A n all-too-familiar problem for science instructors who teach lecture courses is the “zoned-out” student. To engage these students, instructors often try techniques such as classroom case studies, small collaborative projects, or instant writing assignments; these techniques allow students to participate in learning, which helps them pay attention and think about the material, but they may not always be enough.

Instructors who don’t have time for such techniques can still use demonstrations, which is a less participatory approach to making lectures more active. Although demonstrations lack many of the beneficial qualities of more student-centered activities, they still can illustrate a point while providing a nice break in lecture for students.

Visualizing science

In biology class, though, a demonstration by itself may fail to hold students’ interest. My biologist colleagues and I envy physical science professors who can do demonstrations that bubble, change color, and blow up in lecture without resorting to any sort of fancy technology. Of course, biologists often have visual demonstrations as well (e.g., O’Brien 2001), although our demonstrations may lack the impact of a controlled explosion.

Various types of video technology can make these presentations a little more exciting, but technology may not always be available in the classroom or for the particular point we are trying to address. Furthermore, flipping on a projection screen sometimes leads to students lapsing into TV-watching passiveness rather than being engaged.

So, I have come up with a simple and inexpensive technique to catch the attention of my introductory zoology class; this technique, although not a demonstration itself, complements any object-based demonstration, wakes students up, and draws their attention to what comes next. This simple trick works for any lecture in any course with object-based demonstrations, and it doesn’t require safety goggles or an electrical outlet.

I tested my idea in an introductory zoology class (Animal Diversity) that is usually taught as a medium-sized lecture course (with 30 to 80 students) with an associated laboratory. For lecture, I often bring objects for use as in-class demonstrations; these objects range from animal examples (mollusk shells, horseshoe crab exoskeletons, and sea stars), to models (a Bart Simpson doll to illustrate symmetry), to miscellaneous props (golf balls, various sized tubes, and so forth).

Brown Bag It

Although the demonstrations typically get students’ attention, one day I decided to make one more interesting. Before the lecture, I put the object (a shell of a cone snail) into a small, brown paper bag. During lecture, I showed the paper bag to the class and announced that this was the “Brown Bag of Science” (phrasing copied shamelessly from Bill Nye’s excellent science series). Then, I told them that there was an invertebrate in the bag. I said that the invertebrate was a vicious sit-and-wait predator that would hide...
until a vertebrate such as a small fish came by, quickly shoot out a poison harpoon to paralyze the prey, and then swallow it whole.

Next, I asked a student volunteer to reach inside the bag to get the animal and hold it up (it took a little reassurance that the animal was not, in fact, alive in the bag). The class’s immediate, positive reaction to the demonstration told me that I was on to something.

Since that lecture, whenever I do a demonstration, I place the object in a brown bag first. Sometimes I preface the demonstration with a story; and sometimes I ask a student to reach in the bag to pull out the prop. Occasionally the props are too big to fit into a brown paper bag. In those cases, I leave the object sticking out. The absurdity of putting such a large object in a small bag usually works just as well.

The brown bag approach can work for any type of class that has visual aids; however, it is used best in classes in which the visual aids are small enough to be crammed into a bag. Of course, the bag itself could be any size; I find shopping bags and gym bags allow for larger objects. The key to making the brown bag work is to develop the mystery about what is inside [as is the key to good storytelling (Herreid 2000)], especially for demonstrations used early in the semester.

Magicians and stand-up comedians have long used hats and bags and boxes to add a sense of drama to their performances. Likewise, I use props and watch students’ reactions when demonstration items are pulled out of bags. The fact that students consistently make favorable comments about the brown bag on their student evaluations is evidence that this simple trick works and peps up lectures that otherwise might be passive. So, the next time you use an object-based demonstration in class, I suggest that you “brown bag it.”

References

What is your Favorite Demonstration?

Do you have a tried-and-true classroom demonstration that students love? If so, the Journal of College Science Teaching would love to hear from you!

We’re looking for short manuscripts describing simple but effective demonstrations you’ve done with your students and found to be valuable.

To share your ideas with your peers, please electronically submit your manuscript of no more than 3000 words (including any figures) to the column editor, Brian Shmaefsky, at Brian.Shmaefsky@nhmccd.edu.