Lecture demonstrations have two important purposes: to increase student understanding of the concepts demonstrated, and to increase student enjoyment of class. Previous studies have cast doubt on whether traditional demonstrations accomplish the first, finding that passive observation of demonstrations does not significantly improve student understanding of the associated concepts. Indeed, many students alter their memory of demonstrations to match their ideas about the underlying physics!

Does the presentation of a demonstration affect its effectiveness? If students are required to predict the outcome of a demonstration and discuss their predictions with one another before the demonstration, they think more actively about the demonstration and its explanation, and have opportunities to discover inconsistencies or weaknesses in their own thinking. We are studying whether this strategy improves student understanding of the demonstration.

We identified four possible modes of demonstration presentation:

no demonstration
show and tell (traditional approach)
predict (students predict the outcome individually before seeing the demonstration)
predict and discuss (students predict the outcome individually, then discuss their predictions with others, before seeing the demonstration)

Each demonstration was presented to part of the class in each of these modes during discussion sections.

At the end of the semester, we gave a free-response

DEMONSTRATIONS: Entertainment or education?

Demonstrations are universally agreed to be the fun part of physics classes. But do students actually learn much from them? The answer from education research seems to be *no*!

Demos: do you remember what you saw or what you *think* you saw?

We are searching for ways to make demonstrations more effective by asking students to predict outcomes before seeing the demonstration, thus forcing them to think about the physics and enhancing their interest in the demonstrations. Careful research will tell if students do learn more from demos presented this way.

test in which students were asked to predict and explain the outcome of physical situations similar or identical to the demonstrations. Initial analysis suggests a small improvement in performance when students have to predict the outcome of a demonstration before seeing it; follow-up studies are in progress.