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# Using Thinking Classroom Structures in the K-2 Classroom



Robyn Tedesco  
Math Specialist

Kate Dunn  
Grade 2

Liz Nawrocki  
Grade 1

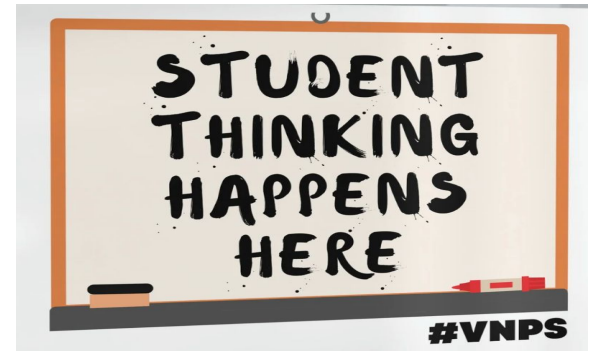
Sara Barthel  
Kindergarten

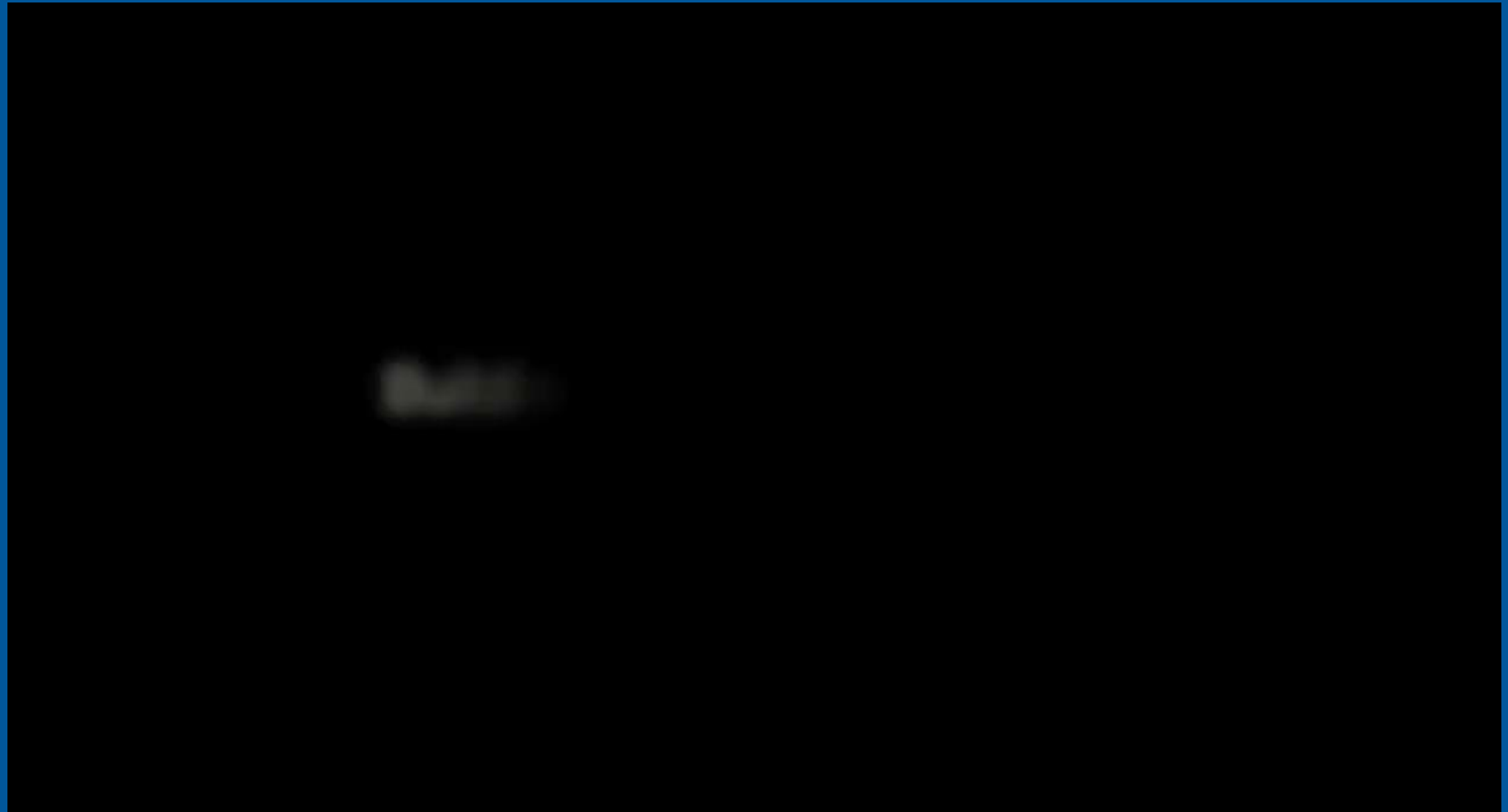
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# Learners will:

- Become familiar with the first three practices from *Building Thinking Classrooms* by Peter Liljedahl.
- Hear how each of these practices are in use in a school-wide math lab and individual classrooms.
- Consider next steps for implementing these practices in your classroom space.





# Math Lab Background

- Authentic opportunities for colleagues to see ideas in practice
- Space to provide ongoing professional development for staff
- Place to try new instructional strategies as a school
- Coaching in the moment
- Observe student behaviors in a learning environment different from their typical classroom
- Additional space in the building for teachers to go with their class and try out these strategies without committing their classroom to this structure

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# 2022-2023 School Focus Statement

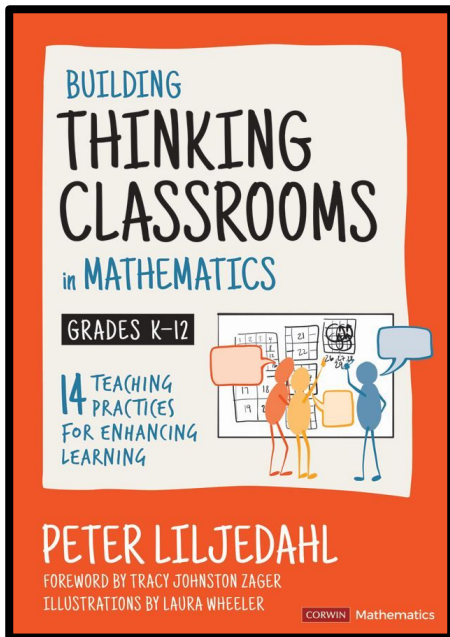
*“Thinking is a necessary precursor to learning, and if students are not thinking, they are not learning.”*

