PEER INSTRUCTION: DISCUSSION AND "BRAINS-ON" DEMONSTRATION

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Why it works for students

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- focuses students on understanding
- gets students thinking
- uncovers misunderstandings
- builds confidence

Why it works for instructors

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- **modification, not drastic change**

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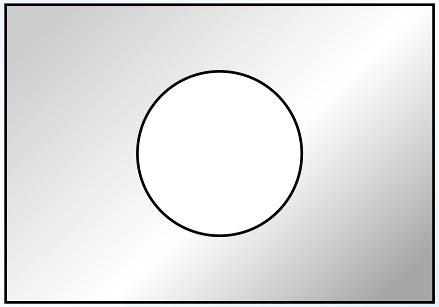
- modification, not drastic change
- adaptable
- resources (http://galileo.harvard.edu)

Outline

- **ConcepTests**
- **Feedback**
- **Problem with Problems**
- **Discussion**

Question 1

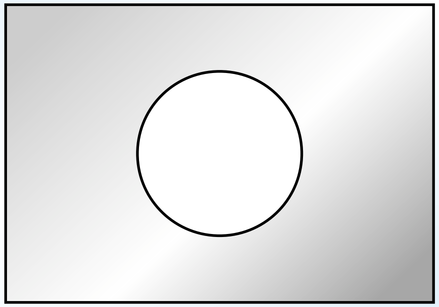
Consider a rectangular metal plate with a circular hole in it.



Question 1

Consider a rectangular metal plate with a circular hole in it.

When the plate is uniformly heated, the diameter of the hole



1. increases

2. stays the same

3. decreases

Message 1

It’s easy to fire up the audience!

Question 2

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Does the level of the water in the lake (with respect to the shore)

1. go up,

2. go down, or

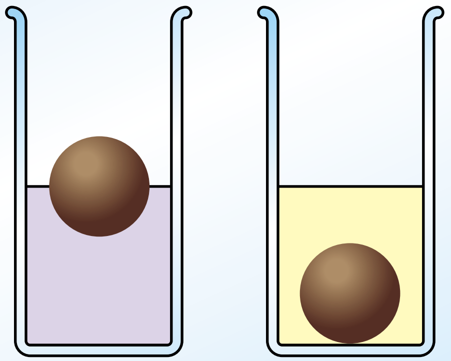
3. stay the same?

Message 2

We all make mistakes!

Question 3

Consider an object that floats in water but sinks in oil. When the object floats in water, half of it is submerged.



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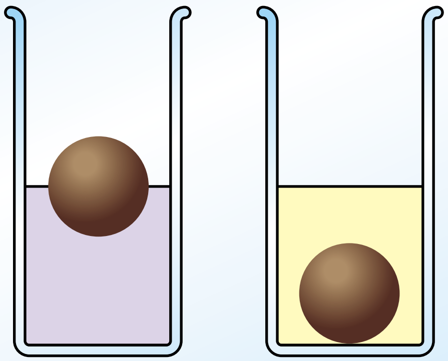
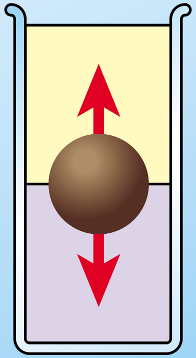


If we slowly pour oil on top of the water so it completely covers the object, the object

1. moves up.

2. stays in the same place.

3. moves down.



Message 3

It’s easy to make simple demonstrations fascinating!

Question 4

When we hold a page of printed text in front of a mirror, the text on the image in the mirror runs from right to left:

The New York Times

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Why is it that right and left are interchanged and not top and bottom? Because

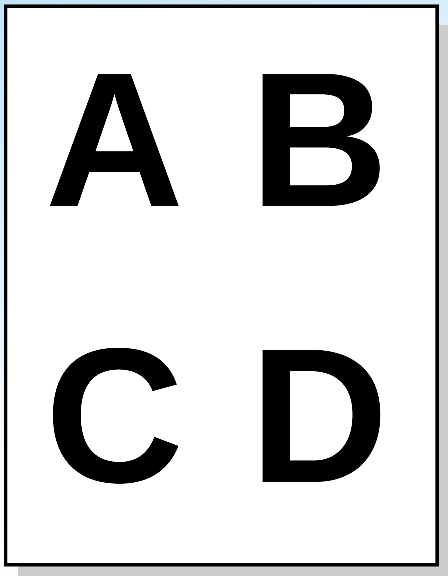
1. the mirror is oriented vertically,
2. we have two eyes in the horizontal plane,
3. the Earth’s gravitation is directed downward,
4. a habit we have when looking at images in a mirror,
5. It only *appears* to run from left to right.

Message 4

It's "simple" only if you know the answer

Feedback

Flashcards: simple and effective!

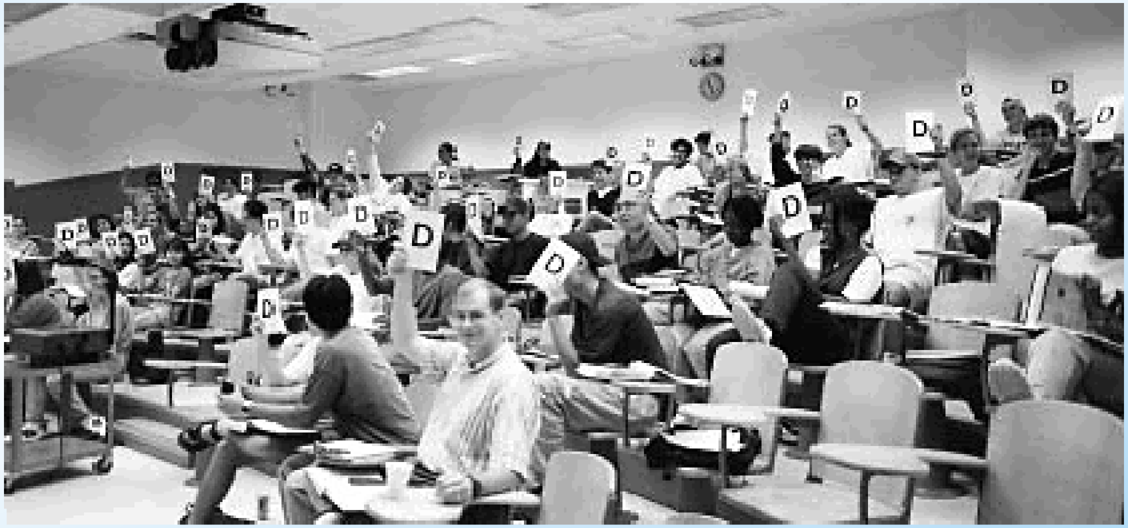


Feedback

Flashcards: simple and effective!

A B

C D



Feedback

Personal Response System (Varitronix, Hong Kong)

Problem with problems

On a Saturday afternoon, you pull into a parking lot with unmetered spaces near a shopping area. You circle around, but there are no empty spots. You decide to wait at one end of the lot, where you can see (and command) about 20 spaces.

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Requires assumptions
Requires developing a model
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Requires applying a (new) model

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Requires using a calculator

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- **Rewards for participation**
- **Noncompetitive grading**
- **Conceptual exam questions**

Resources

Peer Instruction: A User’s Manual **(Prentice Hall, 1997)**

http://galileo.harvard.edu

Funding

National Science Foundation

For a copy of this talk and additional information:

http://mazur-www.harvard.edu