# Researching Mathematics TACTivities

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# Who we are…

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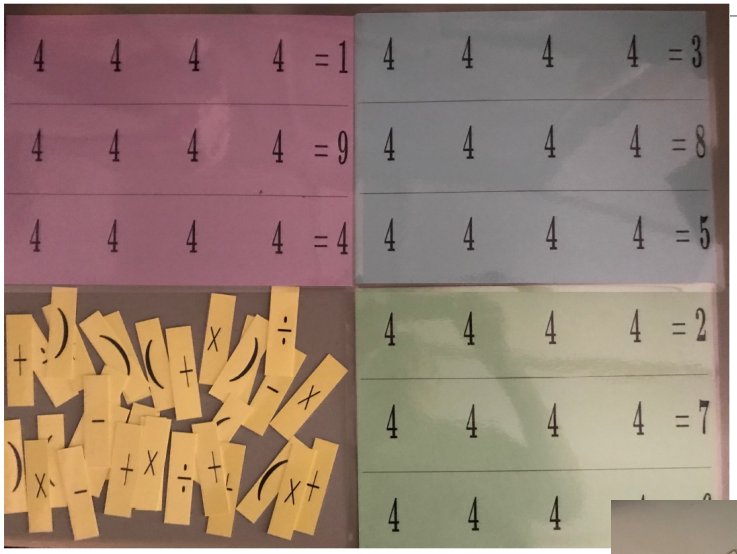
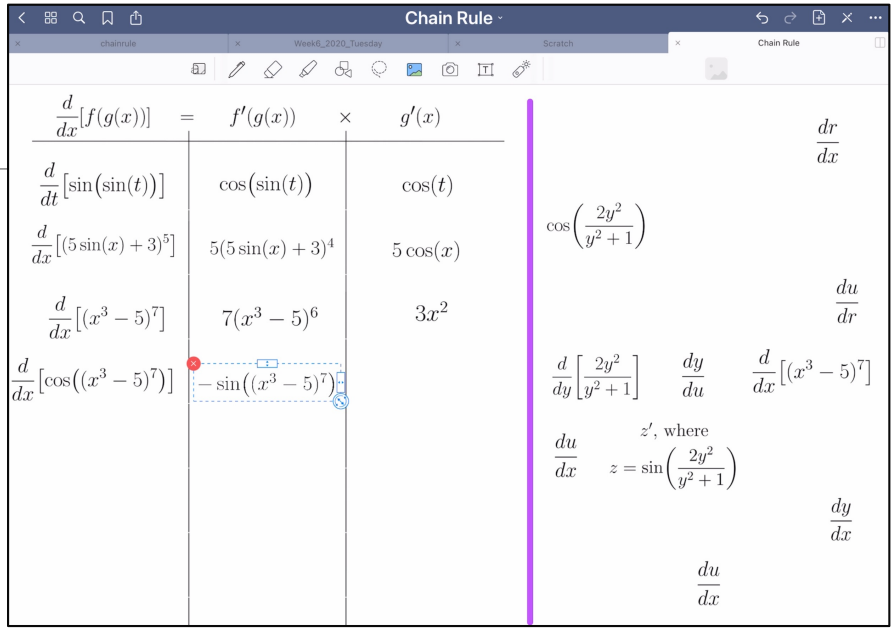
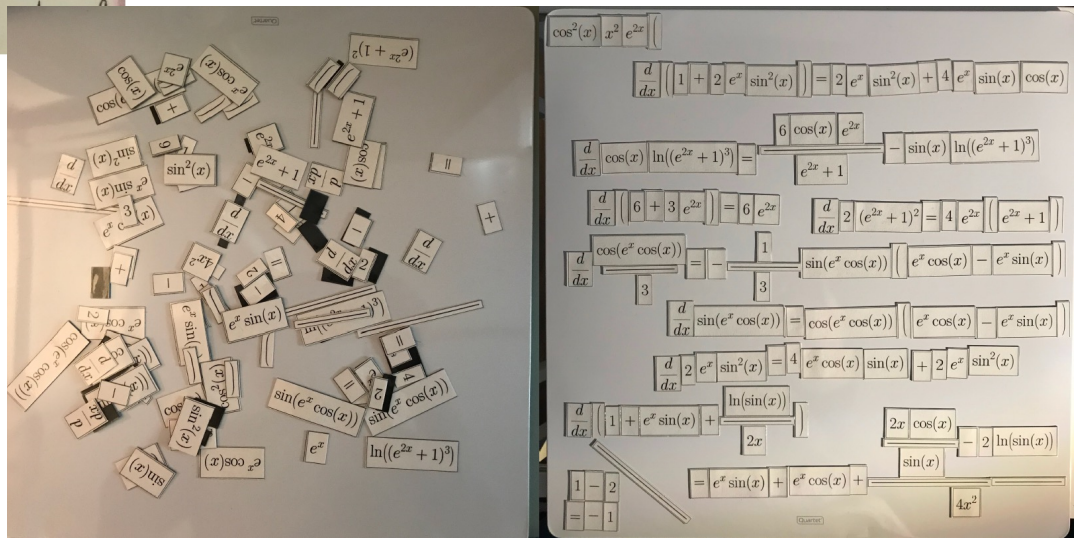
# What is a TACTivity?

