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

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.*

• Perimeter Institute new and old curricular offerings: New units on energy, climate change and waves, plus Emmy Noether's revolutionary theorem explained, from kindergarten to PhD

resources.perimeterinstitute.ca/collections/
insidetheperimeter.ca/noethers-theorem-kindergarten-phd/
tinyurl.com/WS-NoetherConvergence
insidetheperimeter.ca/forces-of-nature-great-women-who-changed-science/
www.perimeterinstitute.ca

The Perimeter Institute for Theoretical Physics (Perimeter Institute or PI) has just released new curriculum units titled "Evidence for Climate Change (grade 10)," "Wave Model Applications (grade 11)," and "A Deeper Understanding of Energy (grade 11)."

"A century ago, Emmy Noether published a theorem that would change mathematics and physics. Here's an all-ages guided tour through this groundbreaking idea." PI has a lovely page on Noether, featuring short video snippets on her life story and physics explained by a physicist-author of children's books (like QM for Babies), then more generalist public lectures, and finally a discussion of the field theorems by a mathematical theorist. There is a link to an hour-long Convergence Series video on Noether's mathematics by Peter Olver and Ruth Gregory. Finally, PI provides links for downloading a series of posters about women in science titled "Forces of Nature."

• Physics demos by John Johnston at the Faraday Center: Collection updated and extended

tunyurl.com/WS-Johnston

"This website features several hundred demonstrations, models and explanations of topics from high school physics. Most of the apparatus are homemade, produced in a woodshop with table- and jig-saws and a drill press. Detailed instructions are well-illustrated; projects mostly require common hardware store items.

"The website is especially aimed at young teachers who could develop a fine collection o durable apparatus for a quality, lifetime career. This website collection has served the author for over 50 years. Because designs are generally simple, construction is not difficult; if needed friends and relatives (and even students) can lend a hand. More than a few topics are good make-and-take projects. The content is free to copy and use, please take advantage, improve as desired, and share."

Submitted by John Johnston, AAPT Fellow

• The Under-Representation Curriculum project

underrep.com

"In nearly all levels of science and in nearly all disciplines, the population of scientists doesn't match the American population as certain groups are underrepresented. The Under-Representation Curriculum is a set of lessons, created and tested by teachers with a range of ages in a range of settings, that use the tools of science to explore why this is. In the process, students learn about society and science culture in a way that promotes learning for all students, the creation of a more just scientific culture, and the formation of scientific identity for students from under-represented groups. The link above includes access to lesson plans, teacher notes, related readings and videos and podcasts, and an online discussion community of teachers doing this work."

Submitted by Chris Gosling

• Parallel Pedagogy: Learning the concepts simultaneously, intro mechanics

sharedcurriculum.peteschwartz.net/parallel-pedagogy/
tinyurl.com/WS-ParPed
aapt.scitation.org/doi/full/10.1119/1.4981034

"Parallel Pedagogy" allows students to learn mechanics much the same way we learn our first language—we just start doing it. We simultaneously introduce (in simple form) momentum, energy, forces, and motion; we stress concepts, picture drawing and discussion; we add math only as it becomes necessary. The method is briefly described in the above video and manuscript: "Focusing on Concepts by Covering Them Simultaneously," *Phys. Teach.* **55**, 280 (2017).

Through the above website, the instructor has access to all resources including my student evaluations. Students can watch videos and answer questions through a web platform that records their participation. We have three short, concise textbooks: Calculus-Based, Algebra-Based, and Conceptual. I like the flipped classroom because it leaves the class time open for demos, activities and group problem solving. However, parallel pedagogy can be taught in traditional lecture format equally well. Please contact me with questions, collaboration, or comments.

Submitted by Pete Schwartz, Cal Poly Physics, pschwart@calpoly.edu