Active Learning in Math as a Tool to Promote Equity

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Photo from San Diego Mesa's Flickr album

What is active learning?

Type your definition of active learning in the chat.

You can reply and react to other posts!
👍🏻 💕

1:00

ACTIVE LEARNING

Students are **actively engaging** with the content through **meaningful activities**.

How does active learning promote equity?

Give your answers in the chat.

You can reply and react to other posts! 👍🏻 💕

1:00

Dan Meyer @ddmeyer · 19h

Okay I think I figured out the three phases of my career so far:

Kids, I want you to understand the brilliance of ...

1 ... MY ideas.
2 ... MATH ideas.
3 ... YOUR ideas.

How does this map onto your own teaching story?

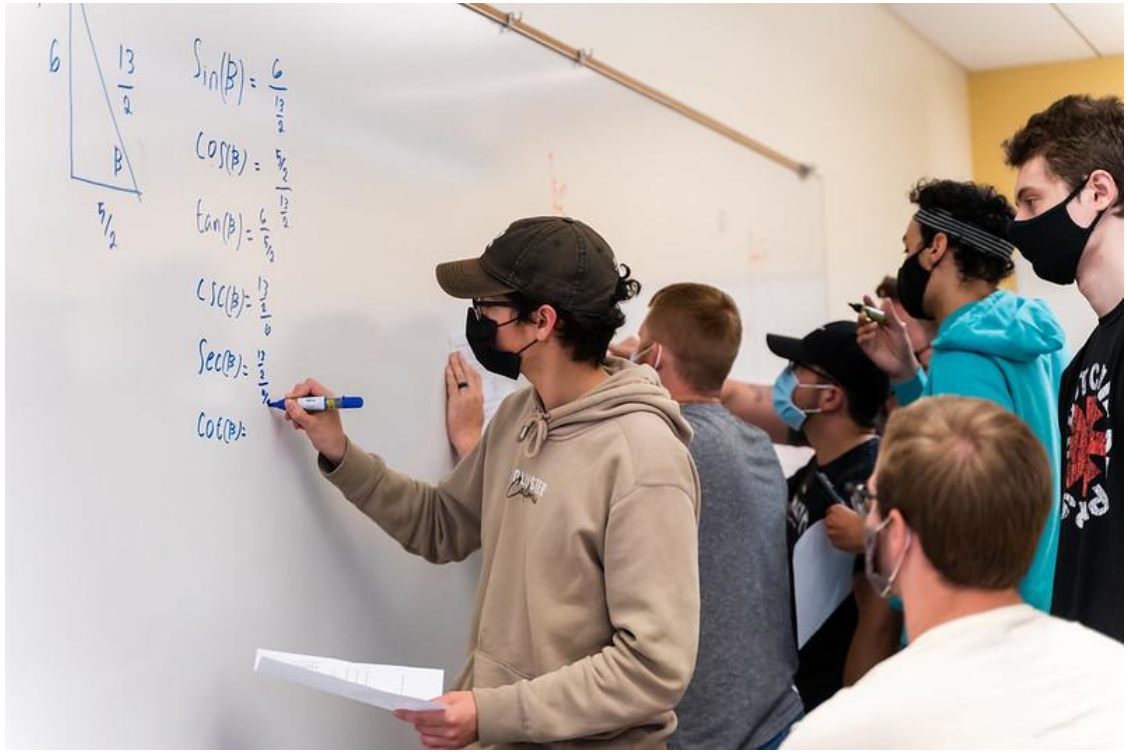
19 24 155

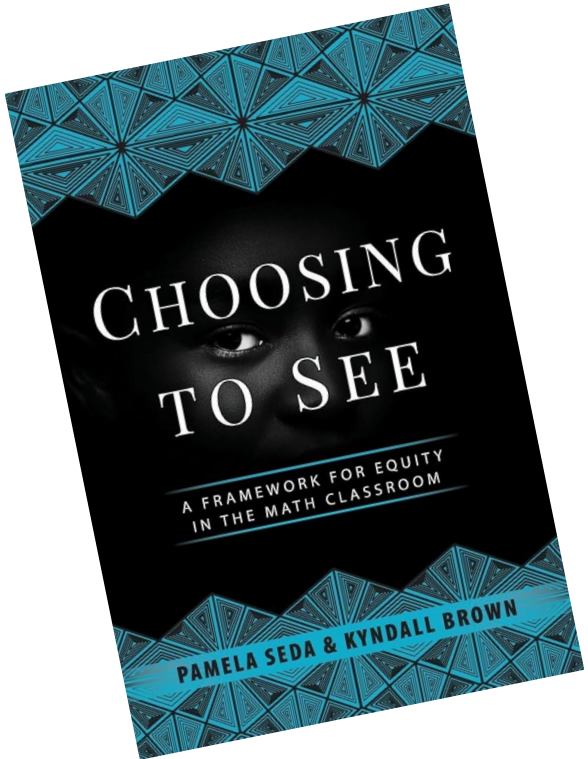

EXIT

PROMOTING EQUITY

Successful instruction starts with **student knowledge**, with whatever students know now. - Dan Meyer

ACTIVE LEARNING FOR **BELONGING**





Include others as experts

Create classroom environments that extend beyond the teacher as the sole authority to develop competence and confidence in others as experts, including the students themselves.