*- Peter Liljedahl*

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# Thinking is the Goal



- Thinking vs. Studenting
    - **Trying it on their own** – attempting to work through a problem, regardless of whether they got it right or not
    - **Slacking** – not attempting to work at all
    - **Stalling** – doing legitimate off-task behavior
    - **Faking** – pretending to do the task but really doing nothing
    - **Mimicking** – mindlessly repeating what they have in their notes
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# The Fourteen Practices - What Teachers Do

1. What types of tasks we use
2. How we form collaborative groups
3. Where students work
4. How we arrange the furniture
5. How we answer student questions
6. When, where, & how tasks are given
7. What homework looks like
8. How we foster student autonomy
9. How we use hints and extensions
10. How we consolidate a lesson
11. How students take notes
12. What we choose to evaluate
13. How we use formative assessment
14. How we grade

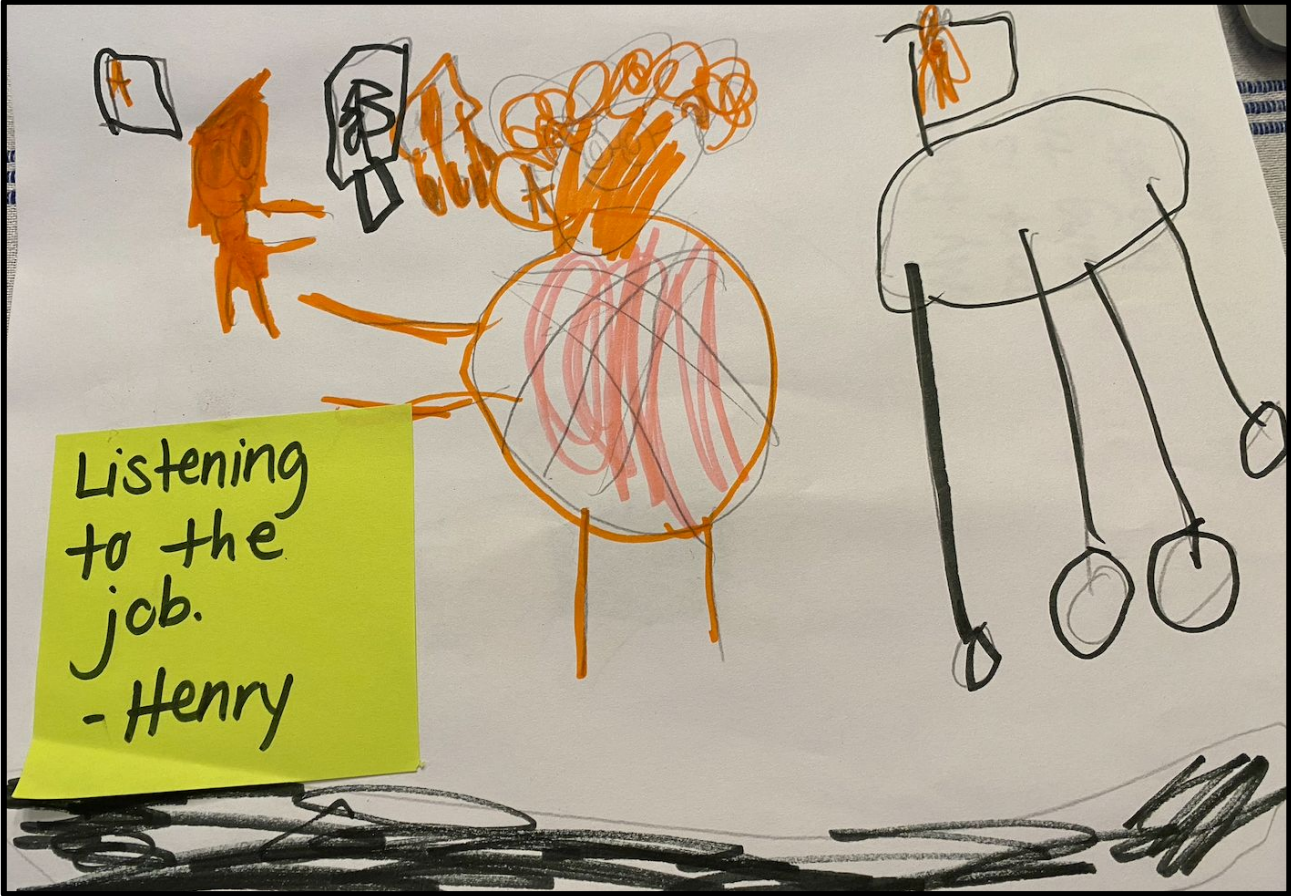
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# Tasks

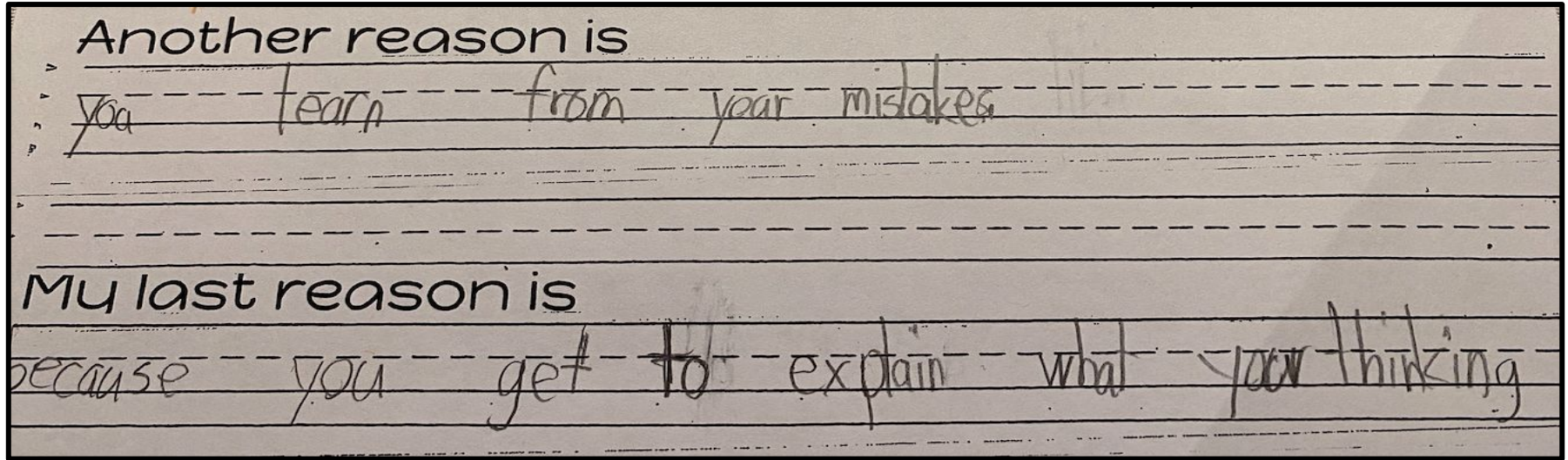
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# Kindergarteners favorite thing about the lab.....



