Examples of Active Learning

Rachel Teasdale
California State University Chico
(Comprehensive Univ)

Intro course: 100-120 students, lecture theaters
Lab sections taught by TAs
Some undergraduate SA
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Challenges- Time & Space

1. Time in semester:
   Triage the syllabus- what do they need to know to accomplish course learning goals? (omit the rest)

2. Time per class period:
   Move some content to pre-class work (flip?)-
   • Use videos (Google: Geoscience Videos Youtube McConnell)
   • Pre class readings (USGS Fact Sheets, compilations)
   • (NO TEXTBOOK!)

Geoscience Videos: https://www.youtube.com/watch?v=Pih-dbA-AOA
(Google: Geoscience Videos Youtube McConnell)
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3. Time to create/prepare lessons
   - Go to workshop with dedicated work time (!!!)
   - Use pre-prepared materials (InTeGrate, Teach the Earth, NSF & more!)

   • PLAN
   • START SMALL (Manageable!)
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Challenges- Time & Space

4. Space- lecture theater?

How can we do interactive activities with big groups?

**Turn them into a bunch of small groups:**
(every day)

My Goal: Every Class Period:

- One activity with students working together
  - with the data &/or
  - on topics relevant to them &/or
  - on topics relevant to northern California regions
- *I get to interact with students & assess their learning*
Examples of Active Learning: Think Pair Share

**Instructor:** Asks a question during class

**Students:** think (write in notebook) independently
(on instruction) **pair** with other student to compare answers
(on instruction) **share** with rest of class

Where is the best place to build your dream home?
- Location a, b or c?

Why?

How does the Sacramento River play into political considerations of northern California?

SERC Starting Point: [https://serc.carleton.edu/introgeo/interactive/tpshare.html](https://serc.carleton.edu/introgeo/interactive/tpshare.html)
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**Where is the best place to build your dream home?**

- Location a, b or c?
- d = I don’t know

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**Clickers - instant feedback**

- [https://www.polleverywhere.com/](https://www.polleverywhere.com/)
- [https://www.menti.com/](https://www.menti.com/)
- (lots of options!)

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**SERC Starting Point:** [https://serc.carleton.edu/introgeo/interactive/tpshare.html](https://serc.carleton.edu/introgeo/interactive/tpshare.html)
Examples of Active Learning: Gallery Walk

Students work in groups to examine hazards maps,

- ID hazards for 1\textsuperscript{st} county, rotate
- ID hazards for 2\textsuperscript{nd} county, rotate
- ID hazards for 3\textsuperscript{rd} county, rotate
- Compare hazards in 3 counties

- Make a Geologic Hazards brochure for one county

More at: https://serc.carleton.edu/introgeo/gallerywalk/what.html
Examples of Active Learning: Gallery Walk

- ID hazards for 1st county, rotate
- ID hazards for 2nd county, rotate
- ID hazards for 3rd county, rotate
- Compare hazards in 3 counties

*Modified* Gallery Walk - the county posters are passed among groups instead of having students move among stations

More at: [https://serc.carleton.edu/introgeo/gallerywalk/what.html](https://serc.carleton.edu/introgeo/gallerywalk/what.html)
[https://serc.carleton.edu/details/images/84486.html](https://serc.carleton.edu/details/images/84486.html)
Learning Outcome: Students will:

- Use geodetic data from Kilauea volcano to develop an eruption forecast
- Communicate future risks to surrounding communities

Assessment:
On the exam, students interpret, compare & contrast data sets (tilt, seismic, GPS and InSAR)

Activity: Jigsaw
Phase I: Learn “Expert” topics
Phase II: Mixed groups learn “non-expert” topics & assess eruption potential & alert levels

Example: GETSI (ITG) Volcanic Hazards & Communicating Risk
Monday Morning Meeting

Jigsaw: https://serc.carleton.edu/NAGTWorkshops/teaching_methods/jigsaws/index.html
Examples of Active Learning: Jigsaw

Expert Groups (day 1)

Mixed Groups (day 2)

Seating Today: Go to pod number on the worksheet you completed on Monday (ignore color coding)

In your new group, complete the worksheet:
HVO Monday Morning Meeting: Interpretation (1 per person)
Do NOT leave when done! (raise your hand & I’ll give next info)

More at: https://serc.carleton.edu/sp/library/jigsaws/index.html
Align the content and style of learning & assessment activities

**Exams:** Similar format as class activities
- MC questions (e.g. pre-class quizzes, in class Qs)
- Short Answer: concept maps/sketches

1st day of exam (Individual Exam)
  - MC + short answer
  - worth ¾ of exam score
  - taken as individuals

2nd day of exam (Group Exam)
  - MC only
  - worth ¼ of exam score
  - (optional, in working group)

**Results:** 2nd day of exam scores
- Avg score increases by ~5-10 pts
- Max scores increase ~5 pts
Align the content and style of learning & assessment activities

Give ‘em points for doing what I want them to **do** (learn!!--

a. Pre-class work (on Bb) 10%

b. In-class participation in class (stuff they turn in) 10%

c. Exams 15%, 17%, 18%

d. Labs 30%