Be **C**ritically Conscious

Take the time to understand how negative stereotypes impact diverse learners and actively work to erase the effects of those negative stereotypes on the educational outcomes of marginalized students.

Understand your students well

Learn about your students, their families and their communities for the purpose of improving instruction (not making assumptions).

Use **C**ulturally relevant curricula

Use instructional materials in ways that help students see themselves as doers of mathematics and help them overcome the negative stereotypes and messages regarding who is--and who isn't--mathematically smart.

Assess, Activate and build on prior knowledge

Value the prior knowledge that students bring to the classroom, both personal and cultural, and leverage that knowledge as a resource for creating new knowledge.

Release control

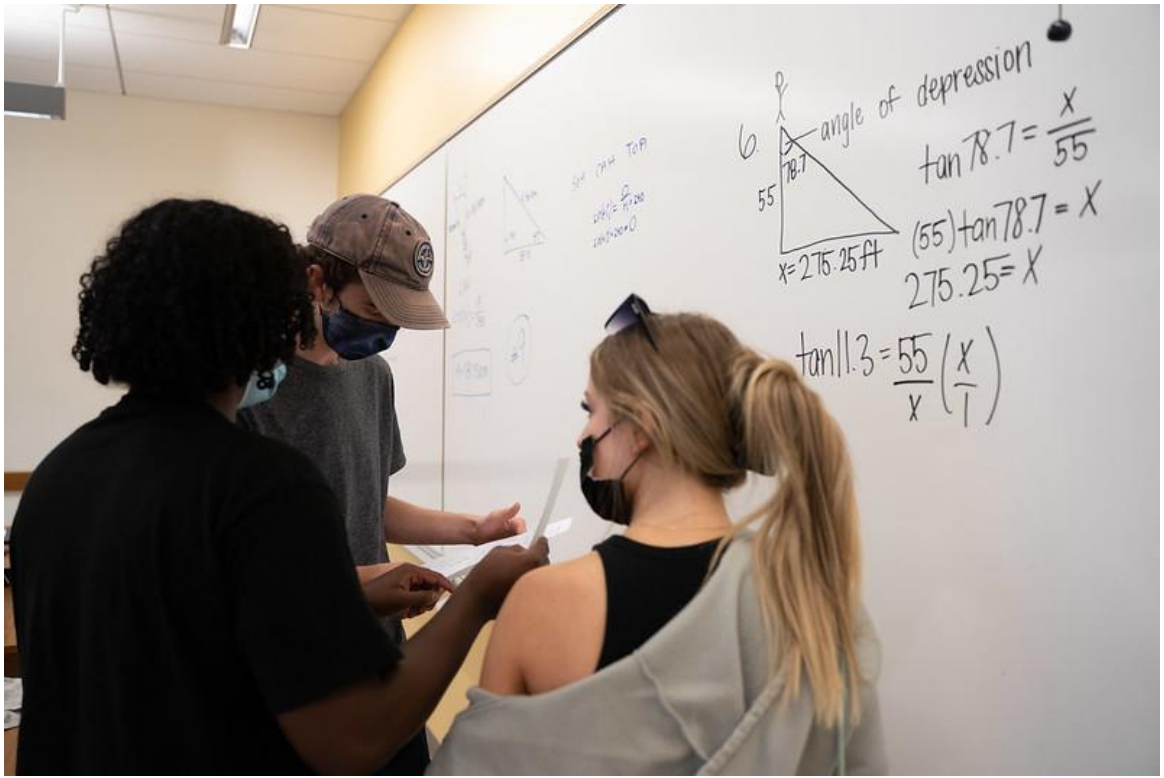
Empower your students to take ownership of their learning by focusing on sensemaking and allow them to make choices about things that are important to them in the classroom.

