Developing interactive lectures

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What is an interactive lecture?

❖ Class meeting in which the instructor takes at least one <u>break from lecturing</u> to conduct an activity in which <u>students work directly with course material</u>

(SERC Starting Point, Intro Geo)

What are the benefits?

❖ Interactive lecture methods:

  ❖ are preferred by students

  ❖ improve student retention

  ❖ promote deeper understanding of course material (McConnell et al., 2003)

❖ Provides instructor with real-time feedback about student understanding of course material

❖ Interactive lecture techniques cater to a wider variety of learning styles than traditional lecturing

What are (some) challenges?

❖ Time
  ❖ Need to sacrifice course content to make time for in-class activities.
  ❖ Designing an activity takes time.
  ❖ Some students will finish activities earlier than others.

❖ Student population
  ❖ Students likely used to traditional lecture courses and may be uncomfortable with an interactive format.

❖ Implementation
  ❖ Ease of implementation is influenced by class size, classroom setup, availability of technology, etc.
  ❖ Anxiety: what if the activity completely bombs?

Some interactive lecture strategies

- ❖ Think-pair-share
- ❖ ConcepTest
- ❖ Demonstration
- ❖ Working with data
- ❖ Jigsaw activity
- ❖ Gallery walk

Think-pair-share

❖ Think: Students think <u>individually</u> about a response to a question.

❖ Pair: Students discuss their responses with a partner or in small groups.

❖ Share: Instructor asks selected groups for responses.

http://serc.carleton.edu/introgeo/interactive/tpshare.html

ConcepTests

❖ Quick, conceptual multiple-choice questions embedded in the lecture

❖ Administered during class to assess student understanding in real time

❖ Allows anonymous answers to questions

❖ Can be implemented with or without technology

    ❖ Classroom Personal Response Systems ("clickers")

        ❖ Tallies and displays student responses

    ❖ index cards

ConcepTest example

Examine the image of rock layers below. Which letter represents the layer that was formed first?
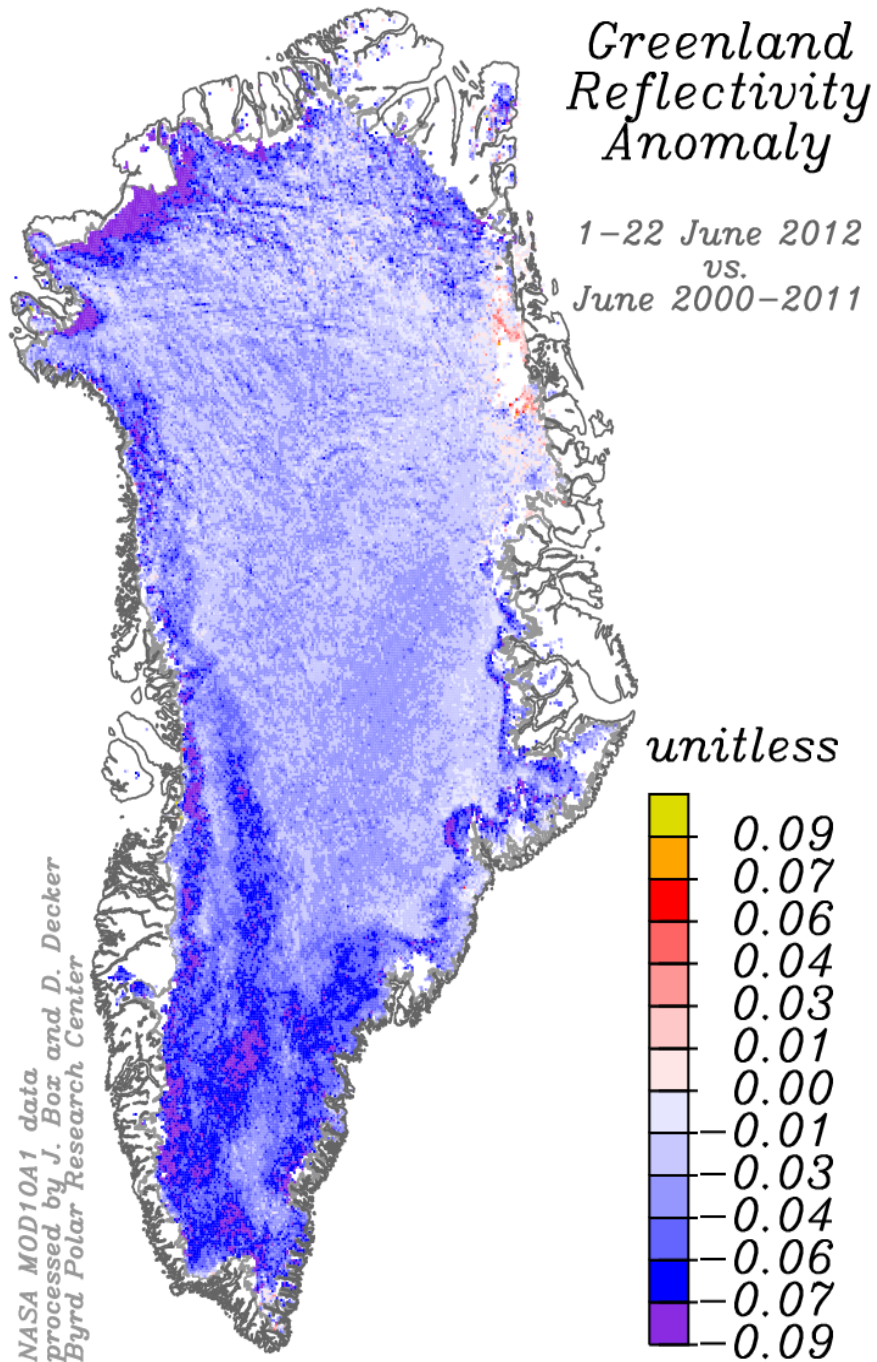
a. A
b. B
c. C
d. D

