

\$2000 scholarships for teachers to re-train for high-need STEM and CTE content areas (an update in May 2018 by Jane Jackson)

By mid-February, 2018, the ADE had awarded all 150 \$2000 scholarships to teachers to re-train to teach physics, chemistry, and other high-need STEM and CTE subjects – or to prepare to qualify to teach a dual enrollment (DE) STEM or CTE subject. Teachers have 3 years to do this.

Only 23 scholarships were awarded to re-train in physics, and 11 in chemistry. To prepare to teach dual enrollment, 7 were awarded in physics, and 6 in chemistry. This is not enough in physics and chemistry. Arizona needs at least 75 more certified physics teachers to reach the national average of 40% of high school students taking physics! Also, physics and chemistry are the most important dual enrollment sciences, since they are taught in grades 11 and 12. Thus the pilot program should be re-authorized and better targetted to physics, chemistry, and math, the hardest-to-staff subjects.

TEACHERS NEED ADDITIONAL FUNDING:

- * Teachers need 3 times the scholarship amount to re-train with ASU credit, or up to 5 times the scholarship amount to prepare to qualify to teach dual enrollment.
- * Long-distance teachers cannot afford ASU dorm housing, and their school will not/cannot pay. They cannot use their \$2000 scholarships until they can find funding for housing.
- * Many more teachers want scholarships. They applied too late, or never heard about the scholarships.

ASU EXPERTISE: world-renowned professional development in physics and chemistry!

- * Overwhelmingly, teachers say that ASU Modeling Workshops are the BEST preparation to pass the AEP/NES physics test! Two to four ASU 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 summer-only degree in physics at ASU. Read their testimonies at <http://modeling.asu.edu/MNS/DualEnroll-MNScourses15.htm> or download at <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 our Federal ESEA “Improving Teacher Quality” grants (2006- 2010).

Modeling Instruction is deep content taught by effective pedagogy: interactive engagement. It makes the classroom more like the workplace: it teaches 21st century soft skills & thinking skills.

A \$2000 scholarship can pay for FIVE non-credit ASU Modeling Workshops (@ \$400 each), or one summer Modeling Workshop for ASU graduate credit (\$2000). Teachers have these options at ASU:

- * Each summer: 3 to 5 Modeling Workshops in physics & chemistry: 2 or 3 weeks.
- * Spring semesters: MECHANICS Modeling Workshop at ASU, 4:30-6:30pm, 2x/week.
- * West Valley locations, if teachers want them. (Tell Jane Jackson if interested.)
- * Possibly online versions, if teachers ask. (The first course must be face-to-face).

Our ASU course schedule through 2021 is at <http://modeling.asu.edu/MNS/MNSCourses2018-21.htm>

HOUSING: ASU dorm housing costs about \$670 for 3 summer weeks. Campus parking costs \$40/month. A well-appointed family condo in Scottsdale is ~\$1400 for 1 month. School district Federal Title II funds can pay for housing: teachers can ask their principal to advocate for them. (This is hard; funds are tight!)

NEED A REFRESHER? 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 is best, but Rio Salado CC has online versions. The cost for each course is about \$360.

HISTORY of the \$2000 scholarships/grants: Senate Bill SB1038 was signed into law in May 2017, by Gov. Ducey. (Mike Vargas, physics teacher at Pinnacle HS in Phoenix, initiated the bill. See the picture of 5 of us who worked hard for it— below.) On July 17, 2017 the Arizona Department of Education (ADE) issued an application form for \$2000 scholarships/grants. Teacher applications were reviewed by ADE staff starting on July 31, 2017.

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 faces a crisis: **More than 10% of public district high schools in Greater Phoenix do not have a physics teacher. 25% of rural AZ public district schools eliminated physics after the recession of 2008.**

* The most concrete science is physics; it deals with the simplest systems, and therefore can use the most math -- it makes math make sense – it helps kids 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 ADE promotes, that is aligned with the research-based NRC *Framework for K-12 Science Education*.

A 3-page document for Arizona businesses, 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 businesses can help are addressed. Download at <http://modeling.asu.edu/AZ/AzPhysicsCrisis-ForBusinesses.pdf> .

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 MCCCDCD 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!

To help you understand our work, please see

* our 2-page Annual Report, at <http://modeling.asu.edu>

* evidence of effectiveness: <http://modeling.asu.edu/Evaluations/Evaluations.html> .

This document is: [http://modeling.asu.edu/AZ/\\$2000scholarships-retrainSTEM.htm](http://modeling.asu.edu/AZ/$2000scholarships-retrainSTEM.htm)

Need advice? call Jane Jackson, 480-314-1522. jane.jackson@asu.edu

This and related documents are available at <http://modeling.asu.edu>, in the Arizona Community section at the bottom.

(Update May 2018. jane.jackson@asu.edu)



Larry Dukerich, Mike Vargas, Earl Barrett, Jeff Hengesbach, Jane Jackson. Fall 2016