

Not Just Fun and Games! Structure Class Demonstrations to Reinforce Learning Goals

Classroom demonstrations that illustrate an important process, phenomenon, or application of a concept can generate interest and engage students with course material. Although students enjoy classroom demonstrations, they sometimes remember the activity but do not remember the course learning goals that instructors want to promote when they design the demonstration. An effective demonstration connects student memories of the classroom experience with the concepts the activity was designed to demonstrate.

Strategies that transform an entertaining demonstration into an effective learning experience

- Identify the learning outcome(s) you intend to promote with the classroom demonstration. For example, a demonstration that illustrates a counterintuitive or surprising outcome can be used to identify assumptions that lead students to make erroneous predictions. Students experience surprise at unexpected results, which motivates curiosity and encourages students to give weight and credibility to disciplinary concepts and models that explain these findings.
- Practice the demonstration to ensure it works properly during class.
- Prepare students for the demonstration. Observations are biased by preconceptions (Bransford & Johnson, 1972). Two observers of the same event will remember it differently if they experience the event with different frameworks and expectations (Holst & Pezdek, 1992). Don't assume students will notice the details you notice or interpret the demonstration in the same way you do. Begin with an explanation that gives students the framework they need to focus their attention on the most relevant aspects of the demonstration. Remind students about the relation between observations during the demonstration and the course material.
- If possible, make students predict the outcome before you conduct the demonstration.
- After the demonstration is finished, ask students to discuss the outcome and their observations with each other and the class as a whole.
- Reinforce the purpose of the demonstration with a debriefing discussion that identifies and explains the principles demonstrated. Explicitly connect the observations from the demonstration to course content and the learning goals for the activity. Use the curiosity elicited by a surprising outcome to focus attention on disciplinary explanations that are based on valid disciplinary assumptions and models rather than the naïve models students used when they made their initial prediction.
- Ask students to take a minute or two to write a reflection on the demonstration. What did they learn from this experience? What was the purpose of including this activity in the class? Reflective writing will reinforce student learning. These essays will also reveal areas that continue to confuse students, which instructors can use to refine the demonstration for use in future classes.

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<http://emp.byui.edu/PyperB/Best%20Practices%20in%20Physics%20Demonstrations.pdf>

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