- A tactile activity that encourages collaboration and engagement.
- Tactile (movable pieces)
- No moves are permanent
- Actively engages students
- Can be used to help teach or to review a concept
- Most are designed for groups of 2-4 students
- Often self-checking
- Very few (if any) directions needed

# Example TACTivities



# Impetus for this presentation

- TACTivities
  - Tactile learning activities
- Methods used to engage students actively in mathematics
  - Both in-person/f2f and remotely/virtually (online)
- Our research team is looking at the use of TACTivities in Mathematics education

# How you can use a TACTivity

- To introduce a new concept
- To teach a new concept
- To explore a concept further after a lesson
- To review a previous concept
- To provide another way to look at a concept
- To motivate students about a concept

# Examining TACTivities - Research

- Engagement
- Collaboration
- Mathematics Efficacy
- Instructor Perceptions
- Student Perceptions of Learning

# Research Questions

1. What are teacher attitudes toward the use of TACTivities?
2. What are student attitudes toward the use of TACTivities?
3. How do TACTivities affect perceived student performance?

# Examining TACTivities - Tools

- Classroom Engagement Inventory (CEI)
- Learning Object Evaluation Scale for Students and Teachers (LOES-S and LOES-T)

# Instruments

## Classroom Engagement Inventory

**Factors:**

- Affective Engagement
- Behavioral Engagement – Compliance
- Behavioral Engagement – Effortful Class Participation
- Cognitive Engagement
- Disengagement

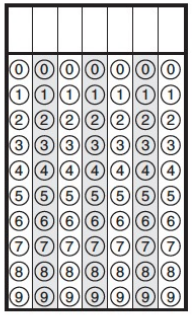
Wang, Bergin, & Bergin, 2014

# Classroom Engagement Inventory

Choose the response that best fits your opinion in THIS class. Some questions will seem the same, but they are asked in a little different way to make sure we really understand your opinion.

**Please use a #2 pencil to completely and carefully fill in each bubble.**

A. What is your student ID? [Write your ID numbers in the boxes AND fill in the bubble below each number.] Fill in from the left.



B. What class are you in right now as you complete this survey? (*Choose only one.*)

- ○ Math
- ○ Language Arts (English)
- ○ Science
- ○ Social Studies (History)
- ○ Arts or Music
- ○ Other (specify): _____

C. What grade are you in?

- ○ 4th grade
- ○ 5th grade
- ○ 6th grade
- ○ 7th grade
- ○ 8th grade
- ○ 9th grade
- ○ 10th grade
- ○ 11th grade
- ○ 12th grade

