

Instructor Science Fair

Presented by:

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Tuesday, March 19, 2019

9:30 – 10:30am

WSU Tech Room S116

Introduction



Education or Entertainment?

Are classroom demonstrations really necessary?

How prepared are your students?

- K-12 classes fail to give basic understanding of science.
 - Suppress whatever interest students have in subject.
- Many AMTS students have no real understanding of the science, electricity & magnetism, etc.
- Even those who have previously taken courses on these subjects in the past tend to have little understanding
 - Never actually learned, they just memorized.
- Classroom demonstrations can help students cross the line between memorization and understanding.

Does observing help?

- Students who simply observe demonstrations do not typically learn anything from them.
- In fact, they may misinterpret the results, creating barriers to learning instead of knocking them down.
- Students who have a chance to predict the outcome of a demonstration and discuss it with peers prior to seeing it consistently achieve significantly higher success rates.

Do you have the right attitude?

- Personal beliefs and dispositions of teachers relate to or predict successful technology integration.
- Teacher philosophy (student-centered versus teacher-centered) affects ability to effectively use technology in the classroom.
- Teachers' beliefs, specifically self-efficacy beliefs, are an important, and measurable, component of the beliefs that influence technology integration.

What's your plan?

- Choosing a demo takes thought and planning.
 - What do you hope to accomplish?
 - What do you intend for the students to learn?
 - What learning outcome is supported?
- Avoid demonstrations that detract from the class
 - Avoid demonstrations of principles that will not be taught at some time during the semester.
 - Do not try to fool the students with tricks!
 - Use demonstrations to obtain of quantitative results.
 - Allow sufficient time to analyze and discuss results.

Lessons learned:

- Tremendous need for demonstrations, especially those involving understanding of basic science.
- Students learn better from participating in demonstrations than from simply observing them.
- The teacher's attitude is one of largest contributors to whether demonstration is successful.
- Demonstrations must serve an academic goal described in curriculum – otherwise, valuable class time is wasted.

Conducting Demonstrations

Examples of how to use them effectively

The Bernoulli Bag

- www.enasco.com
Product # SB51118M
\$6.75 for a pack of 4.
- If you blow the bag up like a balloon, it will take many breaths to fill it.
- If you hold the bag in front of your mouth and blow into it, the air pressure in the stream is reduced, entrapping surrounding air and forcing it into the bag.



Elasticity of Gasses

- Fisher Elasticity of Gases Kit -Model S52009
 - Numerous suppliers, roughly \$20
- Set a volume of gas in the piston, then use weights to pressurize the system.
 - As the weights are added, the volume of gas is decreased.
 - Plot volume vs. pressure to approximate Boyle's law.



Feel Flux

- www.fatbraintoy.com
\$49.99 - \$99.99
- Demonstrates Lenz's law



World's Simplest Motor

- www.enasco.com
Product # SB26058HV
\$5.95 each
- Demonstrates the basic principles of electromagnetism



Energy Ball

- www.enasco.com Product # SB28883 \$3.95 Each
- Since your body is mostly water and there are water and minerals on your skin, your body can be a conductor, but a poor one.
- The weak current travels from one silver tab onto one hand and then across the surface of your skin to the other hand and onto the other silver tab.



Tesla Coil

- www.enasco.com
Product # SB28821M
\$299.99
- Transmit electricity without wires.
- Watch lightbulbs glow in your hand.
- Source of high frequency high voltage electricity
- Safe because current flows over, not into your skin.
- 50,000V potential



Conclusion

Almost done – really!

What should you do?

- The decision of investing time and resources into classroom demonstrations depends on goals and objectives of each AMTS.
 - Some only interested in minimal standards and effort, others spend significant time and effort, most somewhere in-between.
- Wherever your AMTS falls on this spectrum, I urge you to evaluate your use of classroom demonstrations.
 - If you don't use them, perhaps you should consider exploring the idea.
 - If you do use them, consider reviewing your presentations for effectiveness and evaluating your faculty members' presentation skills.

Questions?

Thank You!

If you have any follow-up questions or would like more information, feel free to contact me:

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