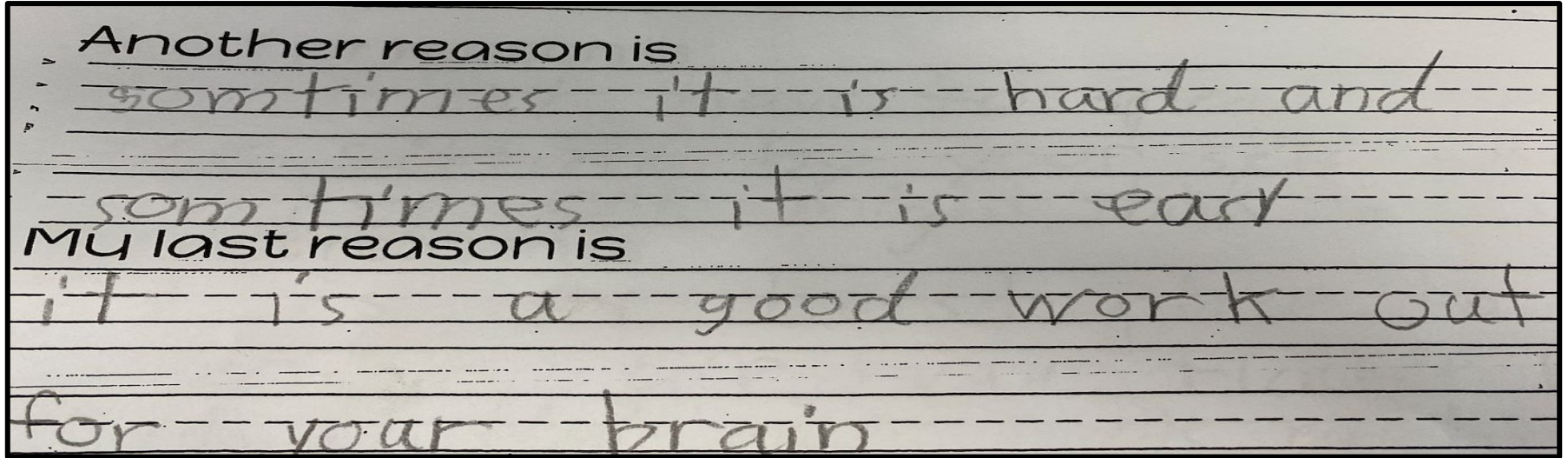
# My reasons why the “Math Lab is the best place” ....



Another reason is “you learn from your mistakes.” My last reason is “because you get to explain what you are thinking.” Chris, grade 1

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# My reasons why “Math is the best subject”...



Another reason is “sometimes it is hard and sometimes it is easy.” My last reason is “it is a good workout for your brain.” Andrew, grade 2

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# My reasons why “Math is the best subject”...

My first reason is

because some of the problems  
that are fun to solve!

Another reason is

some of them are hard but  
I like a challenge!

My first reason is because some of the problems that are fun to solve! Another reason is some of them are hard but I like a challenge!” Carter, grade 2

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**Problem solving is what we do when we  
don't know what to do.**

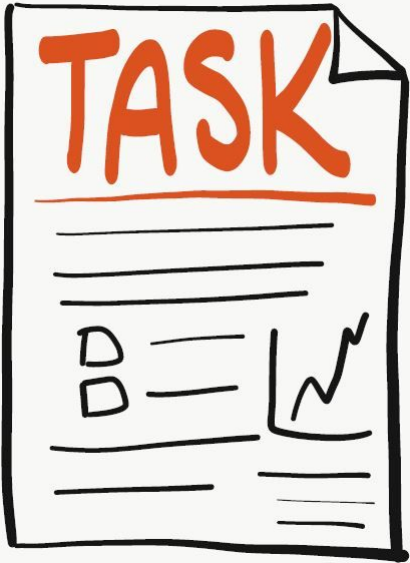
**- Peter Liljedahl**

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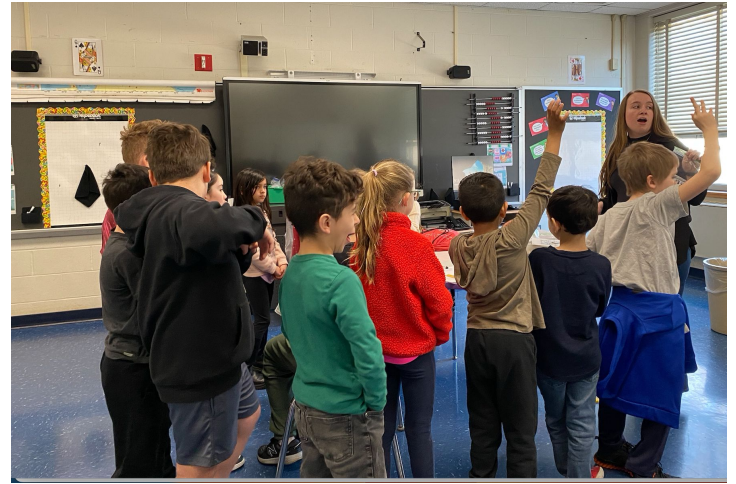
# 1. Types of Tasks We Use

- **Low-floor task** – anyone can get started with the problem
  - **High-ceiling task** – they have enough complexity to keep people engaged
  - **Open-middle** – while there is a single correct answer, there are multiple ways to solve the problem
- 



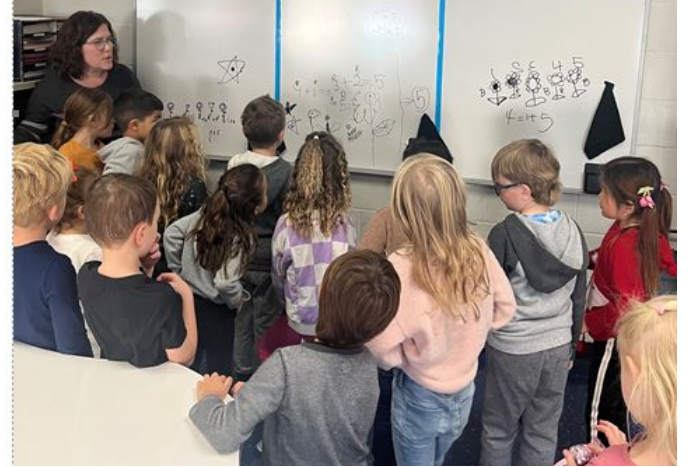
# Task Delivery

- Students are in a huddle
- Task is given orally
- Depending on the task students may have a picture or written task to reference
- Only share the bare minimum of pre-knowledge
- Teachers can't rush in to "save students"



# Task Debrief

- Class is once again in a huddle
- Teacher leads debrief using authentic student work
- Teacher provides the questioning as students analyze others' work
- We are “detectives” interpreting and explaining the work of our classmates





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# Questions about Tasks?

