

# Ready, Set, React!

## Getting the most out of peer instruction using clickers

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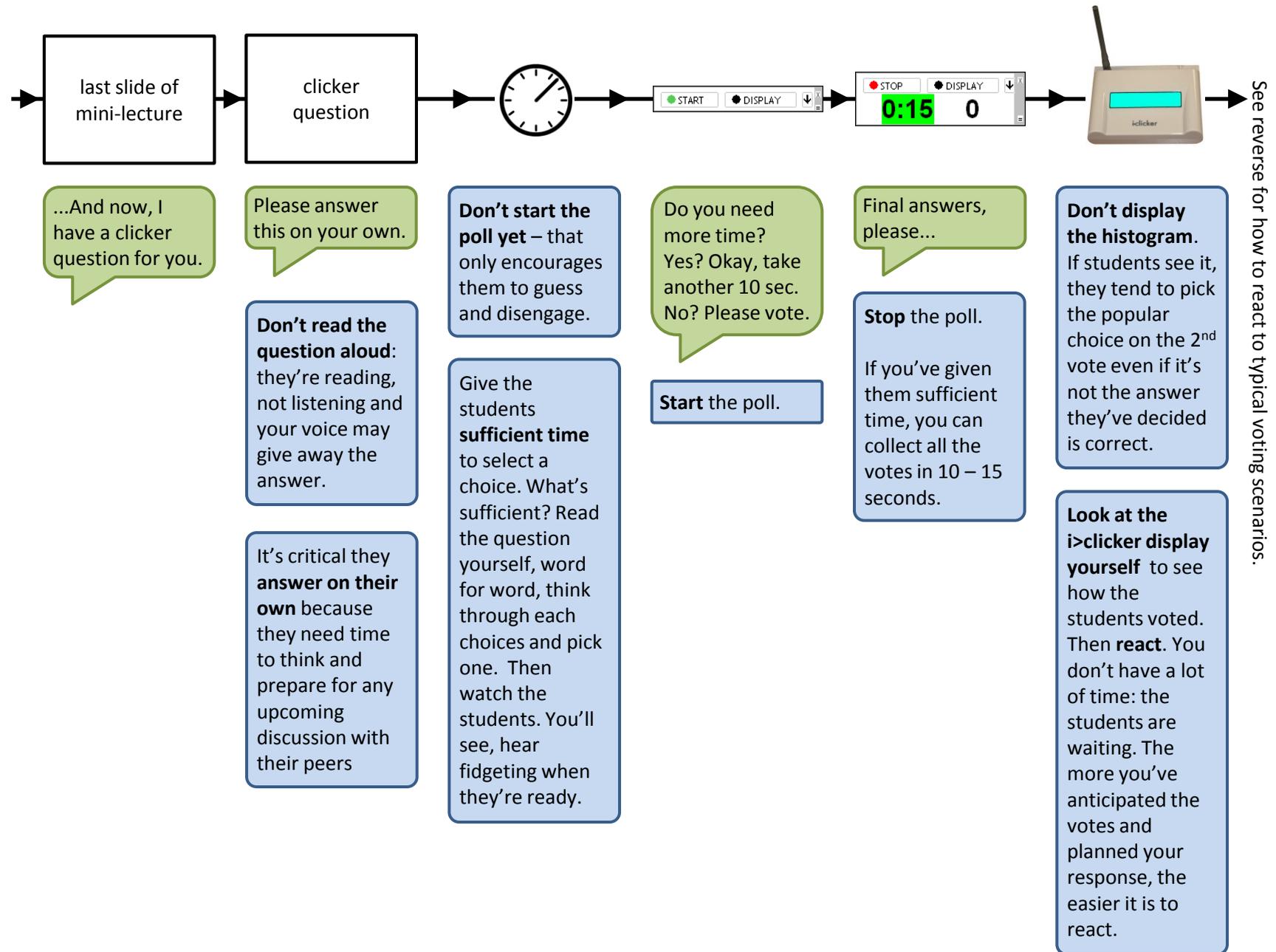
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Students learn better and retain knowledge longer when they are engaged and actively processing the concepts in class. Peer instruction using a classroom response system, commonly referred to as clickers, is an excellent option for creating a student-centered learning environment.

