

Maximizing Student Engagement in Large Classrooms

Rick Moore, Sally Wu, and Eric Fournier
Center for Teaching and Learning



Click the squirrel that matches your current mood

On this squirrel scale,
how do you feel today?



Powered by  **Poll Everywhere**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

When poll is active, respond at pollev.com/sallywu

Text **SALLYWU** to **37607** once to join

What is your experience with teaching large classes?

Have not taught a large class before

Taught 1-2 large classes

Taught 3-5 large classes

Taught 6-10 large classes

Taught 10+ large classes

Powered by  **Poll Everywhere**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

What are your biggest challenges or concerns about teaching a large class?

Powered by  **Poll Everywhere**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

Our workshop goals

- Learn some new engagement strategies
- Share your experiences with encouraging engagement in large courses with your peers
- Try out several engagement techniques from the perspective of a student
- Leave with an idea of how to increase engagement in one or more specific class sessions
- Spend the next few hours focused on teaching

How we'll get there

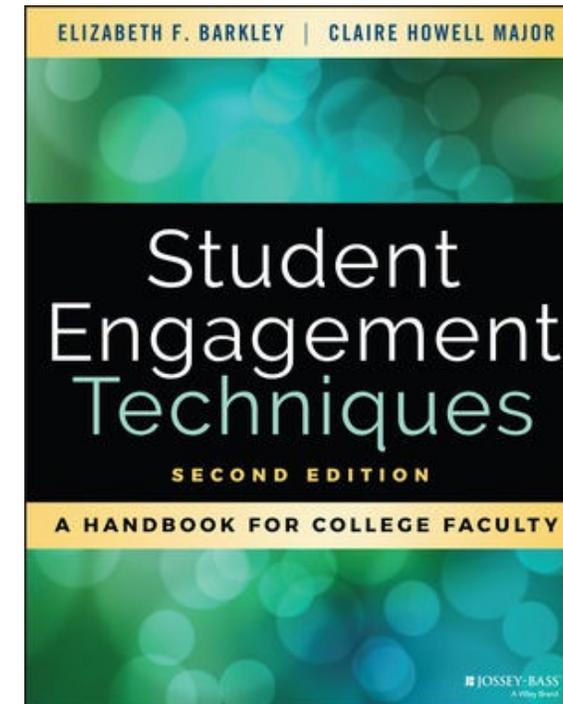
- Why Engagement Matters
- General Considerations for Engagement in Large Classes
- Mapping out a class
- Engagement Examples
- Wrap Up Discussion
- Throughout we'll weave engagement strategies and ideas
- And take a break around half-way

Why Engagement Matters

What is “engagement?”

- Different people mean different things by “engagement”

“Student engagement is the mental state students are in while learning, representing the intersection of feeling and thinking” (Barkley & Major, 2020, p. 6).



Why engagement matters

- We learn better when we actively engage material

(e.g. Deslauriers et al., 2019; Deslauriers et al., 2011; Eyler, 2018; Freeman et al., 2014; Holmes et al., 2015)