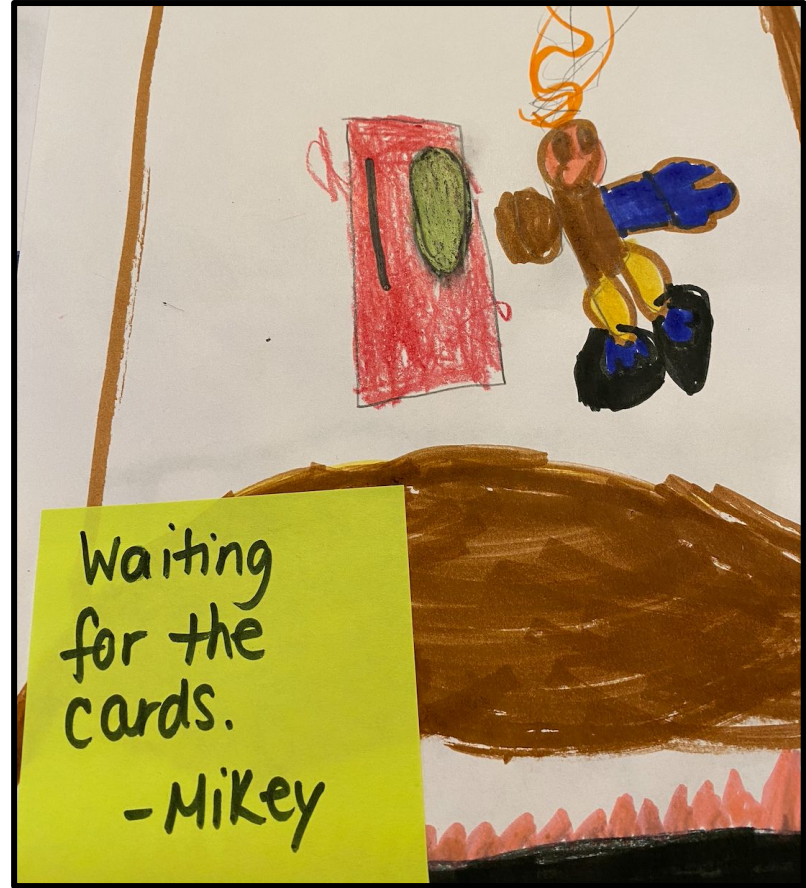
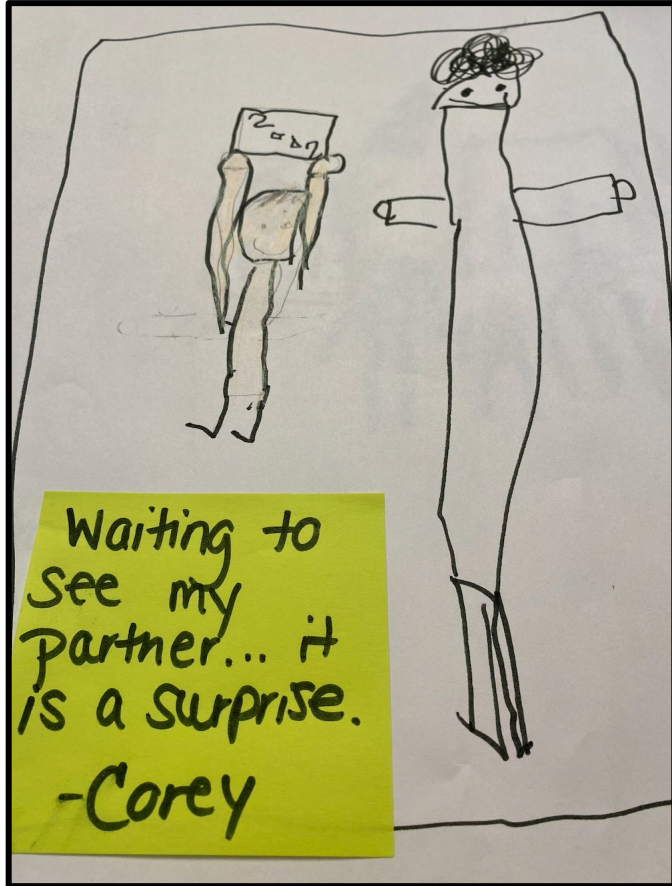
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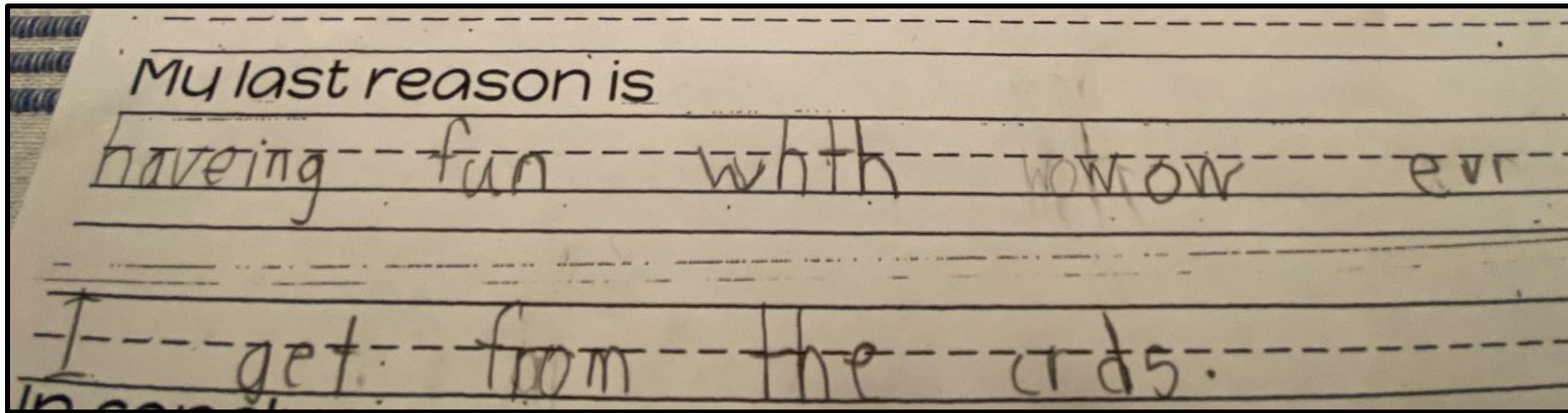
# Random Groups

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# Kindergarteners favorite thing about the lab.....