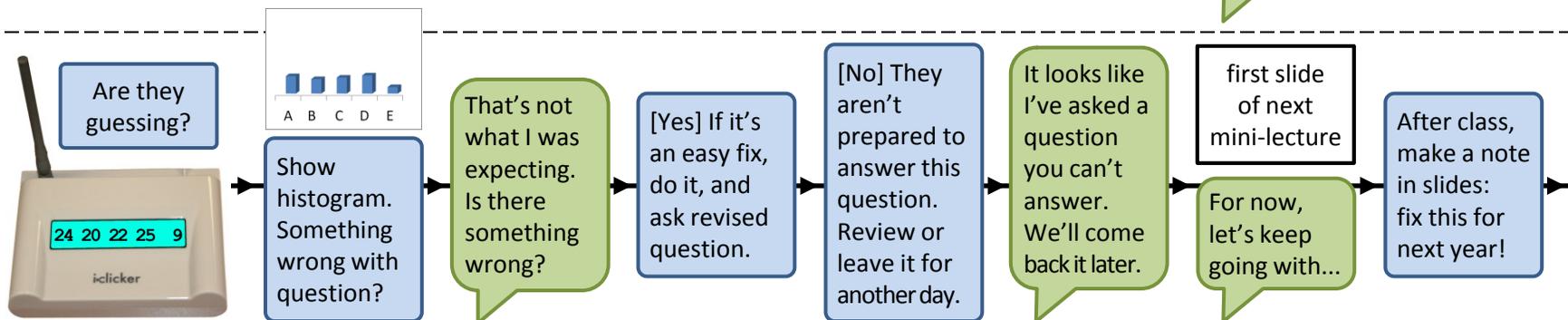
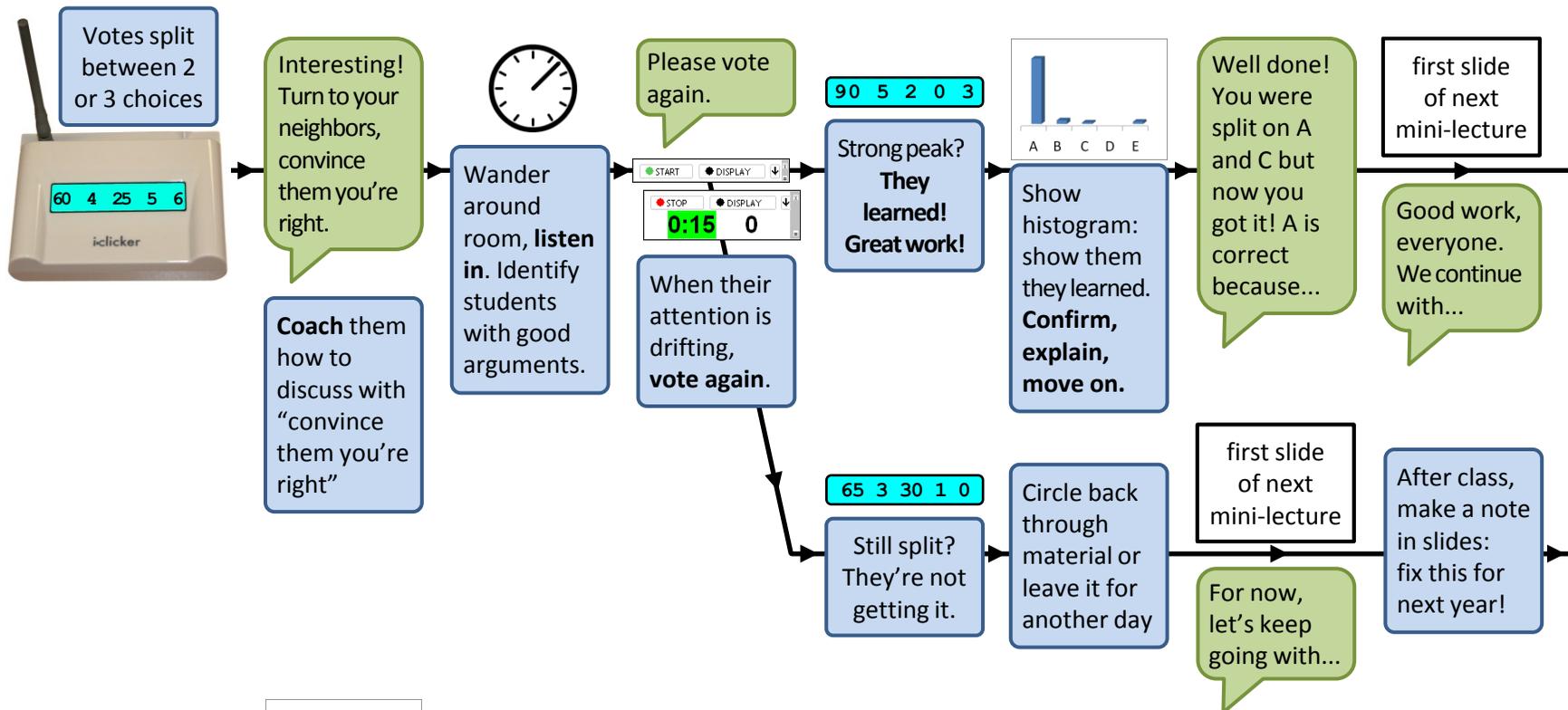
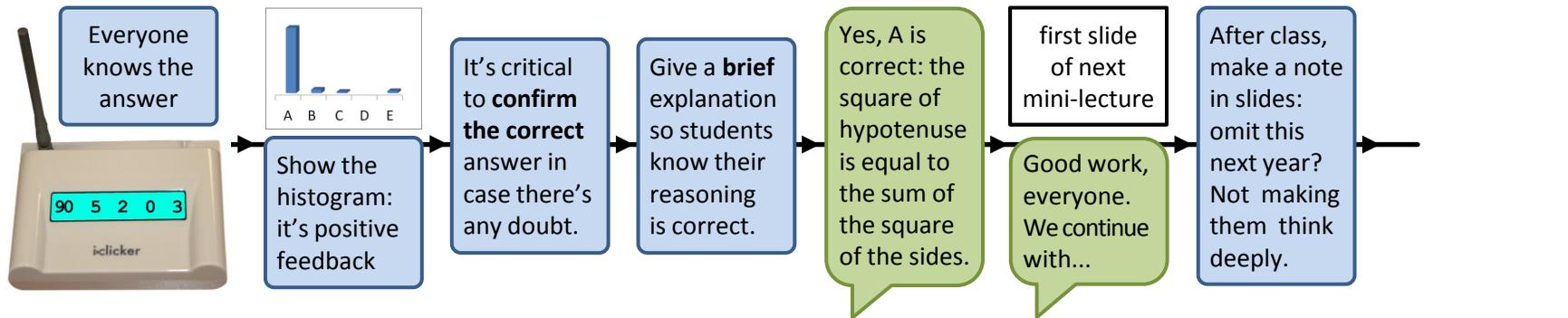
In an ideal episode of peer instruction,