Expect more

Hold high expectations for all students and avoid deficit views of diverse learners.

ACTIVE LEARNING FOR LEARNING

ACTIVE LEARNING FOR SOFT SKILLS



ACTIVE LEARNING FOR DIFFERENTIATION

📍 Shared Notes + Q&A:

https://tinyurl.com/ActiveLearningMath

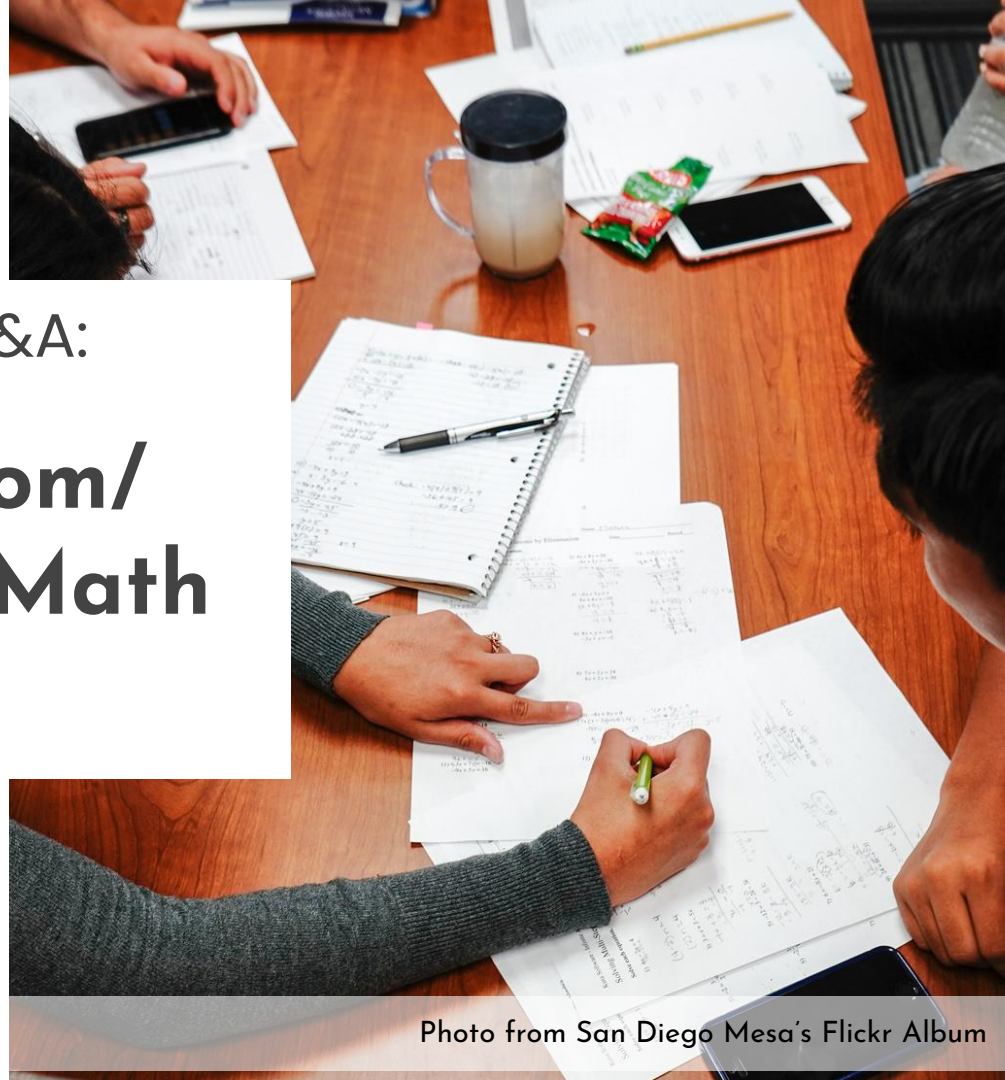


Photo from San Diego Mesa's Flickr Album

TODAY'S ROADMAP

ON SITE

Active learning options in a **physical classroom**

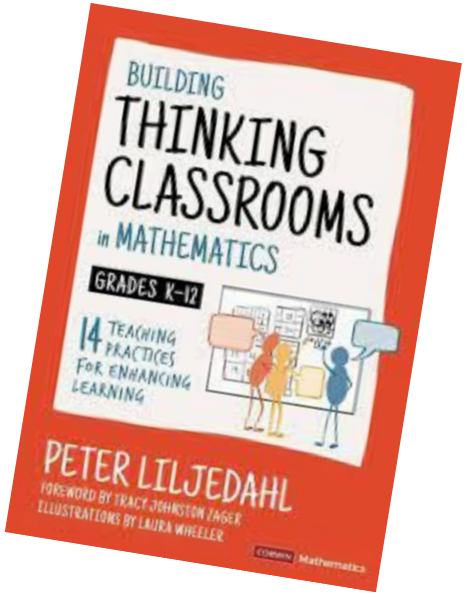
SYNCHRONOUS

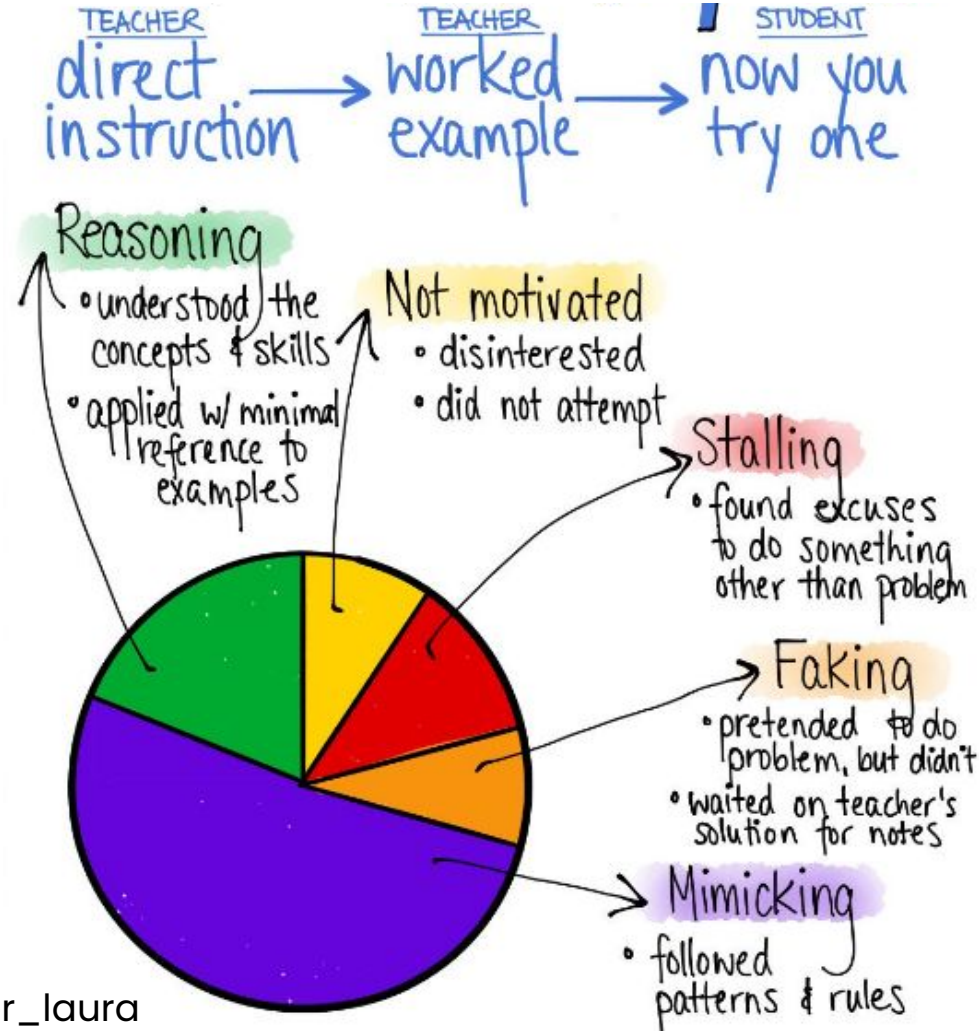
Active learning options on **Zoom**

ASYNCHRONOUS

Active learning options on **Canvas**

BUILDING THINKING CLASSROOMS





Sketchnote by @wheeler_laura

VNPS

VERTICAL
NON
PERMANENT
SURFACES

→ INCREASED KNOWLEDGE MOBILITY

STANDING
- BETTER POSTURE
- IMPROVED MOOD
- INCREASED ENERGY

TIPS FOR VNPS SUCCESS

- CLOSE NOT CROWDED
- ONE MARKER PER GROUP
- THOUGHTS WRITTEN BY SOMEONE ELSE
- HOLD MEMBERS ACCOUNTABLE TO EXPLAIN GROUP'S THINKING
- DIFFERENT COLOUR MARKER FOR THE TEACHER
- KEEP OLD/WRONG THINKING (OLD THINKING)

EQUITY

- INCREASED RELIANCE ON EACH OTHER INSTEAD OF TEACHER
