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WebSights features reviews of select sites presenting physics teaching strategies, as well as shorter announcements of sites of interest to physics teachers. All sites are copyrighted by their authors. This column is 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 URL and describe how you use it to teach.

Some Mechanics Simulation Games: PHUN, World of Goo and LineRider

—***PHUN:*** http://www.phunland.com/ advertises itself as a "2D physics sandbox" and a "playful synergy of science and art." I'd describe PHUN as a freeware (for noncommercial use) mechanical modeling environment—think something like a subset of Interactive Physics. Available in versions for Windows, Linux, and MacOS, PHUN was developed by Emil Ernerfeldt as his master's thesis project in Computing Science at Sweden's Umeå University. There is quite the PHUN following online, with over 1000 YouTube videos available.

—***World of Goo*** http://www.beanstalkgames.com/ is an inexpensive, imaginative, humorous, and nonviolent puzzle-solving WiiWare, Windows PC, MacOS, and Linux videogame I'd describe as Dr. Seuss meets Tim Burton's *Beetlejuice* or *A Nightmare Before Christmas* (with a soundtrack reminiscent of Danny Elfman). Players solve puzzles by constructing structures, machines and devices from animated talking, living, squirming globs of goo, which of course have their own agenda. The game is darkly ironic and vaguely reminiscent of Lemmings, and there are free demo versions for Wiiware, MacOS, and Windows, with a Linux version in process.

—***Line Rider*** http://linerider.com/ is built around a simple idea: sketch a simple line with a pencil drawing tool, then release a tiny sled rider to ride the line. Created by Boštjan Cadež, a Slovenian university student, Line Rider is freely available on the web—where again, an online community of aficionados have shared over 11,000 (!) YouTube videos of our tiny tobogganist running through intricate art with various background soundtracks. The simple, original Line Rider is still freely available for web browser play, though for-pay versions are available for wireless phones, iPods, Wii, DS, and Windows PCs.

These games are all marvelous fun and represent important motivational hooks for attracting and retaining physics students, but they are ultimately games. Existing free and commercial physics simulation software like the PhET Simulators free from http://phet.colorado.edu and Interactive Physics with free demos at http://www.design-simulation.com/IP/ are written from the ground-up for physics instruction, in many cases by physics educators and by Physics Education Researchers or those guided by Physics Education Research. For example, I like to use Interactive Physics to make the invisible visible when I teach projectile motion by constructing simple visualizations that show animated free-body diagrams with force and velocity vectors in which the vector components and sum of velocity change length and direction, with numeric readouts attached to the vectors. PHUN, World of Goo, and Line Rider are great entertainment, but not a substitute for well thought-out physics teaching software such as the PhET simulations and Interactive Physics.

PHUN was suggested by Mr. Larry Hiller of North Tonawanda HS Physics; World of Goo by Dr. David Abbott of Buffalo State College Physics, and LineRider by the column editor.

Online Video Math and Physics Tutorials from YouTube.com and KhanAcademy.org

Otherwise in online mathematics tutoring, there are a number of noteworthy mathematics tutoring video collections freely available from YouTube. A squidoo page presents an overview at http://www.squidoo.com/Youtube-Math-Tutors and much of this material is grade school math and physics-related, with some explicit physics content, e.g., the Khan Academy's Physics at http://khanacademy.org/ lists some 80 (!) short video vignettes. This is both useful fodder for review and a pretty fascinating movement in math that could be further applied to physics problem solving (obviously demonstrated at a barebones level by the Khan Academy folk). These short problem-solving videos by professional tutors (not physicists) are exquisitely reductionist and incomplete in their nature, and don't provide the grand unifying themes that this editor believes actually represent physics as science, but could be of considerable help to students struggling with specific problem-solving skills. On the Khan Academy site considerable attention is paid to arithmetic, pre-algebra, algebra, geometry, probability, trigonometry, finance, pre-calculus, calculus, differential equations, linear algebra, finance, SAT preparation, and more.

The column editor, who vaguely believes he recalls a citation to Khan Academy in The Economist.