“En L'An 2000” (In the Year 2000), published in 1899

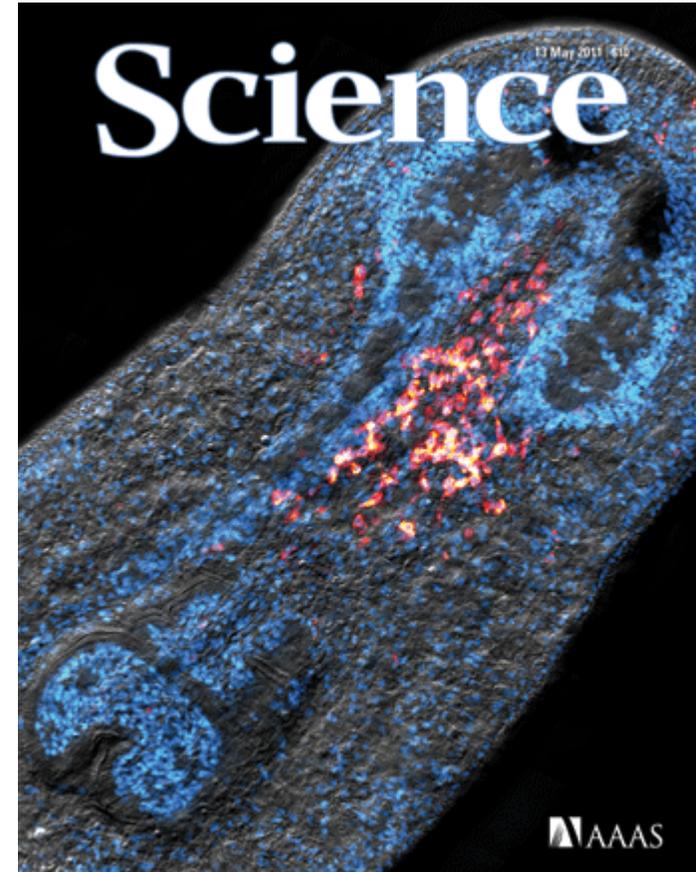
REPORT

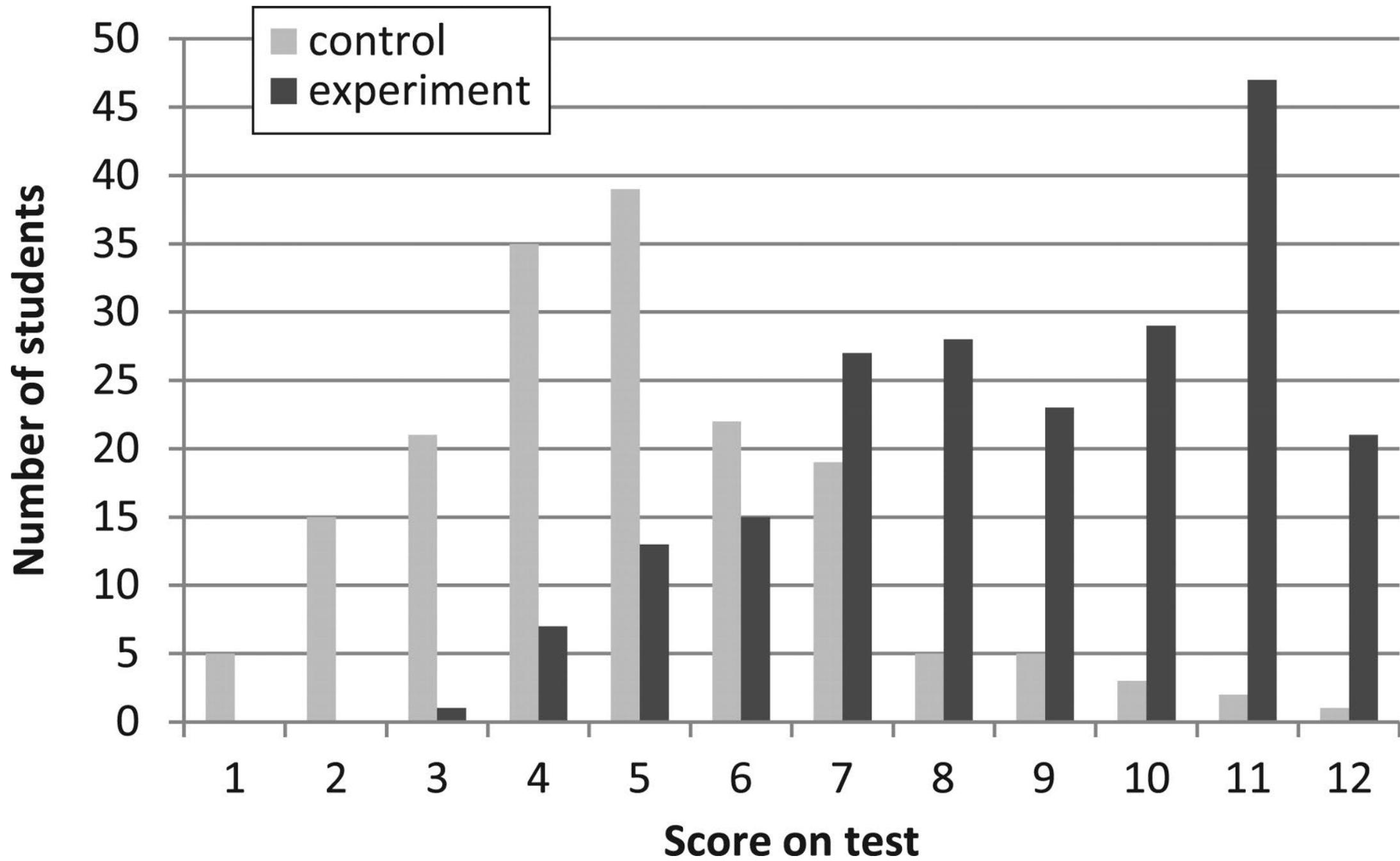
Improved Learning in a Large-Enrollment Physics Class

Louis Deslauriers^{1,2}, Ellen Schelew², Carl Wieman^{*,‡}

+ See all authors and affiliations

Science 13 May 2011:
Vol. 332, Issue 6031, pp. 862-864
DOI: 10.1126/science.1201783







Active learning increases student performance in science, engineering, and mathematics

[Scott Freeman](#) , [Sarah L. Eddy](#), [Miles McDonough](#), , and [Mary Pat Wenderoth](#) [Authors Info & Affiliations](#)

Edited* by Bruce Alberts, University of California, San Francisco, CA, and approved April 15, 2014 (received for review October 8, 2013)

May 12, 2014 | 111 (23) 8410-8415 | <https://doi.org/10.1073/pnas.1319030111>

Metanalysis of 225 studies
Engagement improves student outcomes

Why engagement matters

- We learn better when we actively engage material
(e.g. Deslauriers et al., 2019; Deslauriers et al., 2011; Eyler, 2018; Freeman et al., 2014; Holmes et al., 2015)
- It supports Diversity, Equity and Inclusion
(Ballen et al., 2017; Theobald et al., 2020)

Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math

[Elli J. Theobald](#) , [Mariah J. Hill](#), [Elisa Tran](#),  [+29](#), and [Scott Freeman](#)   [Authors Info & Affiliations](#)

Edited by Susan T. Fiske, Princeton University, Princeton, NJ, and approved February 7, 2020 (received for review September 27, 2019)

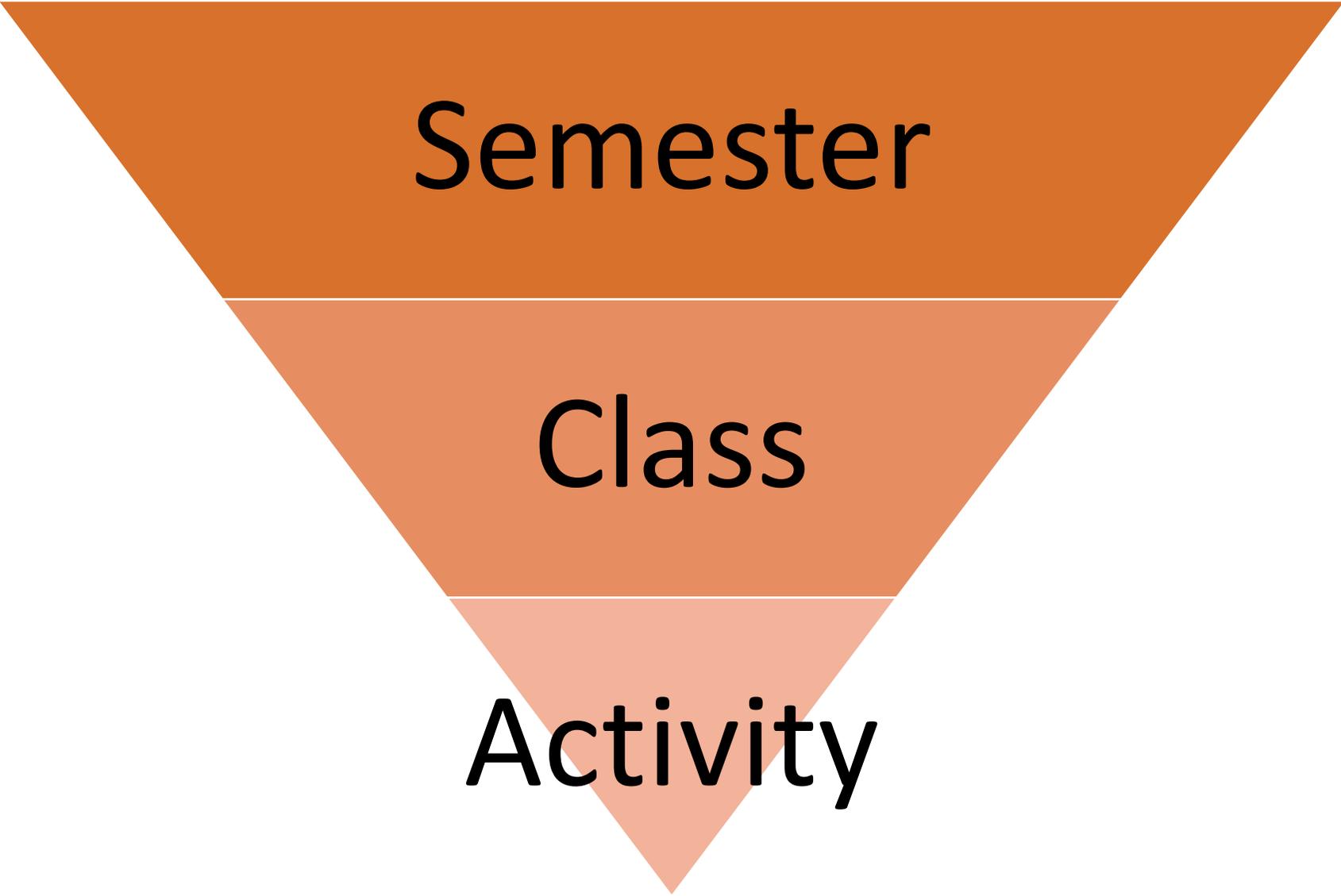
March 9, 2020 | 117 (12) 6476-6483 | <https://doi.org/10.1073/pnas.1916903117>

