**5 Research Based Methods**

**Pre-Assessment**

Poll students at the beginning of a unit or topic – you can see what information the students already grasp, and what misconceptions they have. This information allows you to adjust the content and pacing of your class to best support students (Bibles 2011).

* There are resources available online that list common student misconceptions, which can be used to write challenging questions.
* Get students to explain the reasoning that lead to an incorrect answer. This gives insight on how students approach the material.

**New Content and Reinforcement**

By polling students immediately after covering material you are reinforcing that material. Overall, student motivation and knowledge retention should increase (Johnson, 2005).

* Integrate questions into your presentation to ensure the students are actively thinking about the material.
* If possible, use case studies or moderately challenging questions in the place of recall questions.

**Review**

Similar to pre-assessment, review reveals to both instructors and students which concepts have been learned and which have not. This allows for responsive teaching (Fies & Marshall, 2006).

* Begin reviews with simple questions. These allow the students to “warm up” to the questions and the classroom response system.
* Continue the review with more challenging questions that require application of information or understanding of multiple concepts.

**Opinion**

By asking the students to anonymously give their opinion, you can generate more variety in views. This can be an ideal way to launch deeper discussion and more lively debates (Lio, Chen & Tai, 2009).

* Provide an opportunity for students to answer an opinion question with “Other” or “Not sure” in case they have an unanticipated opinion.
* Be prepared for students to be initially reluctant to voice their opinion in a whole class setting. Consider moving from small group discussion to whole class discussion.

**Peer instruction**

Students must think about a question and then justify their answer and reasoning to their peers. Some instructors have students’ complete readings ahead of the class and use this technique to both test and teach students (Crouch & Mazur, 2001).

Majority Incorrect

Give Detailed Explanation

Discuss with Neighbors

Vote

Pose Question

Majority Correct

Give Brief Explanation

Vote

Adapted from Ellis, Landis, & Meeker.

**Other Research-Based Ideas for Using Clickers**

**Practice with Intro Questions.**  You should start with easy questions.  This way you can introduce the rules for using clickers, the fact that you can change answers, and how clickers are to be collected.  You can also see if any clickers are not working.

**Getting to Know the Class.**  If this is your first week seeing the class, you may want to ask the students questions testing for prior knowledge. This information can be helpful when planning classes.

**Check for Understanding before Class:** You can check whether students have retained what they learned in the previous class or check prior learning for a concept.

**Check for Understanding at the end of a class.** Use the clickers to check whether students understood the main concept of a lesson.  This can help you prepare accordingly for the next class.

**Homework Correction.**  Clickers can help you check homework quickly and effectively.  It will motivate students to do their homework when they know will be checked. Also, you can quickly identify questions that need to be reviewed.

**Use with a Video.** You can present a video and ask questions about what was viewed afterwards, encouraging students to active viewers.

**Practice Tests.** These allows students to check their knowledge on a topic.  It also allows you to know how they are progressing on a particular unit.

**Student Questions.** Have students come up with the questions the day before – they are much more engaged and involved the next day.

**Cooperative Learning.**  The clicker can be used by teams of students to answer more challenging questions.  Students will have to come to consensus about answers, encouraging peer teaching.

**Pop Quizzes.** Give you an idea about whether or not students are doing assigned work.  They also allow you to engage in a discussion of why work is not being done.

**Review before a Test.** You can ask questions OR you can create a Challenge game (like Jeopardy). Students can answer in teams or individually.

**Video Resources:**

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| Topic | Title | Description | Length | Link |
| General | Using Clickers in the Classroom | Some ideas on using clickers | 9 minutes 47 seconds | <http://www.youtube.com/watch?v=CnnP0uCqD4k> |
| Clickers in the Classroom: The Research. Do clickers help students learn? |  | 7 minutes 43 seconds | <http://www.youtube.com/watch?v=PxKHXyVtVIA> |
| How to Use Clickers Effectively | Some steps to implement clickers and answers to some teaching questions | 10 minutes 59 seconds | <http://www.youtube.com/watch?v=z0q5gQfQmng&feature=relmfu> |
| Question-Based Instruction | From Questions to Concepts: Interactive Teaching in Phyiscs | Ways to integrate student questions into lectures | 2 minutes 22 seconds | <http://www.youtube.com/watch?v=lBYrKPoVFwg&feature=youtu.be> |
| Peer Teaching | Eric Mazur shows interactive teaching | View what a peer-teaching lesson might look like | 8 minutes 22 seconds | <http://www.youtube.com/watch?v=wont2v_LZ1E> |
| Reinforcement | Jeremy Petranka 6: Classroom Response Systems | Example of using clickers to scaffold learning | 3 minutes 45 seconds | <http://www.youtube.com/watch?v=VMkL-oy0bqs> |

**Other Resources:**

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| Title | Description | Link |
| Clicker Resource Guide | Some ideas on using clickers in your classroom, FAQ on common implementation issues, and example questions | <http://www.cwsei.ubc.ca/resources/files/Clicker_guide_CWSEI_CU-SEI.pdf> |
| Thought Questions: A New Approach to Using Clickers | Step by step guide to implementing questioning and group discussion in class | <http://www.cwsei.ubc.ca/resources/files/CU-SEI_Thought_Questions.pdf> |
| Question Banks | Classroom Response question banks for various Science disciplines and Mathmatics. | <http://teaching.concordia.ca/resources/teaching-with-new-technologies/using-clickers/question-banks/> |