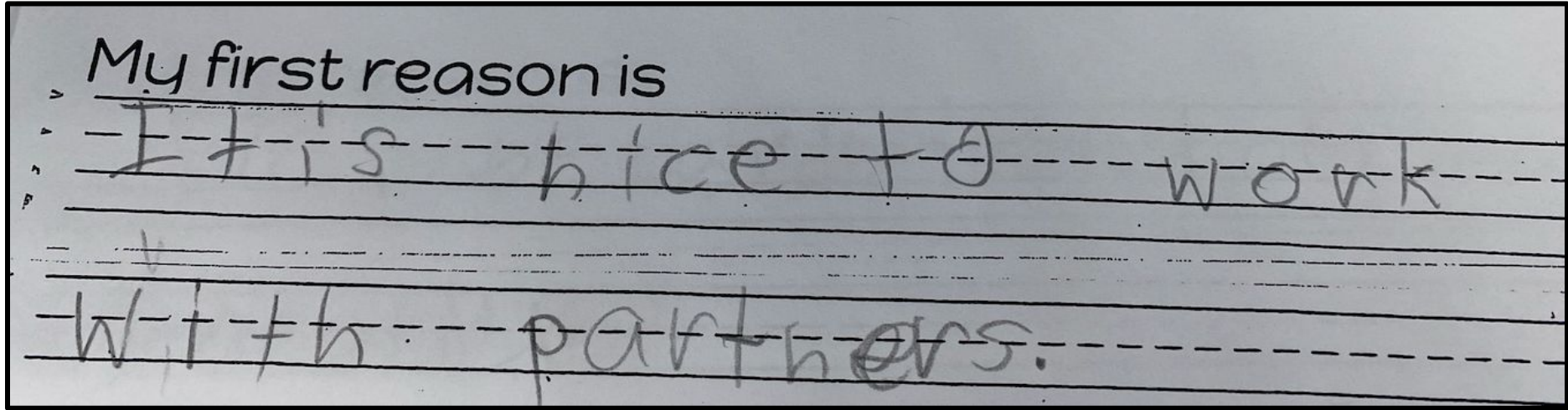
# My reasons why the “Math Lab is fun”....



My last reason is “having fun with whoever I get from the cards”  
Brynn, grade 1

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# My reasons why “Mini math lab is the best thing to have in your classroom”...

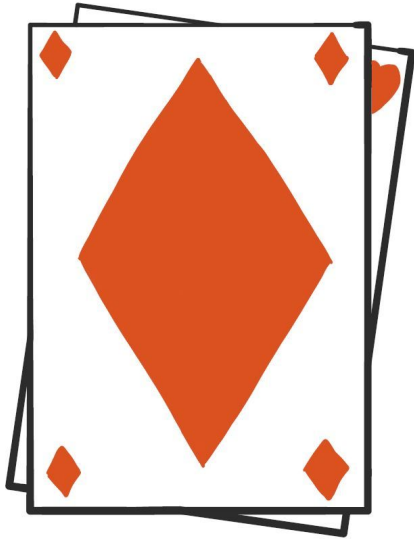


My first reason is, "It is nice to work with partners.", Shelby grade 2

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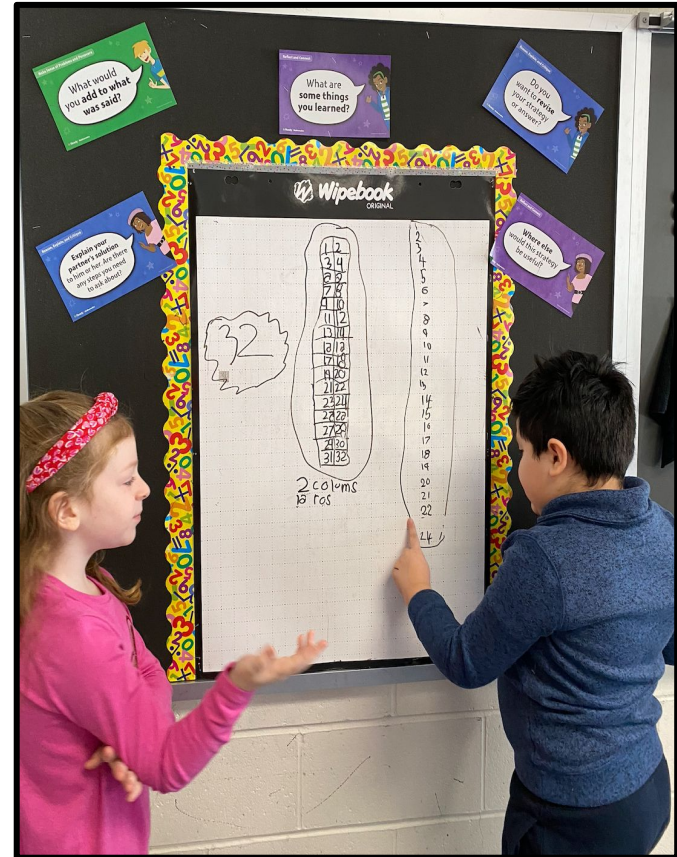
## 2. How We Form Collaborative Groups



- The groupings have to be visibly random
  - Grades 2+ - Three students is the ideal group size
  - Grades K & 1 - Two students is ideal group size
  - We like to say, “The cards have spoken.”
  - Students know where to go and do so efficiently
-

# Benefit of Random Groupings

- Students work with everyone - eventually
- Diversity
  - Range of different learner strengths
- Knowledge mobility
  - We find answers in unexpected places
  - Student to student coaching
- Equity
  - Everyone is doing the same task
  - Everyone has something to offer



# Tools for Randomizing Groups



ClassDojo



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# Questions about Random Groups?

