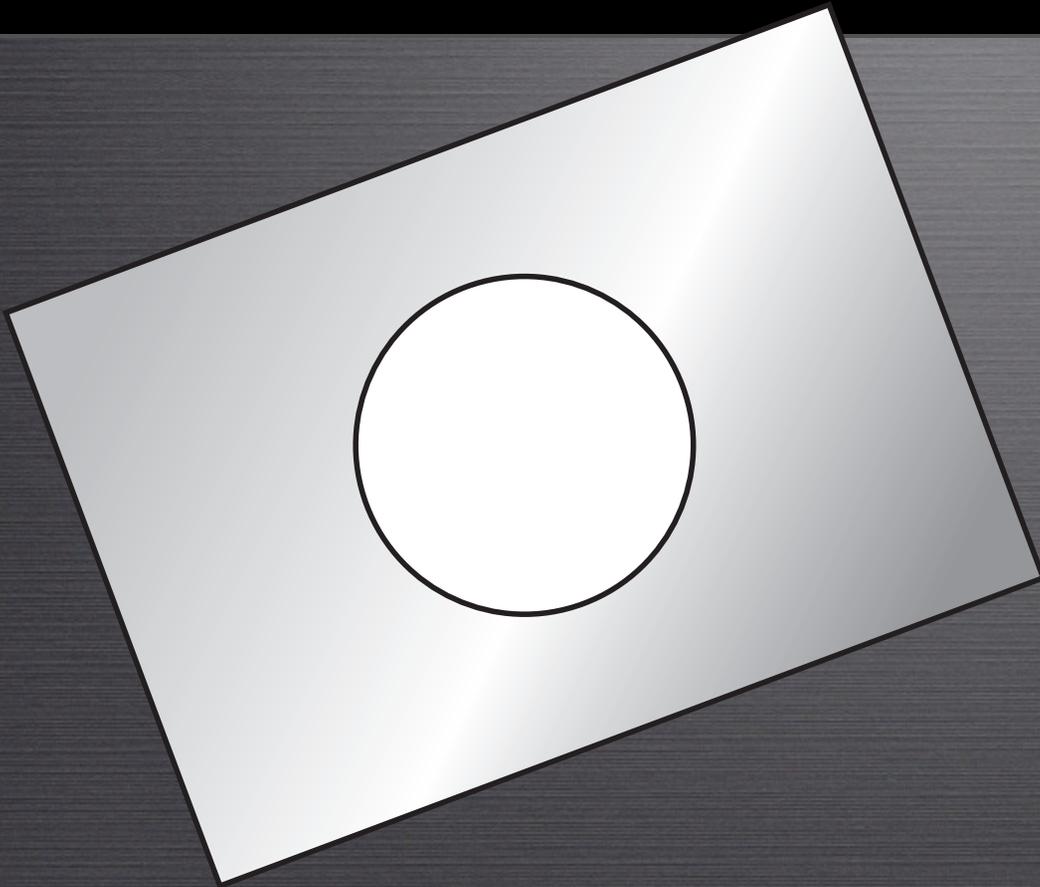


Flip Class Question Design Workshop



Julie Schell
Sr. Educational Research Associate
Mazur Group, Harvard University

NCAT
Greensboro, NC
May 14, 2013
(c) Julie Schell

Goals

- Collaborate on characteristics of effective questions
- Analyze a series of questions
- Create new questions

Anatomy of a Question

Question categories

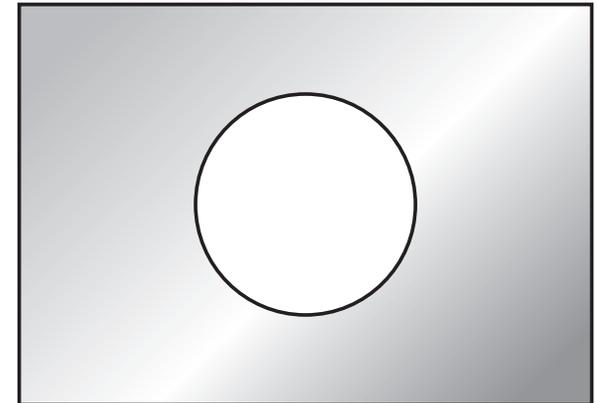
Multiple choice: Best when the universe of responses is known, when you know students' misconceptions

Constructed responses: Best when it is hard to anticipate student responses, and when a more authentic task is desired

Multiple choice

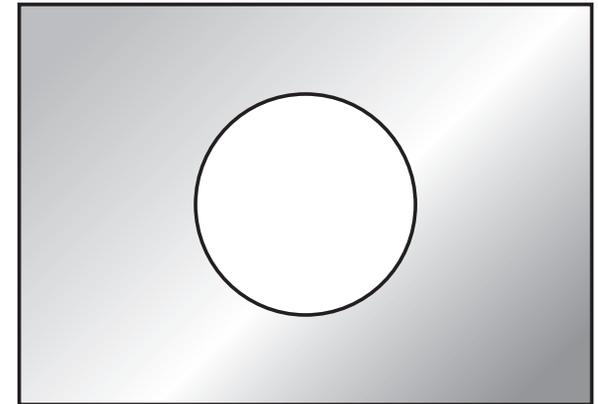
question stem { Consider a metal plate with a hole in it.
If you heat it uniformly what happens to
diameter of hole? } prompt

options { A. increases } Answer
B. stays the same }
C. decreases } Distractors



Constructed response

question stem { Consider a metal plate with a hole in it.
If you heat it uniformly what happens to
diameter of hole and why? } prompt



Things to consider...