Image courtesy of USGS

Demonstrations

❖ Significantly shorter than lab exercises

❖ Depending on time constraints, may do a predictive demonstration

   ❖ Predict: What do you expect?
   ❖ Run demonstration
   ❖ Reflect: Were your results what you predicted?

❖ Example of a quick demonstration: water column properties

http://serc.carleton.edu/introgeo/demonstrations/index.html

Working with data

❖ Using data in a way that:
   ❖ Utilizes geoscience habits of mind
   ❖ Allows students to explore uncertainty in data
   ❖ Builds students' quantitative and critical reasoning

❖ Essential elements:
   ❖ Careful planning
   ❖ Adequate time to implement the exercise, including wrap-up

❖ Example of a quick exercise dealing with data: Greenland reflectivity anomalies

http://serc.carleton.edu/usingdata/index.html

Greenland Reflectivity Anomaly

1–22 June 2012
vs.
June 2000–2011

unitless

0.09	
0.07	
0.06	
0.04	
0.03	
0.01	
0.00	
−0.01	
−0.03	
−0.04	
−0.06	
−0.07	
−0.09	

NASA MOD10A1 data
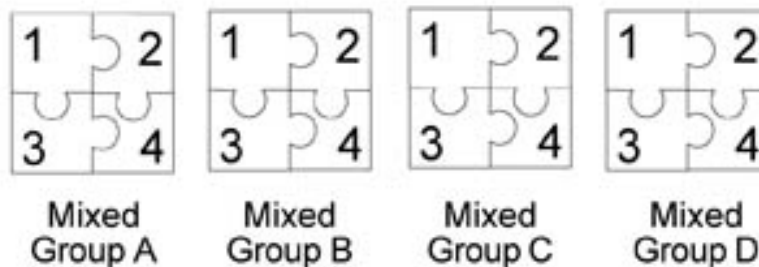processed by J. Box and D. Decker
Byrd Polar Research Center

Byrd Polar Research Center

Jigsaw activity

❖ Small-group work in which students teach each other.

❖ Each team prepares a different topic.

Team 1   Team 2   Team 3   Team 4
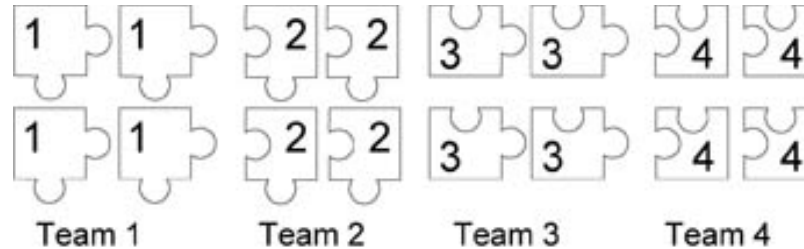
❖ Mixed groups convene, teach each other, and solve a problem that requires input from each member.

Mixed Group A   Mixed Group B   Mixed Group C   Mixed Group D

http://serc.carleton.edu/NAGTWorkshops/coursedesign/tutorial/jigsaw.html

Gallery walks

- ❖ Effective for team building, organizing ideas, synthesis, and physical movement during class

- ❖ Questions posted on large pieces of paper around the classroom.

- ❖ In small groups, students visit each station, review other groups' responses, and add to the existing responses.

- ❖ When the group returns to its original station, they synthesize the responses and report to the class.

- ❖ Example: *Geomagical Mystery Tour of Pitt Campus (Yes— gallery walks can be done outdoors and even in an urban environment!*)

http://serc.carleton.edu/introgeo/gallerywalk/index.html

Your turn

❖ Take _____ minutes on your own and think of one interactive lecture activity for a course that you teach, have taught, or would like to teach.

❖ Include a general outline, class time required, how you will assess its effectiveness, and challenges of implementing the activity

❖ Reminder--we discussed the following techniques:

  ❖ think-pair-share

  ❖ conceptests

  ❖ demonstrations

  ❖ working with data

  ❖ jigsaw activity

  ❖ gallery walk

Share your idea with someone you don't already know

❖ Each person describes his/her activity.

❖ Each person offers feedback about his/her partner's activity.