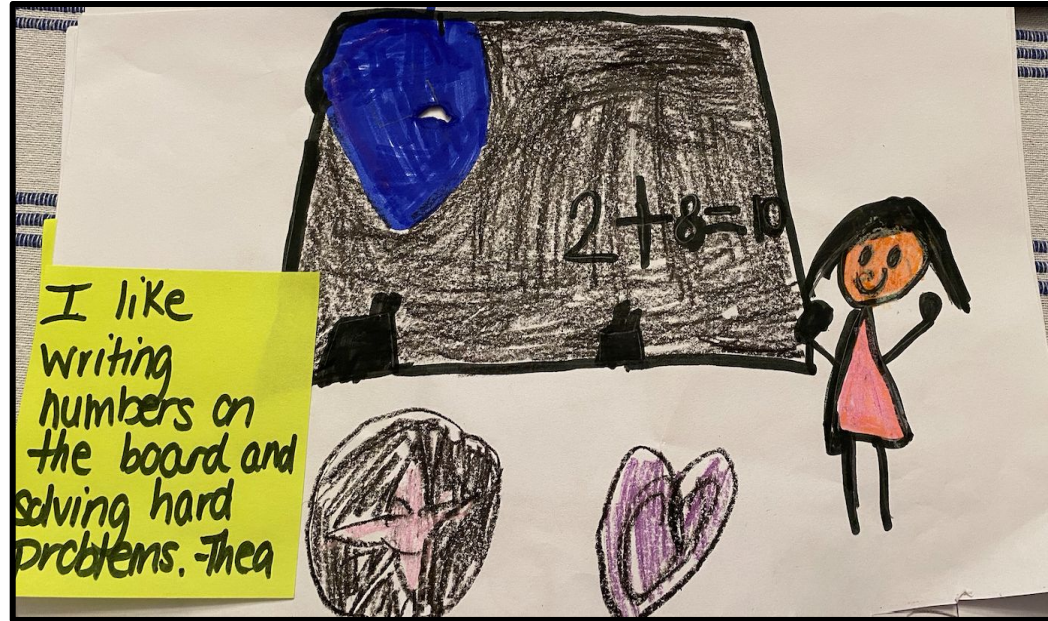
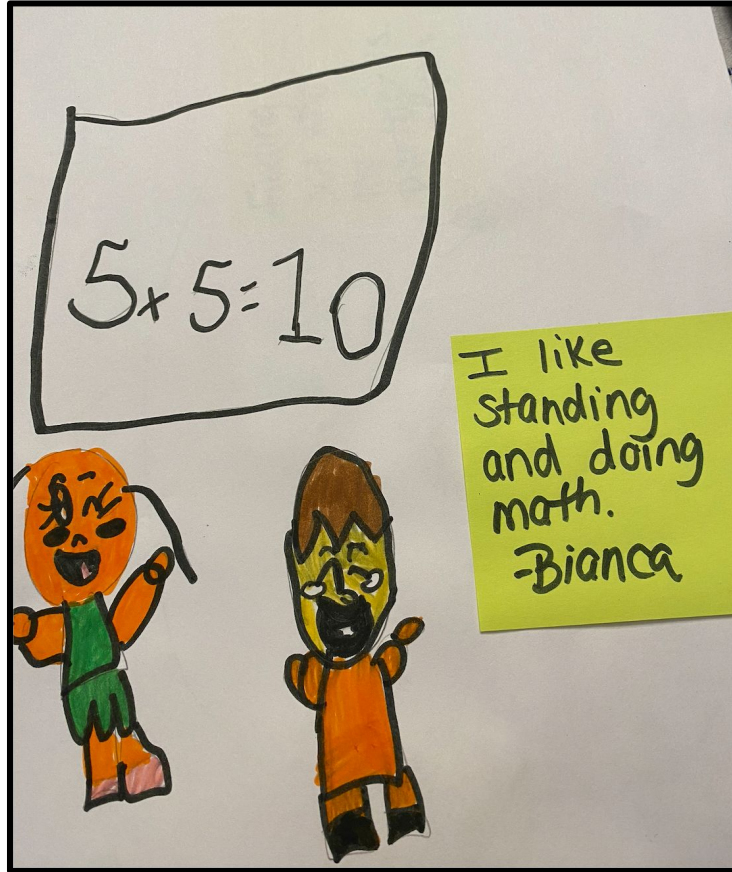
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# Where Students Work

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# Kindergarteners favorite thing about the lab.....



# My reasons why the “Math Lab is the best class” ....

My last reason is

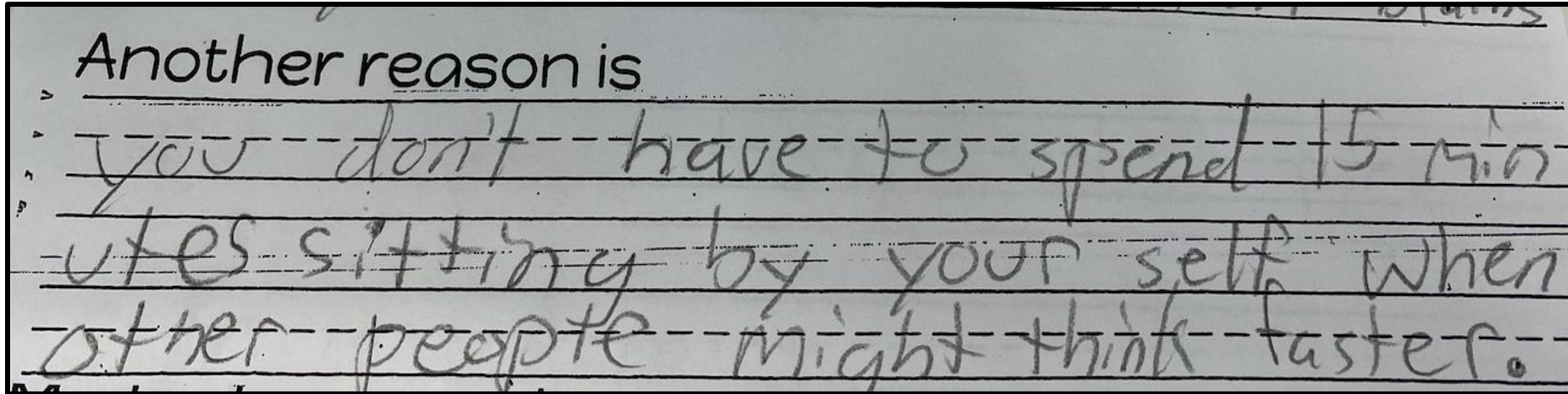
you get to stand and work and

not sit and work

My last reason is “you get to stand and work and not sit and work.” Caden, grade 1

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# My reasons why the "Math Lab is the best class"....

A photograph of a piece of lined paper with handwritten text in cursive. The text is written on a set of three horizontal lines (top, middle, bottom) with a dashed midline. The handwriting is somewhat messy and appears to be from a young child. The text reads: "Another reason is you don't have to spend 15 minutes sitting by your self when other people might think faster." There are some small marks and a faint "10/11/15" in the top right corner of the paper.

Another reason is  
you don't have to spend 15 min  
utes sitting by your self when  
other people might think faster.