“Active learning benefits all students but offers disproportionate benefits for individuals from underrepresented groups. Widespread implementation of high-quality active learning can help reduce or eliminate achievement gaps in STEM courses and promote equity in higher education.”

Why engagement matters

- We learn better when we actively engage material
(e.g. Deslauriers et al., 2019; Deslauriers et al., 2011; Freeman et al., 2014; Homes et al., 2011)
- It supports Diversity, Equity and Inclusion
(Ballen et al., 2017; Theobald et al., 2020)
- It keeps students on task
Rick's story
- It's a fun way to teach!

General Considerations for Engagement in Large Classes



Semester

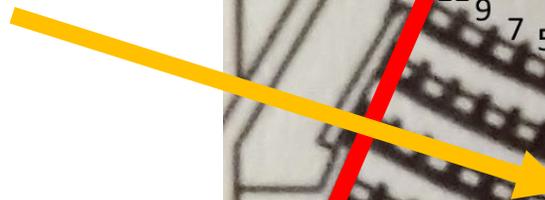
Class

Activity

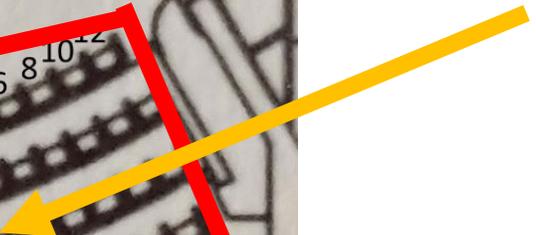
Semester Level Considerations

- How does engagement fit into your course?
 - Frequency? From completely flipped to occasional activities
 - Graded / ungraded?
 - If groups, assigned or self-selected?
 - If groups, do groups change or remain the same?

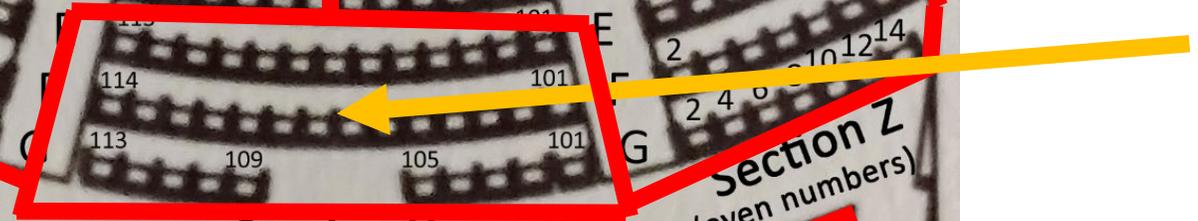
AI 1:



AI 3:

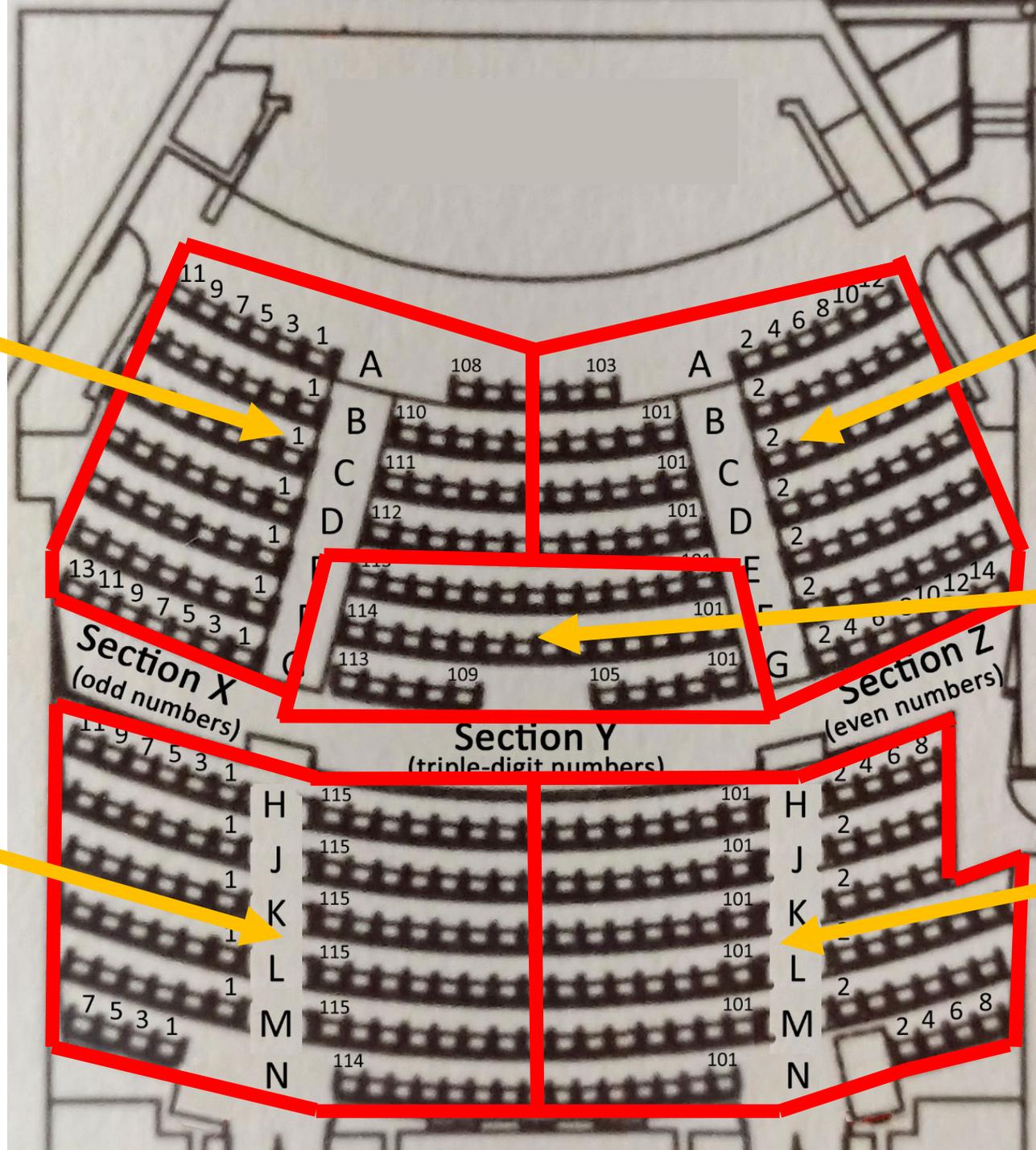
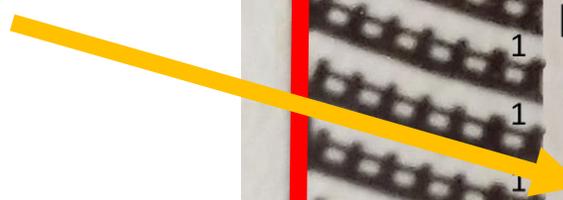


AI 4:



AI 5:

AI 2:



Semester Level Considerations

- How does engagement fit into your course?
 - Frequency? From completely flipped to occasional activities
 - Graded / ungraded?
 - If groups, assigned or self-selected?
 - If groups, do groups change or remain the same?
- Explain active engagement to your students
 - Tell them this will be an active class
 - Explain the structure
 - Explain why and the benefits
 - Build ground rules for discussion together



What are some other semester or course-level issues related to engagement?

Raise your hand and we'll hand you or toss you the microphone!



Interesting in reserving a classroom?

Learn more about reserving a room here

Find Your Classroom

Search Classrooms

example: Eads

Seating Capacity

Seating Style

Equipment

Wheelchair Accessible

Grid View List View

Somers Family Hall
251
45

McDonnell Hall
162
150

Jubel Hall
121
65

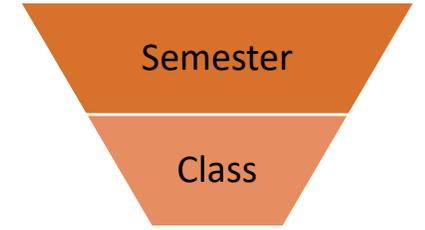
Jubel Hall
120
65

Weil Hall
010
30

McDonnell Hall
361
60

<https://ctl.wustl.edu/classrooms/>

Individual Class Level Considerations

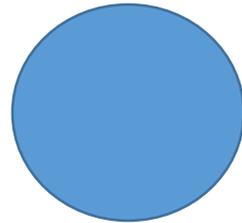


- What topics to focus engagement on
 - Target important learning goals
 - Target topics that lend themselves to active learning
- How long
 - Time you would need for an activity and how much time you can use
- When
 - Consider where an “attention reset” may be helpful in a session
- Start small
 - You don’t have to transform your course all at once

Discuss with a partner

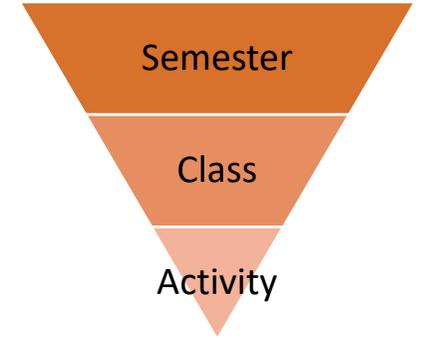
What are your initial thoughts on how much class time you want to make active? Why?

Time = 2 minutes



Time is up!

Kinds of activities

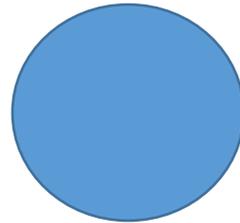


- Individual vs. group activities
- Something that encourages all students to do something
 - Wrestling with something better than just recall
 - Some activities are better than others at involving the whole class
- Desirable difficulty
 - Not too hard or too easy
- Examples
 - Synthesize ideas from readings, assignments, or lectures
 - Draw conclusions about tables, graphs, data, or text
 - Solve multi-step or complex problems

Discuss in groups of 3-4

What features make an activity in a large class work well?

Time = 4 minutes



Time is up!

