$2000 scholarships for teachers to re-train for physics or chemistry, by Jane Jackson, Co-Director, Modeling Instruction Program, ASU Dept. of Physics. Jane.jackson@asu.edu   http://modeling.asu.edu (Sept. 2019)

Certified AZ teachers: apply NOW for a $2,000 professional development (PD) scholarship. You have 3 years to use it. You can re-apply EACH year for another $2000. Apply at http://www.azed.gov/hetl/pd-pilot-program/
The PD must support you in gaining additional credentials (e.g., qualify to teach dual enrollment physics or chemistry) and/or certification in math, a science subject, technology, engineering or career and technical education.

WHY PHYSICS AND CHEMISTRY?
* Arizona has extreme shortages in both subjects. We must double the number of physics-certified teachers. Our motivation is equity. Our goal is to double the # of students taking high school physics, to meet the national average of 40%.
* Physics and chemistry are crucial dual enrollment courses, since they are for grades 11 and 12. Physics is the chief STEM pathway to college and career.

WHAT PD at ASU? A $2000 scholarship pays for FIVE non-credit ASU Modeling Workshops (@ $400 each), or one 3-week summer Modeling Workshop for ASU graduate credit (~$2000). Our ASU course schedule for upcoming years is at http://modeling.asu.edu/MNS/MNS.html in the section on course scheduling. Teachers have these options at ASU:
* Each summer: 4 Modeling Workshops in physics & chemistry: 2 or 3 weeks.
* Spring semesters: Mechanics Modeling Workshop, 4:30-6:30pm, 2x/week.
* Fall semesters: Physical Science or Chemistry I Modeling Workshop (after school, once or twice a week). (Tuition is ~$2800. Or non-credit costs $400.)

NEED REFRESHER COURSES? Prerequisite courses at AZ community colleges are also good uses of scholarship funds.
* For physics: trigonometry-based PHY111 and 112 (with labs).
* For chemistry: science majors courses CHM 151 and 152 (with labs).
Face-to-face gives you more support, but AZ teachers also have the option of online versions at Rio Salado CC, and they start at various dates in each semester. The cost for each course is about $360. http://classes.sis.maricopa.edu/

WHY ASU? It has world-renowned, effective PD in physics and chemistry!
* Overwhelmingly, teachers say that ASU Modeling Workshops are the BEST preparation to pass the AEPA/NES physics test! Two to four 3-week (90 contact hours) summer Modeling Workshops typically suffice. (The NES physics test has NO calculus, said a teacher who took it in 2017.)

* We have helped many teachers prepare to qualify to teach dual enrollment. Most earned the MNS summers-only degree in physics at ASU. Read their testimonies at [http://modeling.asu.edu/MNS/DualEnroll-MNScourses15.htm](http://modeling.asu.edu/MNS/DualEnroll-MNScourses15.htm) or download at [http://modeling.asu.edu/MNS/MNS.html](http://modeling.asu.edu/MNS/MNS.html)

* We helped 70 out-of-field teachers to become Highly Qualified in physics, chemistry, or high school physical science, in 5 years when we had Title II grants. Modeling Instruction is deep content taught by effective pedagogy: interactive engagement. It makes the classroom like the workplace: it emphasizes 21st century soft skills & thinking skills. It’s harmonious with new AZ science standards.

**HOUSING**: ASU dorm housing costs about $800 for 3 summer weeks. Campus parking costs $40/month. A well-appointed 2-bedroom family condo in Scottsdale costs ~$1500 for 1 month. Contact jane.jackson@asu.edu if interested.

* School district Federal Title II funds can pay for housing, etc: teachers can ask their principal. Resource: [http://modeling.asu.edu/AZ/TitleII-ESSA-TchrsInvolved.htm](http://modeling.asu.edu/AZ/TitleII-ESSA-TchrsInvolved.htm)

* If you live too far from ASU to commute, and you want/need a $2500 summer stipend, reply to jane.jackson@asu.edu.

**BOTTOM LINE**: Why the need? Physics is the #1 shortage area of K-12 teachers - and has the highest turnover because of strains in the system and higher wages in the private sector. Arizona has a crisis: In Greater Phoenix, ~10% of public district high schools do not have a physics teacher. In rural Arizona, ~25% of public district schools eliminated physics after the Great Recession of 2008.

* The most concrete science is **physics**; it deals with the simplest systems, and thus can use the most math -- it makes math make sense – it helps with math. Physics is everywhere!

* ONLINE physics doesn’t work for most students; students get very little support. No one takes it, in AZ schools that offer it. Also, you can't do the 3-dimensional teaching that the new AZ science standards require, that are aligned with the research-based NRC Framework for K-12 Science Education.

A 3-page document for Arizona school principals, by Larry Dukerich & Earl Barrett, shows that Arizona needs to DOUBLE the number of students who take high school physics to meet the national average of 40%. To do this, we need more physics teachers. Ways that Arizona principals can help are addressed. Read or download at [http://modeling.asu.edu/AZ/AzPhysicsCrisis-ForPrincipals.htm](http://modeling.asu.edu/AZ/AzPhysicsCrisis-ForPrincipals.htm)
DUAL ENROLLMENT (DE): NEW QUALIFICATIONS: To be qualified to teach DE, a teacher must have 18 graduate credits in the content area (or fewer credits if they have taught AP courses or post-secondary, etc. Download the MCCCD qualifications in physics & chemistry at:
http://asa.maricopa.edu/hlc-minimum-qualifications-for-hiring
50% of DE faculty are no longer qualified to teach DE, due to these new requirements, the president of Paradise Valley Community College said in Nov. 2017. So the need is great!
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To help you understand our work, please see
* our 2-page Annual Report, at http://modeling.asu.edu
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Need advice? call Jane Jackson, 480-314-1522. jane.jackson@asu.edu
Related documents are at http://modeling.asu.edu, in the Arizona Community section at the bottom of that web page.

(A picture of the five teachers who started this movement to double the # of physics teachers.)