TEACHING SCIENCE IN THE LARGE SECTION

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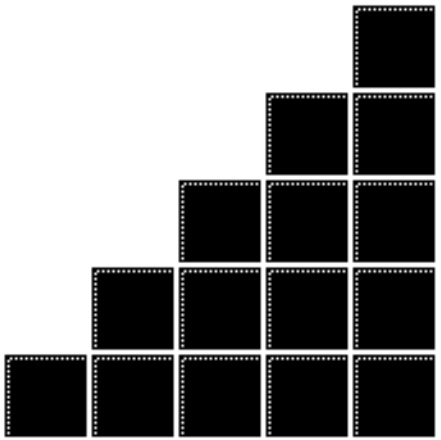
Seminar on Teaching the Large Section
Brigham Young University
18 May 1994



OUTLINE

1. Video
2. ConcepTests
3. Problems with problems
4. Peer instruction: how?

Question 1

A boat carrying a large boulder is floating on a lake. The boulder is thrown overboard and sinks to the bottom of the lake.

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

1. up,
2. down, or
3. stay the same?

Question 2

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.

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 downwards,
4. a habit we have when looking at images in a mirror,
5. of some other reason.

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The problem with problems

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

How would you go about figuring out how long you will have to wait before someone will free up a space?

Requires assumptions
Requires developing a model
Requires applying that model

The problem with problems

On a Saturday afternoon, you are pulling into a parking lot with unmetered spaces. You circle around but there are no empty spots. You decide to wait at one part of the lot from where you can see (and command) about 20 spaces. On average people shop for about 2 hours.

How long will you have to wait before someone will free up a space?

Requires developing a model
Requires applying that model

The problem with problems

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If people leave at regularly spaced intervals, how long will you have to wait before someone will free up a space?

Requires applying a model

The problem with problems

On a Saturday afternoon, you are pulling into a parking lot with unmetered spaces. You circle around but there are no empty spots. You decide to wait at one part of the lot from where you can see (and command) about 20 spaces. On average people shop for about 2 hours.

How long will you have to wait before someone will free up a space?

Requires using a calculator

$$t_{wait} = \frac{T_{shop}}{N_{spaces}}$$

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