- STUDENTS DO NOT FEEL ANONYMOUS WHEN STANDING
- OPPORTUNITIES FOR REAL-TIME DIFFERENTIATION
- NEW COMPETENCIES EMERGE
- SKILLS DEVELOPED: PATIENCE, COMMUNICATION, PERSEVERANCE

Sketchnotes by A Klassen

VRG

FLIPPITY

VISIBLY RANDOM GROUPS

TIPS FOR VRG SUCCESS

- NEEDS TO BE VISIBLE
- SWITCH GROUPS EVERY HOUR/TASK
- NO INDEPENDENT THINK TIME BEFORE COLLABORATING
- EXPLICITLY TEACH AND GIVE FEEDBACK ON INCLUSIVE AND EFFECTIVE COLLABORATION

KNOWLEDGE MOBILITY

RELIANCE ON TEACHER

BORROWING IDEAS → KEEP THINKING

EQUITY

- ELIMINATION OF SOCIAL BARRIERS
- WILLINGNESS TO COLLABORATE
- MORE STUDENTS DO MORE THINKING
- KNOWLEDGE COMES FROM GROUPS
- PUTS STUDENTS' UNBELIEVABLE CAPACITY FOR EMPATHY IN MOTION

[Sketchnotes by A Klassen]

CARD SORTS

Hey, students!

Go to student.desmos.com and type in:

57N F7E

TYPES OF CARD SORTS

OPEN ENDED

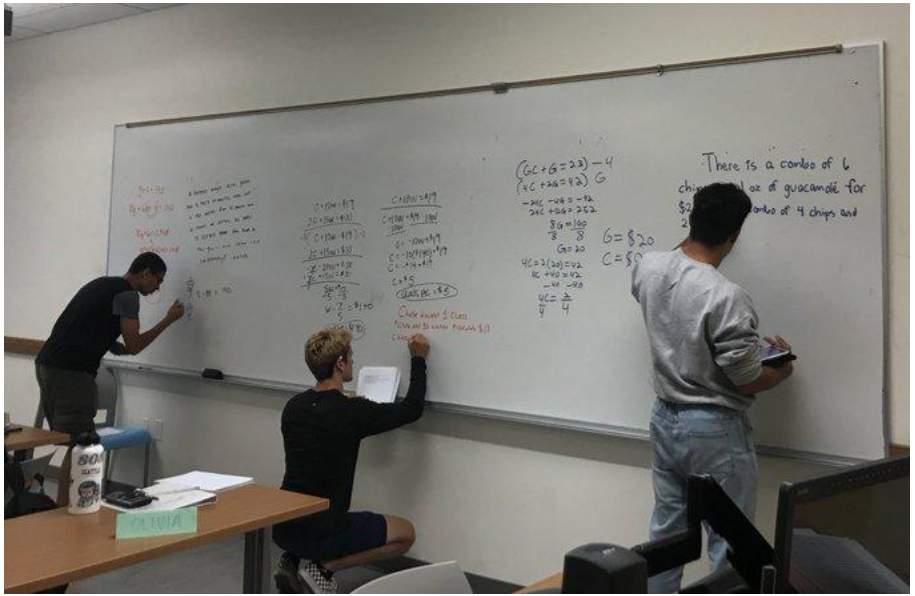
Free exploration highlighting what students notice.

CATEGORIES

Multiple representations, comparing & contrasting.

ORDERED

Proofs and introducing difficult algorithms.



Do you have any other favorite active learning protocols for the physical classroom?

