Active Learning in a large lecture classroom

120-150 non-science majors
GE Intro to Physical Geology “lecture” section *(with labs taught by TAs)*
Large(ish) lecture hall

Rachel Teasdale, EER 2016
Challenges

Time\(^1\)- too many topics in my syllabus
Solution- Triage the syllabus- what topics *need* more/less attention?

Time\(^2\)- 50 minute class periods
Known: For any given topic, interactive lecture format *will* take longer than traditional lecture

Solution- skip the textbook stuff- they can read!!!!
(& take graded reading quizzes daily!)
Time$^3$: What works? (for me & for students)

Solution (?): PLAN PLAN PLAN!
- Start small
- Steal resources (InTeGrate/SERC etc.)

Be ok with stuff not working, reflect, revise, repeat

My Activities Goal:
One activity each class period to have students work together...
- with the use of data &/or
- on topics relevant to them &/or
- on topics relevant to northern California regions
- Interact with me (a little)

Reality:
Pretty much works- not all are clever, but get better every term:
Can we do interactive activities with a big group? How?

Turn them into a bunch of small groups.
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Turn them into a bunch of small groups
Pod Activities- work together, local
Recurring Map

ID Coast Lines
Mtns (Sierra, accretionary terrains)
Structural Geology (Basin & Range, SAF)

For later use on sea level change,
Geologic dev western N. Am;
EQ hazards
Pod Activities (work together, local, relevant)

“Think – Pair – Share” format

Example:
Where is the best place to build your dream home?

a)
b)

WHY???

How does Sacramento River play into politics of northern California?
Pod Activities (work together, local, relevant)

“Think – Pair – Share” format

(After answering MC question):
Find location of Sacramento River on map of Northern California. Where are headwaters, where does it drain to?

How does Sacramento River play into politics of northern California?
Pod Activities: Use of data

**What is it? (Keeling Curve)**

[Graph showing atmospheric CO₂ levels over time with a seasonal variation inset.]

What happened here?

https://scripps.ucsd.edu/programs/keelingcurve/
Pod Activities: Use of data, scientific collaboration, work like scientists

Monday Morning Meeting:
Jigsaw- 4 types of data, each pod reviews time series data to become “experts”

http://nagt.org/nagt/teaching_resources/vepp/examples/48383.html
Pod Activities: Use of data, scientific collaboration, work like scientists

Monday Morning Meeting:
Jigsaw- 4 types of data, each pod reviews time series data to become “experts”

Experts discuss trends (earthquake locations & frequency, tilt data)

2nd day: Class reconfigures to one discipline expert per group,
Discuss data trends,
make eruption forecast

http://nagt.org/nagt/teaching_resources/vepp/examples/48383.html
Student buy in (especially pre-work)

Structure of my class:
Give ‘em points for doing what I want them to **do** (learn!)

- a. Participation in class (stuff they turn in)
- b. Reading assignments (w/ Bb quizzes that close before class)
- c. Exams
- d. Labs

<table>
<thead>
<tr>
<th>Graded Item</th>
<th>% Possible</th>
<th>% Earned</th>
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<tbody>
<tr>
<td>Lecture Class Participation</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Reading Quizzes</td>
<td>10%</td>
<td></td>
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<tr>
<td>Lecture Exam 1</td>
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<tr>
<td>Lecture Exam 2</td>
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<td>Lecture Exam 3</td>
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<tr>
<td>Labs + Lab Exams</td>
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<tr>
<td><strong>Total Points Possible</strong></td>
<td><strong>100 %</strong></td>
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Group Exams

Exams: Similar format as class activities
multiple choice questions
short answer: concept maps/sketches
both practiced during class, individually & with pod

1st day of exam is MC + short answer
worth ¾ of exam score
taken as individuals
2nd day of exam is optional, in pods,
MC only
worth ¼ of exam score

Results
• 2nd day of exam scores
  = avg score increases by ~7 pts
• Max scores go up 4 points

http://serc.carleton.edu/68879