Features for successful activity in a large class:

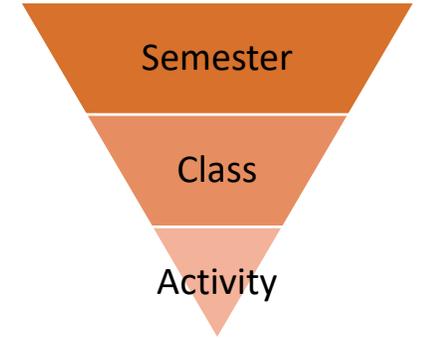


More features for successful activity in a large class:



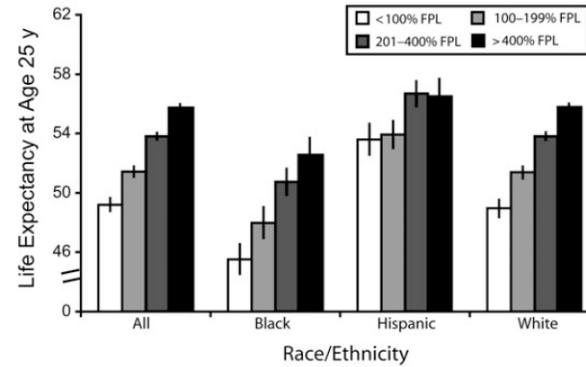
What helps an activity run smoothly?

- Be extra clear with instructions
 - Provide them in writing (slide, board, or handout)
- Legible slides



Discuss with a partner

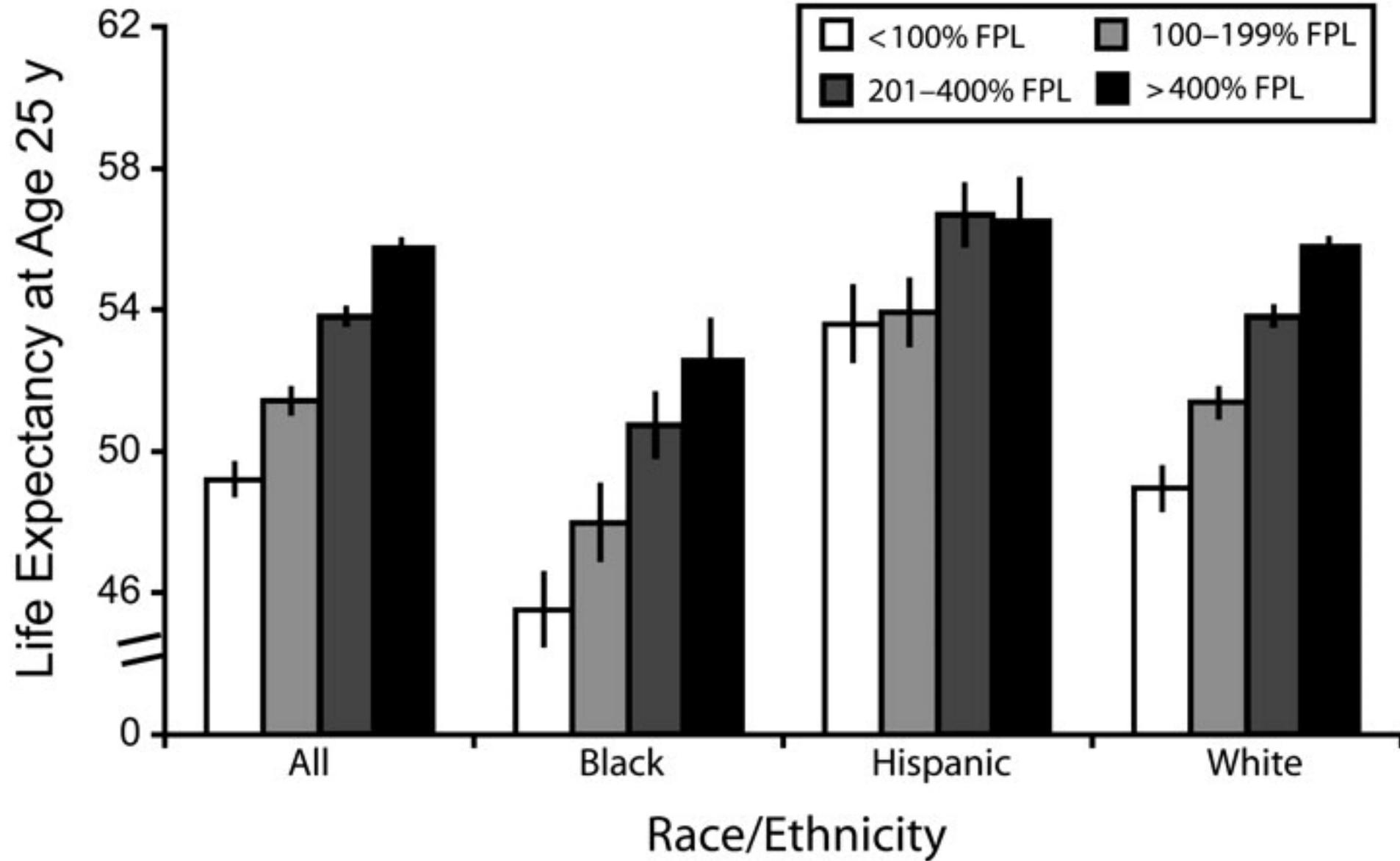
What does this graph tell us?



Discuss with a partner

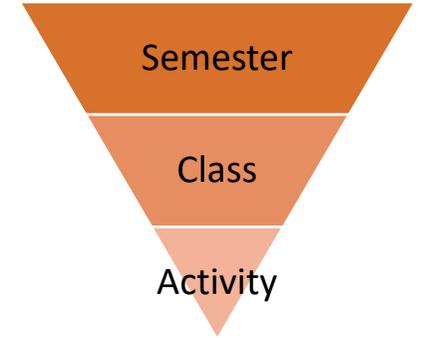
On the next slide there's a graph of income and life expectancy.

What does this graph tell us?



What helps an activity run smoothly?

- Be extra clear with instructions
 - Provide them in writing (slide, board, or handout)
- Legible slides
- Debrief
- Use cues to move class along

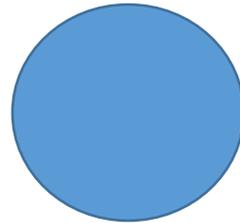


Discuss with a partner

What are your initial thoughts on how much class time you want to make active? Why?