THE ZOOM CLASSROOM

ON SITE

Active learning options in a **physical classroom**

SYNCHRONOUS

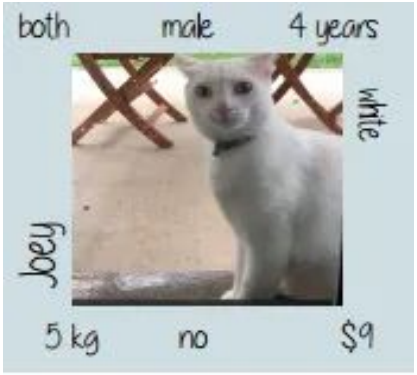
Active learning options on **Zoom**

ASYNCHRONOUS

Active learning options on **Canvas**

Which one doesn't belong?

A



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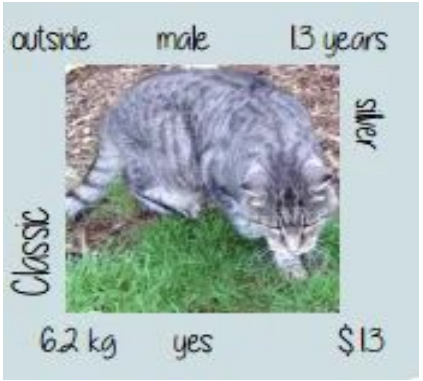


C

D

Which one doesn't belong?