D. How often do you do the following in THIS class that you are in right now?

| **In THIS class,** | **Each day of class** | **Weekly** | **Monthly** | **Hardly ever** | **Never** |
|---|---|---|---|---|---|
| 1. I work with other students and we learn from each other. | ① | ② | ③ | ④ | ⑤ |
| 2. I feel excited. | ① | ② | ③ | ④ | ⑤ |
| 3. I feel interested. | ① | ② | ③ | ④ | ⑤ |
| 4. I form new questions in my mind as I join in class activities. | ① | ② | ③ | ④ | ⑤ |
| 5. I actively participate in class discussions. | ① | ② | ③ | ④ | ⑤ |
| 6. I listen very carefully. | ① | ② | ③ | ④ | ⑤ |
| 7. I go back over things I don't understand. | ① | ② | ③ | ④ | ⑤ |
| 8. I think deeply when I take quizzes in this class. | ① | ② | ③ | ④ | ⑤ |
| 9. I am "zoned out," not really thinking or doing class work. | ① | ② | ③ | ④ | ⑤ |
| 10. I feel happy. | ① | ② | ③ | ④ | ⑤ |
| 11. I pay attention to the things I am supposed to remember. | ① | ② | ③ | ④ | ⑤ |
| 12. I let my mind wander. | ① | ② | ③ | ④ | ⑤ |
| 13. I judge the quality of my ideas or work during class activities. | ① | ② | ③ | ④ | ⑤ |
| 14. I do not want to stop working at the end of class. | ① | ② | ③ | ④ | ⑤ |
| 15. I feel proud. | ① | ② | ③ | ④ | ⑤ |
| 16. I search for information from different places and think about how to put it together. | ① | ② | ③ | ④ | ⑤ |
| 17. I ask myself some questions as I go along to make sure the work makes sense to me. | ① | ② | ③ | ④ | ⑤ |
| 18. I get really involved in class activities. | ① | ② | ③ | ④ | ⑤ |
| 19. I complete my assignments. | ① | ② | ③ | ④ | ⑤ |
| 20. I feel amused (smile, laugh, have fun). | ① | ② | ③ | ④ | ⑤ |
| 21. I just pretend like I'm working. | ① | ② | ③ | ④ | ⑤ |
| 22. I try to figure out the hard parts on my own. | ① | ② | ③ | ④ | ⑤ |
| 23. if I make a mistake, I try to figure out where I went wrong. | ① | ② | ③ | ④ | ⑤ |
| 24. if I'm not sure about things, I check my book or use other materials like charts. | ① | ② | ③ | ④ | ⑤ |

E. Did you answer honestly? ○ Yes ○ No

**Please double-check that you responded to ALL questions. THANK YOU!**

# Instruments LOES-S

## Learning Object Evaluation Scale

- Student Attitudes (learning, design, engagement)
- Student Performance (pre/posttest)

Kay & Knaack, 2005-2012

# Instruments LOES-T

Learning Object Evaluation Scale

- Teacher Attitudes (learning, usability, engagement)
- Pedagogy
- Challenges

**Agree = 1** **Slightly Agree = 2** **Slightly Disagree = 3** **Disagree = 4**

Quality of TACTivity

7. The TACTivity was easy for me to use.
8. The TACTivity was easy for students to use.
9. The students found the TACTivity confusing.

Learning

10. The TACTivity helped students learn.
11. The TACTivity helped clarify the concept(s) being taught.
12. Overall, it was beneficial to use the TACTivity for teaching.

Engagement

13. The students were on task or focused when the TACTivity was being used.
14. The students liked the interactive quality of the TACTivity.
15. The students appeared to like the TACTivity.
16. Overall, the students were engaged when the TACTivity was being used.

Active learning comfort level questions

17. I am good at teaching with active learning in mathematics.
18. I like teaching using active learning in mathematics education.
19. I am comfortable using active learning in mathematics education.
20. I am comfortable teaching mathematics.

# Examining TACTivities - Tools

- Classroom Engagement Inventory (CEI)
- Learning Object Evaluation Scale for Students and Teachers (LOES-S and LOES-T)
- Others:
  - Community of Inquiry (COI)
  - Suggestions from audience…

# If you want to participate by using TACTivities in your class…

- We will help instructors determine what TACTivity would best suit their students and the content area they are learning.
- We will provide instructors with guidance to implement the TACTivity in their classroom.

- The instructor will implement the TACTivity.
- The instructor will provide students with the follow-up survey. This can be in electronic format via the web or printed on paper if easier to administer.
- The instructor will complete the instructor survey.

# To provide us feedback:

TACTivity feedback – Want to be part of the study? Want to use TACTivities in your classroom?

padlet.com/cindyyork/sj9af47fra5khk5q

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