Mark interactive slides differently (e.g. color)

Time = 2 minutes

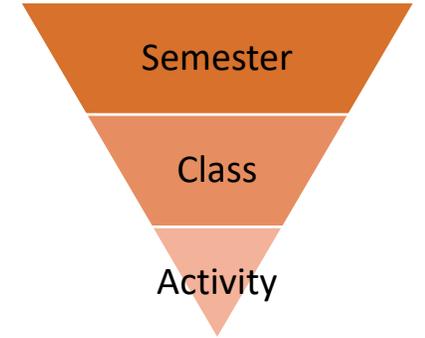


Time is up!

Use a visual timer

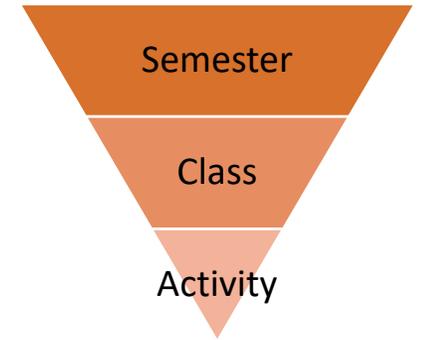
What helps group activities?

- **Group size**
 - 3-4 works well (although pairs can work too)
- **Requires collaboration:**
 - Takes more than 1 person to do
- **Assign roles in the group**
 - E.g. spokesperson, facilitator, recorder, etc.
 - Find ways to change roles up (e.g. earliest birthday is the recorder)
- **Group composition**
 - Self-selected or assigned



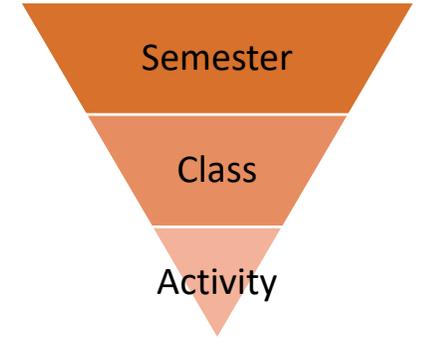
What do I do during activities?

- Walk around
- Observe
- Gently intervene
- Ask & answer questions
 - What part of the problem are you working on now?
 - Have you thought about X, Y, or Z?
- Deploy your AIs, if available
- Give groups a chance to get started before engaging



How should I wrap activities up?

- Many options
 - But best to do something
- Groups report out
 - Can also randomly select groups to report
- Groups hand something in
 - Or complete an online form, e.g. Google Forms
- Full-class discussion



On your own

3-2-1 Activity

Prompt:

- Three things you learned
- Two things you found interesting
- One thing you still have questions about

On your own

3-2-1 Activity

- Promotes metacognition (i.e. thinking about thinking)
- Can be turned in to give you feedback on how students are doing
- Works with multiple formats: Paper/Canvas/Google Forms/Poll Everywhere/etc.

On your own

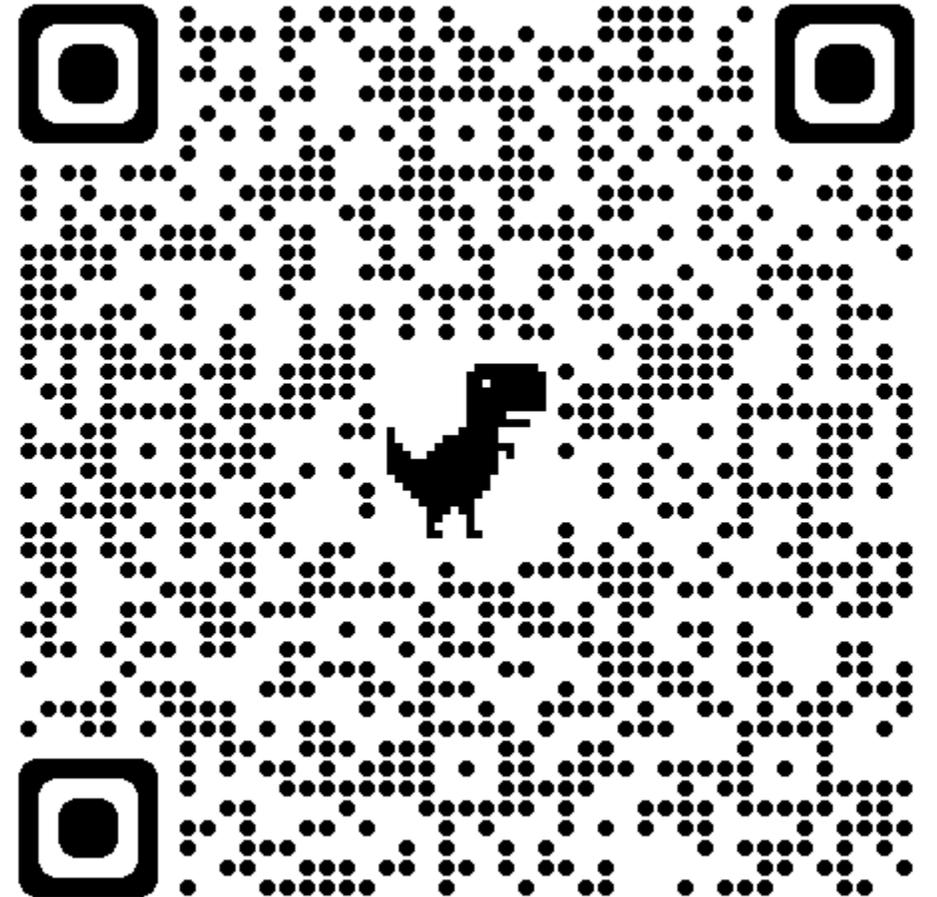
3-2-1 Activity

Go to:

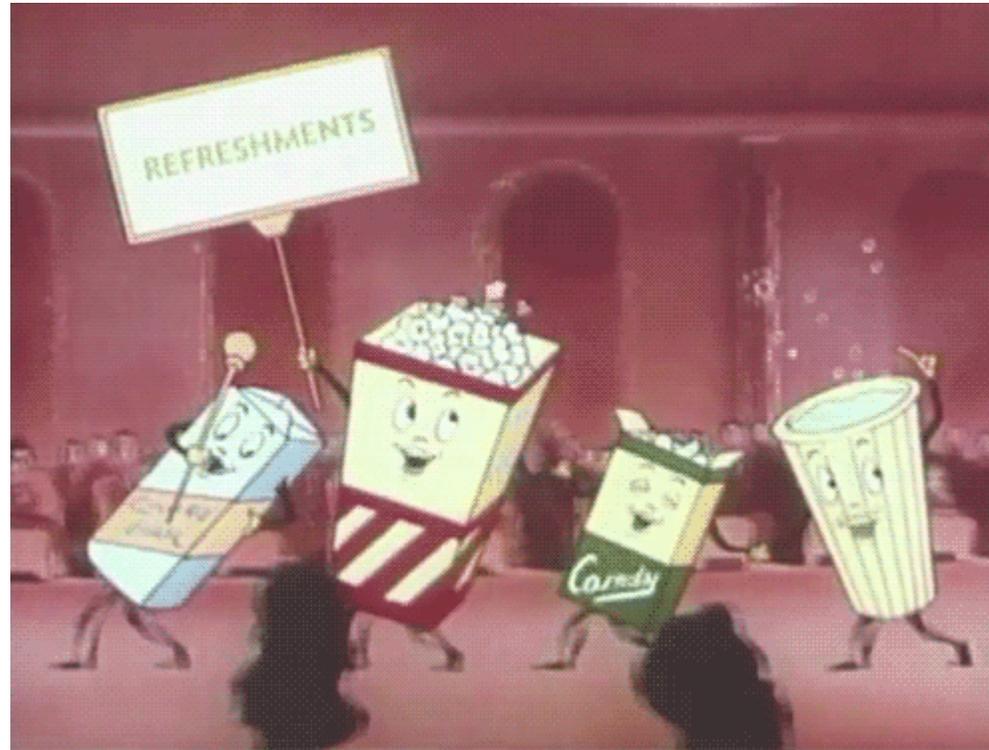
<https://ctl.wustl.edu/large/>

OR

Use QR code →



Intermission

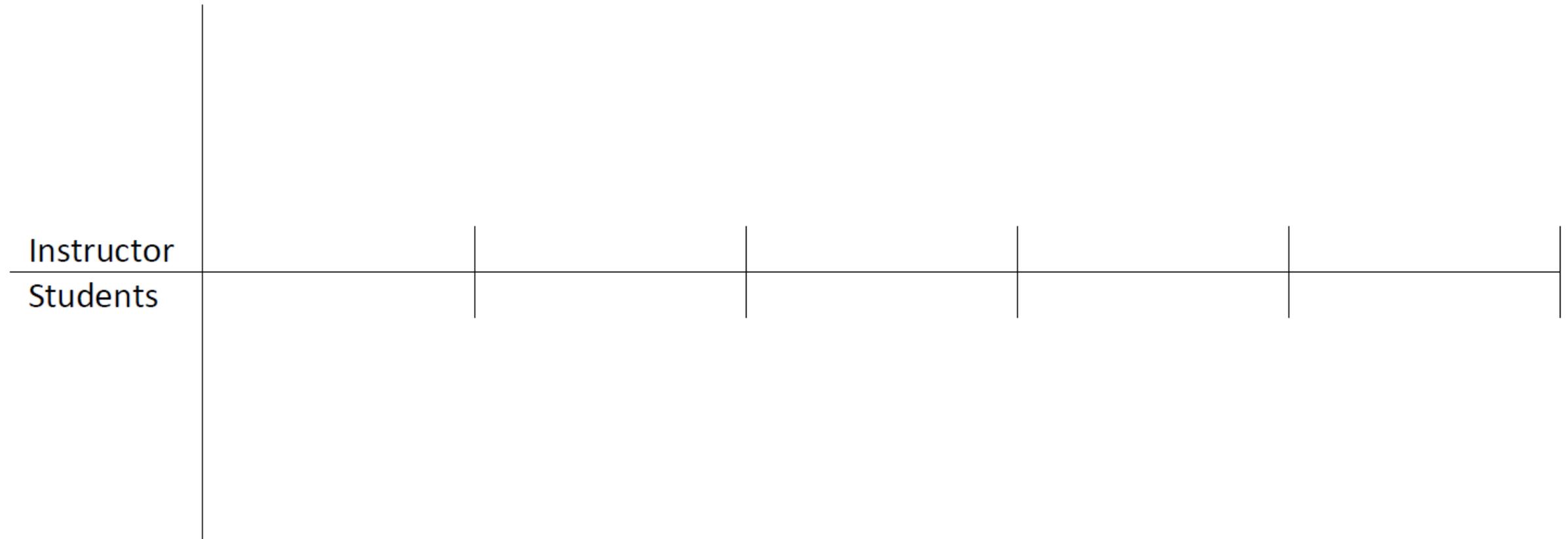


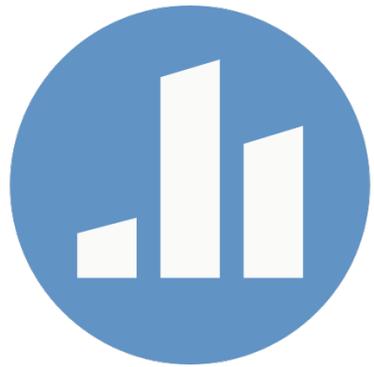
How we'll get there

- Why Engagement Matters
- General Considerations for Engagement in Large Classes
- Mapping out a class
- Activity Examples
- Discussions

Pick one class period and write in activities done by the instructor vs. students during the time period.

Write in the time at the tick marks. If teaching a ~50-min period, each mark is 10 minutes. If teaching a ~1.5 hour period, each mark is about 20 minutes.





Poll Everywhere

Click the squirrel that matches your current mood

On this squirrel scale,
how do you feel today?



Powered by  **Poll Everywhere**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

Check for understanding

Get ready to compete!

There are many different definitions of engagement. Which would NOT be a form of engagement that likely results in learning?

There are many different definitions of engagement. Which would NOT be a form of engagement that likely results in learning?

Explaining processes/mechanisms to a peer

Checking answers to practice problems

Opening students' brains and dumping in formulas

Writing key takeaways from a paragraph of text or figure

Debating Coke vs. Pepsi

Total Results: 0

There are many different definitions of engagement. Which would NOT be a form of engagement that likely results in learning?

