

New Ideas in High School Physics Teaching

Tuesday, Jan 27, 2004 10:30 - 12:15 AM

a) National Science Foundation (NSF) Research Experience for Teachers (RET)

Carolyn Evans, Grandview H.S

This program is available at universities across the US. High school teachers work on a research project with a faculty member for 6-10 weeks.

b) Teaching Modern Physics Using the Physics of Star Trek by Lawrence Krauss

Frank D. Lock, Lemon Bay H.S

The Physics of Star Trek and The Dancing Wu Li Masters can be used to teach concepts of quantum physics, quantum logic, Bell's theorem, time travel, and other "modern" ideas.

c) Night School Science

Katie Page, Barrington H.S.

This is a science course for students who need an alternative to standard day school due to discipline issues, drug problems, family problems, or for other reasons. It runs one session for 3 hours or two sessions for 1.5 hours each week. A typical student has one or more of the following characteristics:

- has been expelled or suspended for behaviour or truancy
- comes from a dysfunctional family due to divorce, drugs, alcohol or abuse
- is a teenage mother or occasionally father
- works during the day to support the family
- is often co-enrolled in a day school

Be ready to get off track. Discipline is usually not a problem: the kids have had their crisis, and are on the other side, ready to turn around their lives.

Half of the course consists of life skills: why are you here, what are your dreams, can you pay your bills

Half of the course consists of applied science skills: want to be an electrician, work on cars, forensics. No "busy work" or meaningless work sheets.

Learning is self-directed, allowing for many skill levels to work together.

Why do it? Earn extra \$, much more flexible teaching than day school, kids are reachable, may be their last stop before leaving school altogether.

d) Portfolio Physics

Shannon M. Mandel, Barrington H.S.

This is an alternative form of assessment, useful for students who are not good test-takers.

- break a large topic into smaller units
- list 8-10 objectives for each unit
- gather resources for students to use
- provide multiple lab setups
- allow students to choose ways of demonstrating proficiency
- each portfolio must contain at least three projects, e.g, book, song, lab report
- each objective must be covered at least once
- a homework packet must be covered on an individual basis
- student work: models, books, posters, PowerPoint, movies
- students receive a rubric ahead of time with four levels: advanced(4), proficient(3), basic(2), novice(1)
- group size = 2, work in class, individual homework, teacher demos (especially on difficult topics)
- grading takes longer than written tests

e) The Capstone Experience

Amy Picard Winston, Newton North H.S.

This program uses Minds on Physics, an inquiry-based co-op approach.

Grade 9: Introductory physics

Grade 10: Chem or Bio

Grade 11: Bio or Chem

Grade 12: Choice from several.

The emphasis is on the development of independent experimentation skills.

Capstone Project:

- select a motion
- produce and present a video of your motion
- kinematics analysis
- dynamics analysis
- independent extension

The motion may come from sports, leisure activities, toys, or other source. We try to avoid automobiles. Some examples are a soccer throw, juggling, wiffle balls.

Analysis software includes Motion Visualizer 3D, VideoPoint, Logger Pro.

f) International Young Physicists Tournament

Donald Franklin, St. Johns Country Day School

This tournament is held in various countries around the world. The next one is in Brisbane, Australia June 24-July 1. For more information visit

<http://www.iypt.org/>.

g) NASA SHARP Mentoring Program (Summer High School Apprenticeship Research Program)

Howard Estes, Morgan Research

This is a program for high school students who are US citizens, at least 16, and have completed at least the 10th grade.

Information is available at:

<http://www.mtsibase.com/sharp>

<http://www.gravityprobeb.com/>

<http://www.einstein.stanford.edu/>