Science Communication, Outreach and Education

Engaging Your Audience
“Common” Sense Comes with Experience
Not just the facts, ma’am.

- Inquiry-based learning, Project-based learning
- 5 E’s
- Show-then-tell
Inquiry-Based Learning

Types of Student Inquiry

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Structured Inquiry
Students follow the lead of the teacher as the entire class engages in one inquiry together.

Controlled Inquiry
Teacher chooses topics and identifies the resources students will use to answer questions.

Guided Inquiry
Teacher chooses topics/questions and students design products or solutions.

Free Inquiry
Students choose their topics without reference to any prescribed outcome.

Inspired by: Fitchman, 2011
The Buck Institute for Education identifies seven key design elements of project-based learning.
5 E’s of Learning

- Engage
- Explore
- Explain
- Elaborate
- Evaluate
Show-Then-Tell

• Great for short interactions or in an expo or large auditorium show
• Abbreviated 5 E’s
  • SHOW
    – “Check this out! Try this!”
  • TELL
    – “What happened?”
    – “Your right!”
    – “Here’s what else!”
    – “What do you think happened?”
Be Aware of Pre- and Misconceptions

- Familiarize yourself with common misconceptions and what your audience already knows
- What’s taught ≠ learned
- Experiential learning is best for truly changing misconceptions
- Avoid creating new ones by:
  - Probing your audience’s understanding along the way
  - Being careful with language, especially terms that mean different things to different fields
Cool Education Resources about taught ≠ learned

• How People Learn, NRC
• Page Keeley’s Uncovering Student Ideas series (Probes)
• Phil Sadler and Matt Schneps
  – A Private Universe
  – Minds of Our Own
• Cherilynn Morrow’s Kinesthetic Astronomy
Basic Classroom Management
Tips for “Holding” Your Audience

• Watch your audience
• Look for the “half-hand up,” “Let’s hear from someone new”
• Re-engage – new demos, volunteers, get them moving, ask questions
• Rely on teachers and chaperones
• “Eyes on me” or clapping as last resort
Culturally/Socially Conscious Education
• Rely on teachers and chaperones
• Share your story
• Share their story
• Differentiate
• Ask questions and encourage questions

“Questions don’t make you look dumb, they make you look smart,” Bill Slavin, safety trainer at PPPL.
Empowering questions like: What do you think?

Favor the shy. Look for the half-up hand.

Positive. NEVER make fun of anyone. Encourage, not discourage. Counter any bullying with support only.

It’s only failure if you don’t learn from it.

Admit you don’t know everything.

DO NO HARM
Practice!
Safety
• Safety! (Safety first! Even if I mentioned it last!)
Discussion

For further discussion:
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Other Campus Resources

- **McGraw Center for Teaching and Learning**
- **Teacher Prep**
- And of course... **Council on Science & Technology**