$$\frac{d}{dx}[e^{2x}]$$

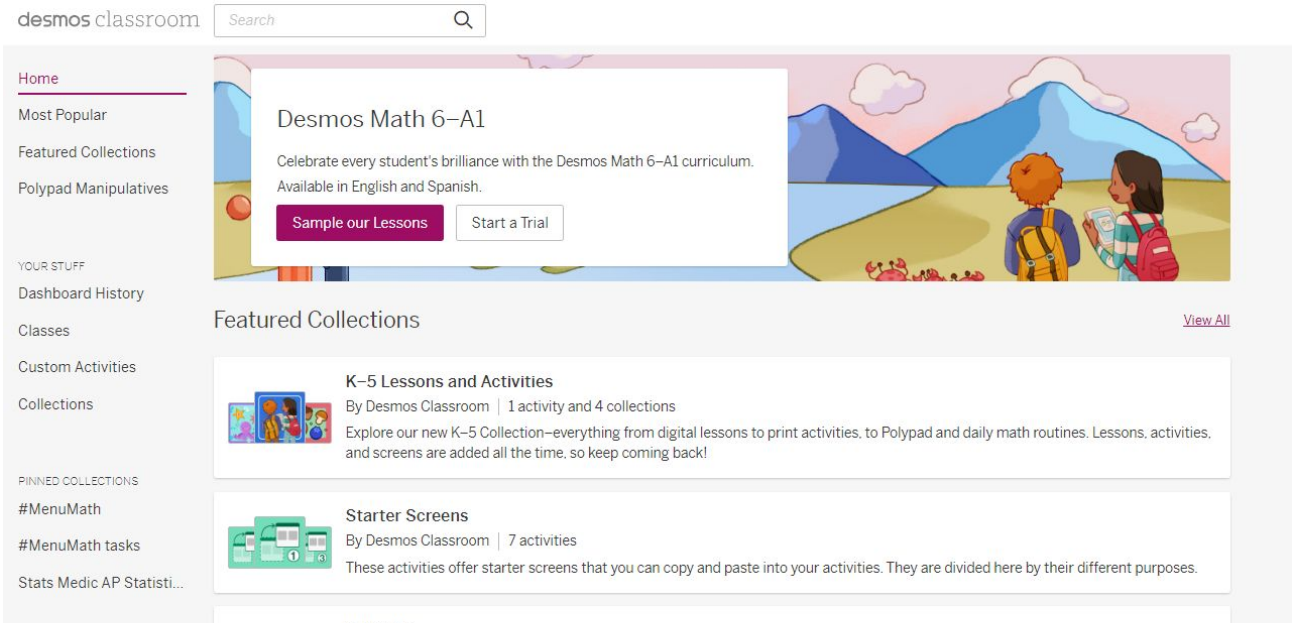
$$\frac{d}{dx}[e^{x} \cdot e^{x}]$$

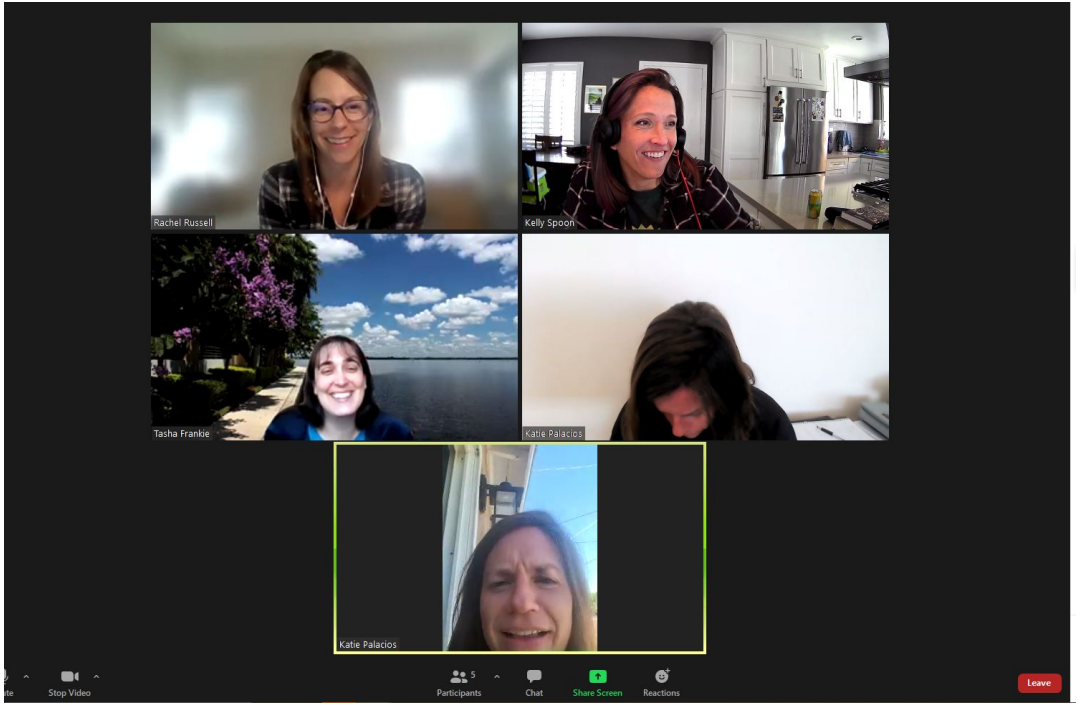
$$\frac{d}{dx}\left[\frac{e^{x}}{e^{-x}}\right]$$

$$\frac{d}{dx}[(e^{2})^{x}]$$

DESMOS ACTIVITY BUILDER

https://teacher.desmos.com/





