Promoting Student Learning:
Diversity and Student Success

Using Clickers in Large Classes

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Third Annual Conference on Teaching and Learning
University of Windsor, Windsor, Ontario
May 12-13, 2009

This presentation utilizes TurningPoint ResponseCards ("Clickers"). All you need to do is press the number that corresponds to your answer choice.

Have you ever used a Student Response System before?

1. Yes
2. No

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- In large classes, particularly in first year courses (and even worse those that are required courses that students often feel put upon to take) any kind of interaction is minimal
- Clickers offer some level of interactivity AND the anonymity for students to respond honestly.

What would you most like your questions to do?

0%	1.	Review material from a previous lecture
0%	2.	Give students confidence with material by seeing they answer correctly
0%	3.	Apply concepts as they are taught
0%	4.	Use pointed questions to get an idea across
0%	5.	Encourage attendance
0%	6.	Encourage discussion among students
0%	7.	Break up the monotony of the 'sage on the stage'
0%	8.	See what the level of general knowledge of the class is
0%	9.	All of the above

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- In lectures I try to apply all these ideas (though not necessarily in every lecture)
- When writing your questions you have to think what you want students to get out of it AND what you want to get out of it

- So a few sample questions

Limits of Human Perception

- Human perception has two limitations which fuel 'UFO sightings'
  - Our brains are hardwired to try and put an identification on something.
  - When looking at objects in the sky it can be impossible to correctly judge distance and therefore speed

What did you just see?

1. Bat
2. Mask
3. Coat of arms
4. UFO
5. Angel
6. Bug

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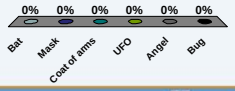
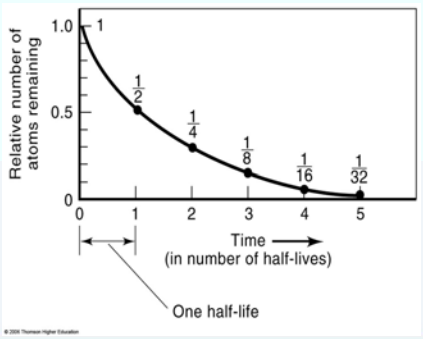


- The point here being is your brain tried to assign some sort of identity AND the question asked probably provided a hint as to what it was.
- This type of suggestion is a serious problem with any kind of eye witness testimony as well. Leading questions can change our memory of an event.

- This question and set of slides was meant to get across the point about UFO sightings from a course I teach. It interactively makes the point about human perception by making the students part of an example.

Applying a concept

- The next slides are examples of something used in talking about nuclear decay and half lives



If a sample has a half life of 2 years, after 8 years how much is left?

1. 50%
2. 25%
3. 12.5%
4. 6.25%
5. 3.125%

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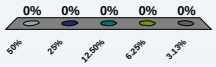

- Point of this question is to immediately apply a concept just learned.
- Particularly since I am teaching non-science majors where there is a great deal of **Math Phobia**, this is a particularly useful exercise as it both immediately allows students to see if they apply the concept correctly AND this helps to ease the math fear

- I often also use questions as an introduction to a topic … and to see if the students have previous knowledge.
- In first year classes where there can be large variation in what students know coming in, this can help establish whether some more time is needed in material you might *think* they already have covered.

What percent of Ontario's energy is derived from Nuclear power?.

1. 10%
2. 25%
3. 50%
4. 60%

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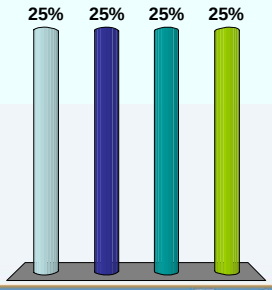
- This was an introduction to the topic of nulcear power. It was meant to help put the issue of nuclear power and its importance to students sitting in the classroom into perspective.

How many bonds can a carbon atom make?

1. 1
2. 2
3. 3
4. 4



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- This previous question I have used either to test what student already know before doing some basic chemistry (like discussion combustion of fossil fuels)
- I might also use it as review question the following lecture, since when look at organic chemistry it is a VERY important characteristic about carbon.

- What you do after the results are in, is also as important as the question design.
- Were you trying to make a point with the question? If so, discuss what that was.
- Were you trying to see what the level of knowledge was? This often serves as a good introduction to new material or concepts.

- In testing general knowledge, particularly when the percentage of correct answers is low, I try to spend some time dissecting the wrong answers.
- The key here is to insert wrong answers that may *seem* correct, but spend the time to explain why they were wrong.

Anecdotally, what are the benefits?

1. Students seem to be more willing to ask questions in class
2. You can see where the students are, both in comprehension and what general knowledge they already have.
3. Students don't fall behind when they are forced to constantly review material.
4. Average on multiple choice elements of tests seem to have increased roughly 5%.

- Please return your clickers at the end of the presentation.