Increase Your Lab Confidence

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Overview

• Our Future & STEM
• Ecological Classroom Outdoors
• Increase Your Lab Confidence
• That’s Swinging Lab
• Teachers as experts
Although most students recognize the importance of STEM to society, they fail to see the importance of STEM to themselves as individuals.
ECO STEM Connections

• Botany
• Entomology
• Limnology
• Ecology
• Chemistry
• Park & wildlife management
• Forrestry
ECO enhances STEM

• Hands on/inquiry-based learning
• Collecting real world data
• Applying data to analyze the ecosystem
• Citizen science
• Creates interest in STEM careers
• Develops ecological stewardship
National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. (These experiences must) provide students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3) (National Research Council, 2006, p.77; NSTA, 2007)
Steps to Maximize Success

★ Context- always tie to classroom lesson
★ Structure for SAFETY
★ Visualize
★ Organize materials
★ Management- noise, movement, time, materials
★ Roles
★ Analyze
★ Summarize/Conclude
Visualize Before the Lab

- Select a lab related to your content. Hands on activities have the greatest value when integrated into the context of topics your students are learning.
- Read over the lab and visualize it. Get out the materials and try it yourself.
- Before every lab, think about safety. Do they need to wear goggles? Are there other safety concerns?
- Think about time and noise management. How can you assign roles that will minimize movement and produce true cooperation among group members?
- Purchase or gather materials.
- Organize materials into buckets or bins for easy movement and access. Students working in groups of 3-4 is ideal.
Beginning the lab

- Set a **timer** that rings at least 5-10 minutes before class ends. This ensures that all materials are put away and the room is ready for the next class.
- Create a routine procedure for lab days. Meet them at the door and check that they have their goggles and hair ties.
- Tell students to clear the tables and keep all areas of the floor clear so that they can move safely around the room.
- Noise level must be kept low for safety. Use your established **attention signal** to get silence when needed.
- Show/demonstrate the materials.
- Discuss the **roles**. Let students choose their role.
- Students create an **hypothesis**. Write in “If….then ….” form.
Why science teachers are not asked to monitor recess.
That’s Swinging Lab

See your handout.

You will work in groups of 4.

Roles:

Reader/recorder
Counter
Swinger
Timer
After the Lab

- When timer rings, have each member of the group return materials to the bins. Have the same roles bring the materials back to their original location.
- Students need to **analyze** their results. Sometimes this involves creating a graph. Be sure to allow time to help them with this task.
- Discuss the results as a whole group out loud. This ensures that students are synthesizing the experience properly.
- **Important note**: Science investigations do not “prove” anything! The data can only “support” or “fail to support” their hypothesis.
- Were there any flaws? Making mistakes are expected (remember Ms. Frizzle), but they must be identified so that the next time is more accurate.
Other Lab Resources

Drops on a Penny Lab

Sewer Lice- NSTA Press

https://www.sciencebuddies.org/science-fair-projects/project-ideas/Phys_p016/physics/pendulum-motion#background

www.edmodo.com Teacher’s forum for sharing ideas and getting help

NASA- educator’s section
Teachers as Experts

Share a favorite lab that you have done with your students.
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If a child is to keep his inborn sense of wonder, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement, and mystery of the world we live in. — Rachel Carson