Do you have any other favorite active learning protocols or tech tools for the Zoom classroom?

TAKING IT TO CANVAS

ON SITE

Active learning options in a **physical classroom**

SYNCHRONOUS

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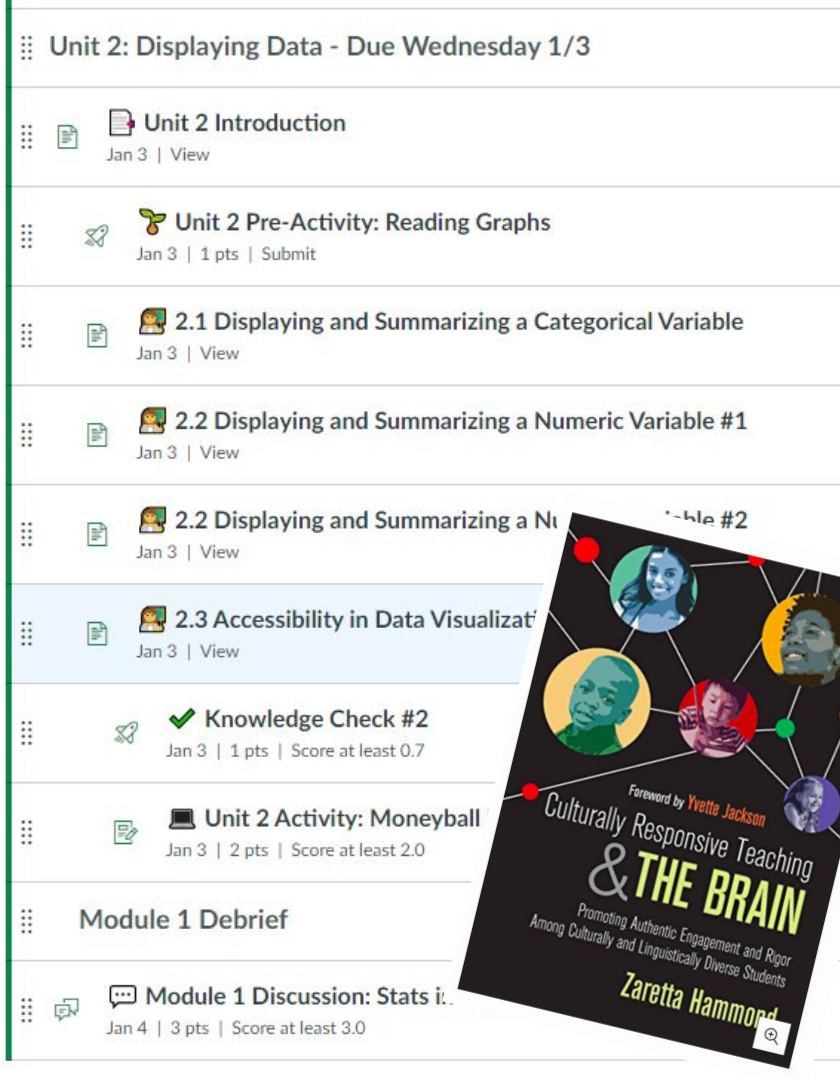
ASYNCHRONOUS