Learning outcomes: Focus questions on key knowledge and abilities you want students to develop

ECR: Use questions to elicit, confront, and resolve student misconceptions or difficulties

Desirable difficulty: Aim for questions that are not too hard but not too easy

Diversify: Use questions to engage students in a variety of thinking skills

Bloom's Taxonomy

Create	putting together information in an innovative way
Evaluate	making judgements based on guidelines
Analyze	breaking things into parts, comparing and contrasting
Apply	using learning in new ways
Understand	making sense of what is learned
Remember	recalling what is learned

Bloom's Taxonomy

Traditional Arrangement						
Instructional Design	In-class		Out-of-class			
Bloom's Taxonomy	Remember	Understand	Apply	Analyze	Evaluate	Create

created by Josh Walker

Bloom's Taxonomy

Inverted "Flipped Classroom" Arrangement						
Instructional Design	Out-of-class		In-class			
Bloom's Taxonomy	Remember	Understand	Apply	Analyze	Evaluate	Create

created by Josh Walker

Case Study

Imagine you are teaching the Pythagorean Theorem — the well-known geometric theorem that the sum of the squares on the legs of a right triangle is equal to the square on the hypotenuse (the side opposite the right angle) or, in familiar algebraic notation, $a^2 + b^2 = c^2$. Students will watch a short video explaining the theorem and will answer a quiz question testing their understanding the next day in class.

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

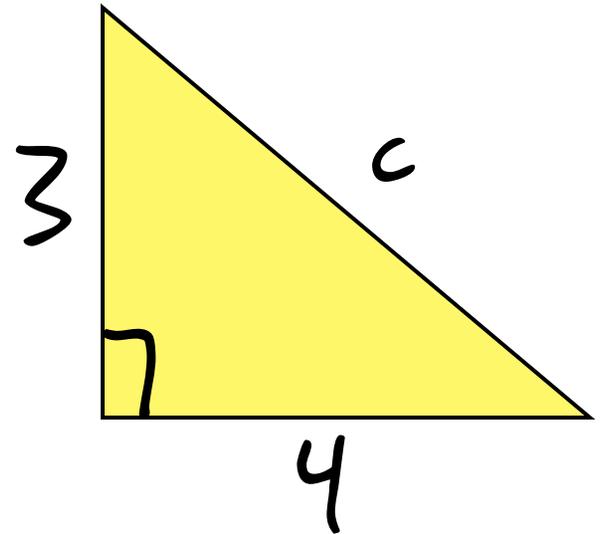
$$3^2 + 4^2 = c^2$$

$$9 + 16 = c^2$$

$$25 = c^2$$

$$\sqrt{25} = c$$

$$5 = c$$



Procedure

Begin worksheet

Round 1: 15 mins for individual component

Round 2: 20 minutes for pair component

Round 3: 15 minutes for individual component

What is the shortest distance between first and third base?

Bloom's Taxonomy: Prompts for Generating Questions

Level	Prompts
Remembering	Where is... What did... Who was... When did... How many... Locate it in the story... Point to the...
Understanding	Tell me in your own words... What does it mean... Give me an example of... Describe what... Make a map of... What is the main idea of...
Applying	What would happen to you if... Would you have done the same as... If you were there, would you... How would you solve the problem... In the library, find information about...
Analyzing	What things would you have used... What other ways could... What things are similar/different? What things couldn't have happened in real life? What kind of person is... What caused _____ to act the way she/he did?
Evaluating	Would you recommend this book? Why? Why not? Select the best... Why is it the best? What do you think will happen to... Why do you think that? Rank the events in order of importance. Which character would you most like to meet? Why? Was _____ good or bad? Why? Did you like the story? Why?
Creating	What would it be like if... What would it be like to live... Design a... Pretend you are a... What would have happened if... Why/why not? Use your imagination to draw a picture of... Add a new item on your own... Tell/write a different ending...

How to use questions to measure for deep learning

<http://bit.ly/ncat2013>

Acknowledgements

PEOPLE

Eric Mazur

Ives Araujo

Cassandra Alvarado

Brian Lukoff

James Fraser

Josh Walker

Nancy Duarte

James Fraser

BOOKS

Flip Your Classroom

Slide!Dology

Made to Stick



www.julieschell.com

@julieschell