Another reason is "You don't have to spend 15 minutes sitting by yourself when other people might think faster." Milania, grade 2

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# Trends in Traditional Classrooms



- Desks or Tables, oriented to the front of the room
  - Teacher space in front
  - Students sit and teacher stands
  - Teachers writes on vertical surface/ students on horizontal surfaces
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### 3. Where Students Work



- Vertical Non-Permanent Surfaces (VNPS)
    - One marker per group
    - Groups in close proximity but not on top of one another
    - Personal whiteboards for computer and testing work
    - Work expectations have been practiced and are posted as needed
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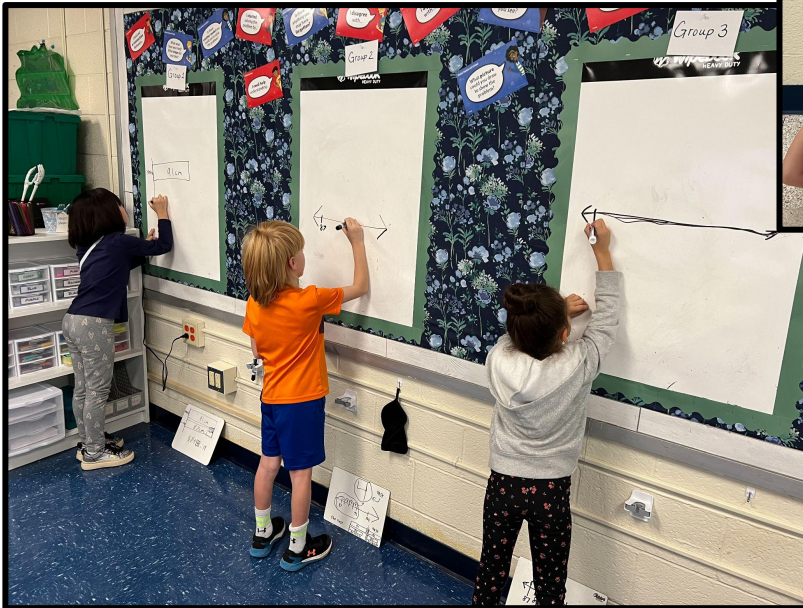
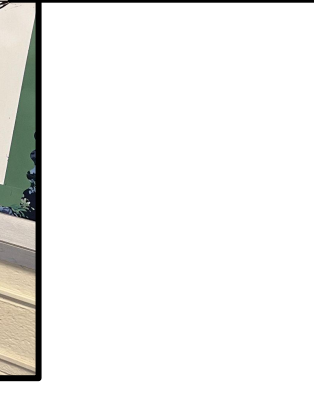
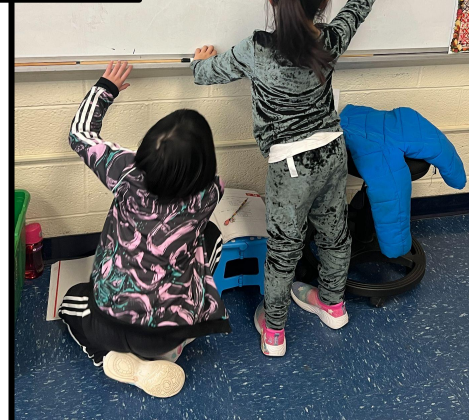
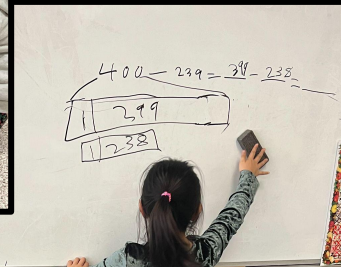
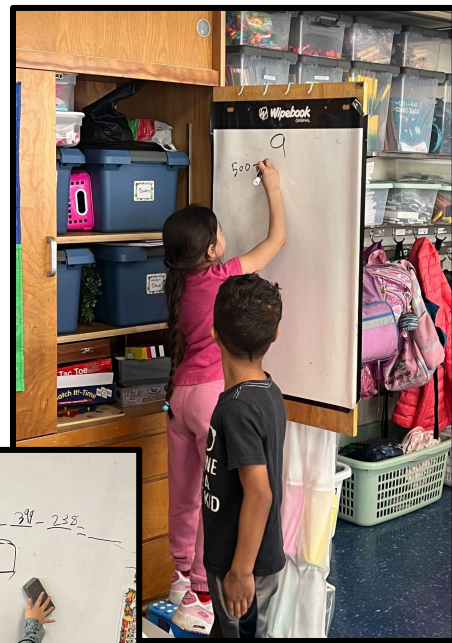
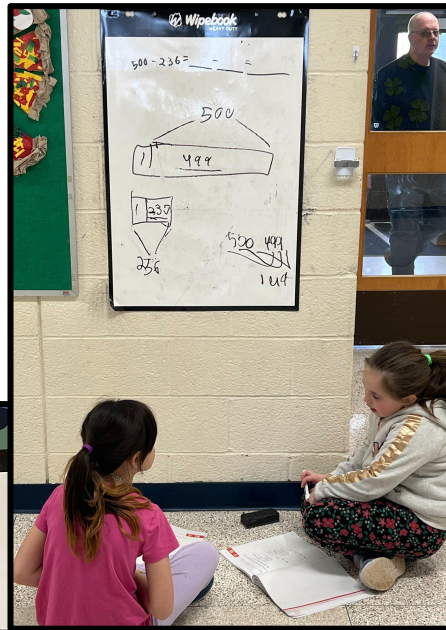
# Benefit of VNPS



- Non-permanent surface encourages more risk taking
  - Transforms passive environment into a thinking learning space
  - Work is on display for everyone to see
    - Promotes the idea of a collaborative work environment - collective learning
    - Mistakes are valued
    - Shows a progression of strategies
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# Kate's BTC Classroom Setup



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# Questions about Working Space?

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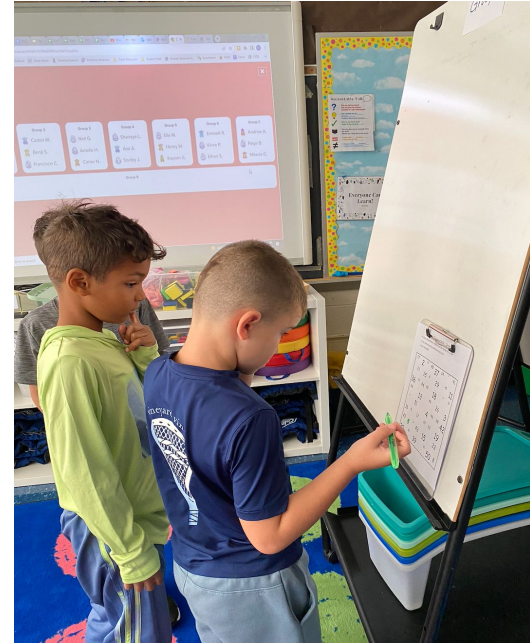
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**How do I get started?**

