html

AAAS/Project 2061 *****

Science for All Americans, Benchmarks, Blueprints for Reform

http://www.project2061.org/publications/toolWeb.htm