

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.

• **Feynman Lectures on Physics three-volume text now completely freely available online**

<http://feynmanlectures.caltech.edu>

<http://www.nature.com/news/lecture-notes-1.14290>

The New Millennium edition of Feynman's three-volume masterwork spanning introductory physics is now completely and freely available online from the California Institute of Technology, though I'll still keep my red volumes on the shelf near my desk. The 50th anniversary of Feynman's 1961-1964 lectures is just passing, according to a retrospective piece by Rob Phillips of CalTech in the December 5th issue of *Nature*. Phillips' retrospective is behind the *Nature* payroll, but the *Nature* editorial "Lecture Notes: A Physics Course that Hooked a Generation Reminds Us that Teachers Need Support" cited above is not. Thank you for making this wonderful resource available to my students.

• **Your Guide to One of the Coolest Physics Demonstrations of All Time, by Robert T. Gonzalez of Io9**

<http://io9.com/your-guide-to-one-of-the-coolest-physics-demonstrations-1442968064>

A very intuitive pop culture introduction to the Reynolds number in fluid dynamics via video vignettes of demonstrations from UNM physics and other sources. R is famously described as the ratio of inertia to viscous force effects, and the io9 piece does a nice job of making the case for an intuitive appreciation of R , together with a table showing the logarithmically dynamic range of R for various self-propulsive organisms. A great page for class discussion of fluids.

• **Stop Teaching! And Let Your Students Learn, by Chris Meyer**

<http://www.meyercreations.com/physics/>

I became aware of Chris Meyer's work with colleagues via the presentations saved at the Ontario Association of Physics Teachers website, www.oapt.ca. He has assembled a collection of talks by himself and others on his "Reformed Physics Teaching" page and I particularly appreciate his unabashed focus on explicitly deemphasizing the teacher in high school physics classroom activity. He also has amassed rich collections of online resources for teaching introductory physics in two workbooks for his grade 11 and 12 physics courses at York Mills Collegiate Institute.

• **BBC Head Squeeze video shorts**

<http://www.youtube.com/user/HeadsqueezeTV/featured>

<http://www.youtube.com/watch?v=a15x5zYgXME>

Another excellent video STEM-popularization site joins the

ranks of Minute Physics, Veritasium, Vsauce, and CGP Grey. Head Squeeze weekly offerings include addressing popular science questions, live experiments (I first found the site from a *BBC News Magazine* video on "Awesome Tabletop Science Tricks"), a science guide, and a mathematics (mainly statistics) segment. There are also periodic segments dedicated to professional entertainment science (unsafe at home), such as the recent "Twelve Explosions of Christmas" sequence. Very entertaining.

• **"Developing Assessments for the Next Generation Science Standards" by the NRC**

http://www.nap.edu/openbook.php?record_id=18409

The Committee on Developing Assessments for Science Proficiency in K-12 of the US National Research Council has released a new, freely available report on systemically assessing progress meeting the NGSS. Six interdisciplinary examples of science topical learning are described. Specific assessments discussed include classroom assessments, monitoring assessments, and monitoring indicators of opportunity to learn.

• **Docking at the International Space Station**

<http://modelinginstruction.org/>

<http://orbit.medphys.ucl.ac.uk/>

<http://smithplanet.com/stuff/orbiter/orbitaloperations.htm>

<http://www.learner.org/resources/series42.html>

A recent thread on the American Modeling Teachers Association list AMTA-L discussed the orbital mechanics of docking a shuttle to the ISS (or rendezvousing with another orbiting object). Freely available simulation software for Windows PCs called "Orbiter—Space Flight Simulator" can be used, following explicit instructions alluding to the physics from Jared Smith. AMTA posters discussed how the procedures can seem counterintuitive (Smith's manual is quite clear on this): firing a rocket while aiming an orbiting spacecraft at another along the same orbit to "move forward" along an orbit doesn't work for pilots—this will impart more velocity to the piloted rocket and (following simple Newtonian mechanics) its orbital radius will increase. The piloted rocket must rise above the target. The procedure is full of gems associated with understanding centripetal motion, gravitation, and orbital mechanics, and a likely way to lure some students into learning basic orbital physics. *The Mechanical Universe* series of videos includes four appropriate and relevant episodes for those introductory physics students interested in space navigation.