1. the instructor poses a conceptually-challenging multiple-choice question,
2. students vote individually on the question,
3. the instructor, seeing a split between the correct answer and one or more common misconceptions, asks students to advocate for various choices and/or turn to their neighbors to discuss the concept,
4. after a discussion, the students vote again, this time with a vast majority of students choosing the correct answer.

With the right peer instruction choreography and some anticipation of how students will vote, you have an opportunity to make every clicker question a "golden moment" where students learn, right before your eyes. This pamphlet demonstrates and deconstructs an approach for running an effective peer instruction episode using the i>clicker system, giving options for reacting to students' clicker votes. This approach can easily be adapted to other technologies, even ABCDE flashcards, which allow the instructor to see the outcome of the votes before the students do.



What if...



## More possibilities

As you get more practice at anticipating the votes and reacting, start trying other options:

- on a split vote, instead of telling the students to turn to their neighbors, ask for volunteers to advocate for different choices. After moderating the discussion, get them to vote again.
- ask a question with more than one correct answer. Be sure the students don't feel you're tricking them, though.
- ask a question about attitudes or opinions. A question with no correct answer can stimulate class-wide discussion.

Peer instruction depends critically on using good questions. Think carefully about **when and why** you ask a question. For example,

- ask a question **before** introducing the new concept, to assess their prior knowledge, reveal a common misconception or capture their interest.
- ask a question **during** instruction to see if they're following along or to practice a new skill.
- ask a question **after** lesson to assess their grasp of the concept, if they can apply the knowledge to an unfamiliar situation.

Peer instruction allows you to create an effective, student-centered learning environment. Using your teaching agility and then witnessing students learn can be very rewarding.

## Resources

Teaching support in Physics and Astronomy at the University of British Columbia: [www.phas.ubc.ca/teaching-support](http://www.phas.ubc.ca/teaching-support)

Carl Wieman Science Education Initiative clicker resources: [www.cwsei.ubc.ca/resources/clickers.htm](http://www.cwsei.ubc.ca/resources/clickers.htm)

Videos by the Science Education Initiative at the University of Colorado (Boulder) provide excellent background for using clickers: [www.cwsei.ubc.ca/resources/SEI\\_video.html](http://www.cwsei.ubc.ca/resources/SEI_video.html)

*Teaching with Classroom Response Systems* by Derek Bruff (2009) and *Peer Instruction* by Eric Mazur (1996) detail best practices and contain many examples of clicker questions.

Peer Instruction network: [blog.peerinstruction.net](http://blog.peerinstruction.net)

Derek Bruff's blog and clicker bibliography: look under Clickers at [derekbruff.org](http://derekbruff.org)