Explaining processes/mechanisms to a peer

Checking answers to practice problems

Opening students' brains and dumping in formulas

Writing key takeaways from a paragraph of text or figure

Debating Coke vs. Pepsi

Leaderboard

Active learning narrows achievement gaps for underrepresented students

True

Probably true

Probably false

False

No clue

Total Results: 0

Powered by  **Poll Everywhere**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

Active learning narrows achievement gaps for underrepresented students

True

Probably true

Probably false

False

No clue

Which are ways to explain active learning to your students?

Select all that apply

Tell them it will be an active class

Explain the structure of activities

Explain why and the benefits

Build ground rules for discussion together

Give a grade for all activities

Total Results: 0

Powered by  Poll Everywhere

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

Which are ways to explain active learning to your students?

Select all that apply

Tell them it will be an active class

Explain the structure of activities

Explain why and the benefits

Build ground rules for discussion together

Give a grade for all activities

How many switches do you have to turn on in the Catchbox?

0, it's always on

1, the one on the wireless mic

2, on the wireless mic and catchbox

3, on wireless mic, catchbox, and at podium

Total Results: 0

Powered by  Poll Everywhere

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

How many switches do you have to turn on in the Catchbox?

0, it's always on

1, the one on the wireless mic

2, on the wireless mic and
catchbox

3, on wireless mic, catchbox,
and at podium

Leaderboard

What do you notice as a student in this room?

Powered by  **Poll Everywhere**

Start the presentation to see live content. For screen share software, share the entire screen. Get help at pollev.com/app

What would be helpful for you as a student in this class?

Top

What types of activities would be useful for you as an instructor in this or future workshops?

Learn about additional active learning strategies

Discuss teaching concerns and challenges (with potential solutions)

Plan out specific activities for my own class

Get help in developing activities for my own class

Learn about how I (and my AIs) can facilitate active learning activities

Learn about how to use classroom equipment/tools to facilitate activities

More Engagement Ideas

More engagement ideas & strategies

- Engagement Outside of Class
- Muddiest Point / Minute Papers
- Ideas to share out
- Prediction Activities

Engagement Outside of Class

Discuss in groups of 3-4

What are some ways to foster engagement outside of the classroom?

<https://ctl.wustl.edu/large/>

“Engagement Outside of Class”

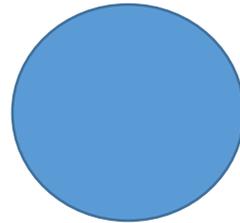
One person from each group submit your group’s ideas.

Muddiest Point / Minute Paper

Write on your own

What is your biggest remaining question about increasing engagement in large courses?

Time = 2 minutes



Time is up!

Variations

- Ways to turn it in (e.g. Canvas, Google Forms, Poll Everywhere, etc.)
- Small groups discuss and agree on 1 muddiest point for the group
- Minute paper: What is the most important thing you learned in class?

Ideas to Share Out

Class Discussion

You've done a group activity, what are some ways to have groups report on what they've done?

Prediction Activities

Christian:	70%	Buddhist:	0.7%
Muslim:	0.9%	Other:	1.5%
Jewish:	1.9%	Nones:	22.8%
Hindu:	0.7%	Atheist:	3.1%
		Agnostic:	4%
		Nothing in Particular:	15.8%

Prediction

- Works especially well where students have incorrect preconceptions
- Good at generating interest in subject
- Doesn't have to use numbers. E.g. What would the next step in the author's argument be?
- If distributing slides, make sure to not distribute answers ahead of time

Wrap Up

Strategies we discussed / tried

- Catchbox
- Think-Pair-Share (TPS)
- Small group discussion
- 3-2-1 Activity (exit ticket)
- Poll Everywhere
- Engagement outside of class
- Using Google Forms
- Prediction Activities
- Muddiest Point
- Ideas to share out

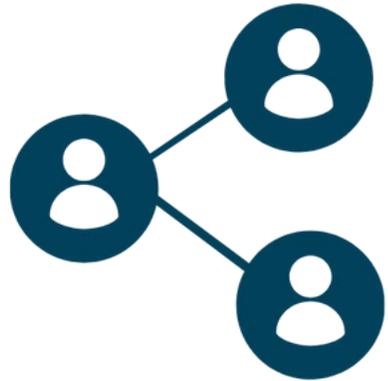
Discuss in groups of 3-4

What might you try differently as
a result of today's workshop?

What questions do you still
have?

References

- Ballen, C. J., Wieman, C., Salehi, S., Searle, J. B., & Zamudio, K. R. (2017). Enhancing diversity in undergraduate science: Self-efficacy drives performance gains with active learning. *CBE Life Sciences Education*, 16(4).
<https://doi.org/10.1187/cbe.16-12-0344>
- Deslauriers, L., McCarty, L. S., Miller, K., Callaghan, K., & Kestin, G. (2019). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences*, 116(39), 19251–19257. <https://doi.org/10.1073/pnas.1821936116>
- Deslauriers, L., Schelew, E., & Wieman, C. (2011). Improved learning in a large-enrollment physics class. *Science*, 332(6031), 862–864. <https://doi.org/10.1126/science.1201783>
- Eyler, J. R. (2018). *How humans learn: The science and stories behind effective college teaching*. West Virginia University Press.
- Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences*, 111(23), 8410–8415. <https://doi.org/10.1073/pnas.1319030111>
- Holmes, N. G., Wieman, C. E., & Bonn, D. A. (2015). Teaching critical thinking. *Proceedings of the National Academy of Sciences*, 112(36), 11199–11204. <https://doi.org/10.1073/pnas.1505329112>
- Theobald, E. J., Hill, M. J., Tran, E., Agrawal, S., Arroyo, E. N., Behling, S., Chambwe, N., Cintrón, D. L., Cooper, J. D., Dunster, G., Grummer, J. A., Hennessey, K., Hsiao, J., Iranon, N., Jones, L., Jordt, H., Keller, M., Lacey, M. E., Littlefield, C. E., ... Freeman, S. (2020). Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math. *Proceedings of the National Academy of Sciences*.
<https://doi.org/10.1073/pnas.1916903117>



Happy teaching!
Thank You!

Rick Moore, Sally Wu, and Eric Fournier
Center for Teaching and Learning