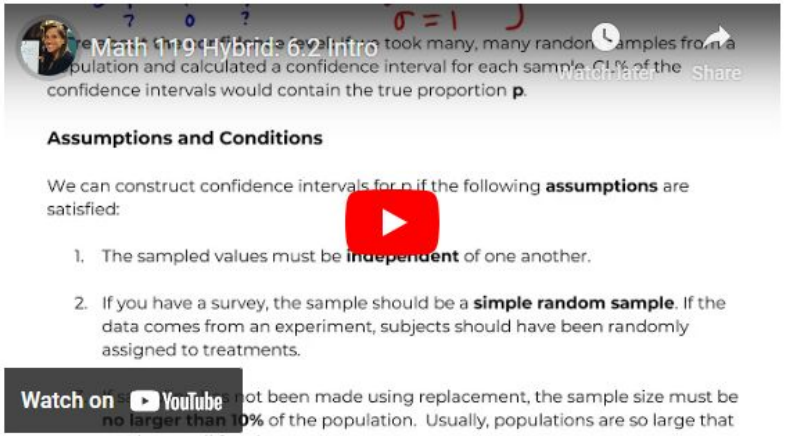
Active learning options on **Canvas**

STRUCTURE

- Ignite
- Chunk
- Chew
- Review



EMBEDDING FORMATIVE ASSESSMENTS



Understanding Check

When constructing a confidence interval for a proportion or mean of a finite population, a condition is that the population size be at least 10 times the sample size. The reason for the condition is to ensure that

- ○ the sampling method is not biased
- ○ the degree of dependence among observations is negligible
- ○ the sample standard deviation is a good approximation of the population standard deviation
- ○ the sample size is large enough
- ○ the central limit theorem is applicable

Check

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MATH 119

Education is what remains after one has forgotten what one has learned in school.

Announcements | Syllabus | Modules | Sign Up for 1-1

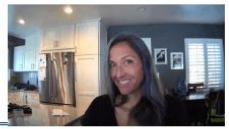
Welcome!

I'm glad to have you as part of our statistics community for this whirlwind 4-week course. I'm still in the process of editing everything, including the syllabus, but wanted to get you in and playing with Canvas (plus seeing what you've signed up for) early.

To begin the course, click the button to start with the Orientation Module

Want to Connect?

- Canvas Inbox, Pronto
- Email me at kspoon@sdccd.edu
- Make an appointment using Sign Up for 1-1
- We'll also connect in the module activities each week.



Do you have any other favorite active learning protocols or tech tools for a Canvas classroom?

INSTRUCTIONAL MOVES

- Flipped classroom as a first step
- Explain motivation for activities
- Highlight student voice

Kelly Spoon
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THANK YOU

ADDITIONAL RESOURCES

- The Supportive Role of Active Learning in a Calculus Course on Low PreCalculus Proficiency Students
- Adventures in Corequisite Calculus Blog
- Which One Doesn't Belong