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# Non-curriculars

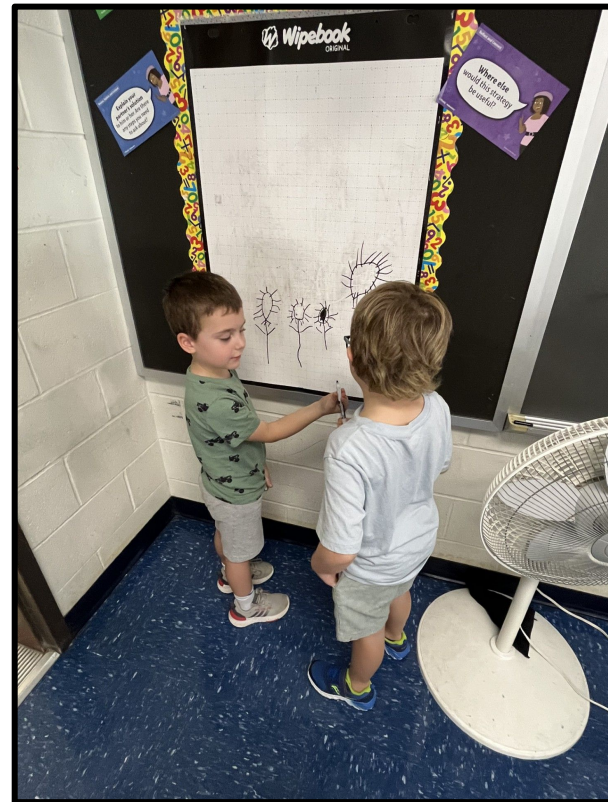
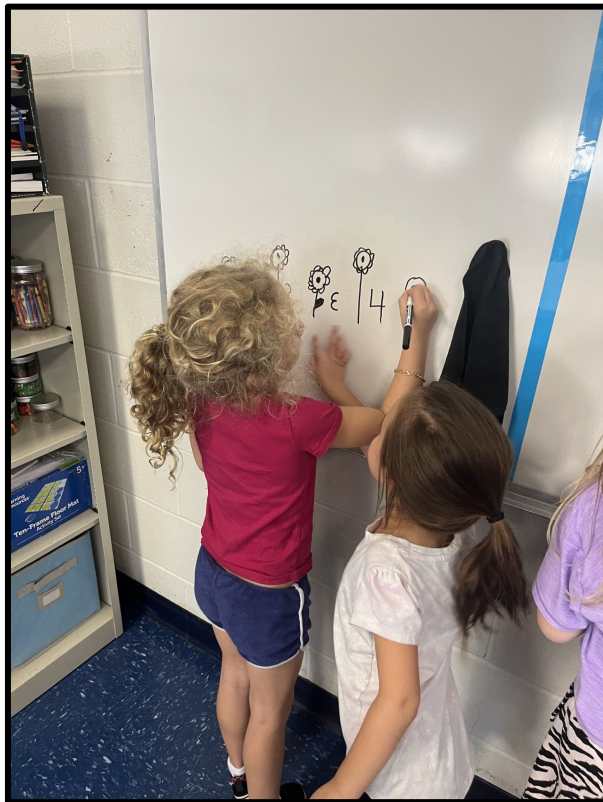
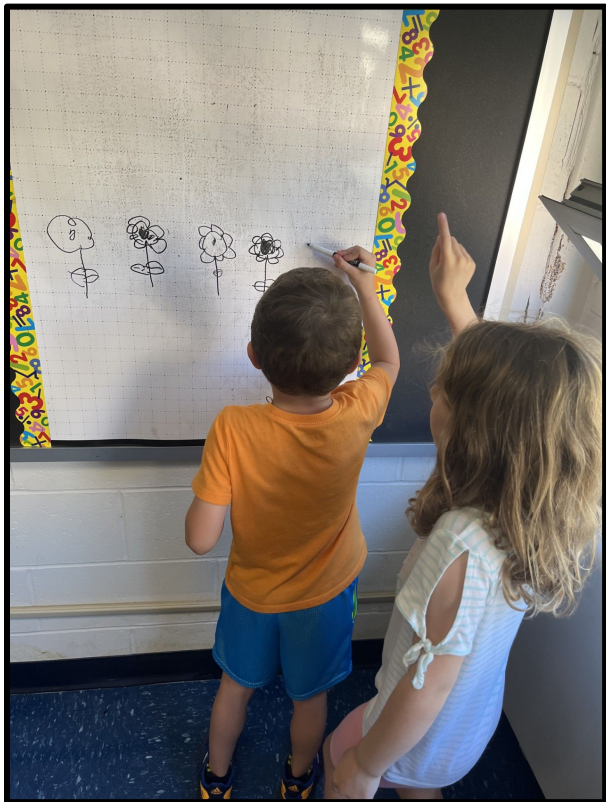
- 3 to 4 non-curricular to set the norms of the room
  - Sharing the pen
  - Taking “field trips”
  - Experience being “stuck”
- They are highly engaging - think “puzzles”
- Don't necessarily need specific math knowledge
- Prime students' willingness to think



Presented to the kindergarteners orally:

- What do you notice about the math lab?
- What do you wonder about the math lab?

Your job today is to draw 5 flowers with your partner.



There are animals on a farm. There are chickens, cows, and pigs. There are 8 legs. What combinations of animals could there be?



There are animals on a farm. There are cows, chickens, and pigs. There are 8 legs. What combinations of animals could there be?



5 solutions

$$4 + 4 = 8$$

2 chickens  
1 pig

$$2 \times 2 + 4$$

$$2 + 2 + 2 + 2$$

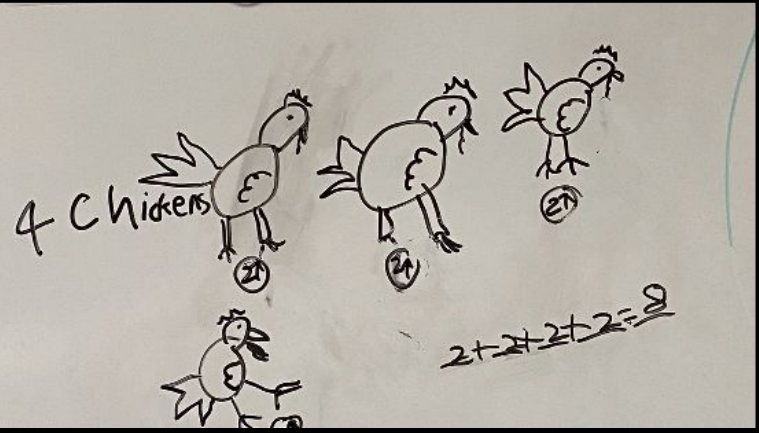
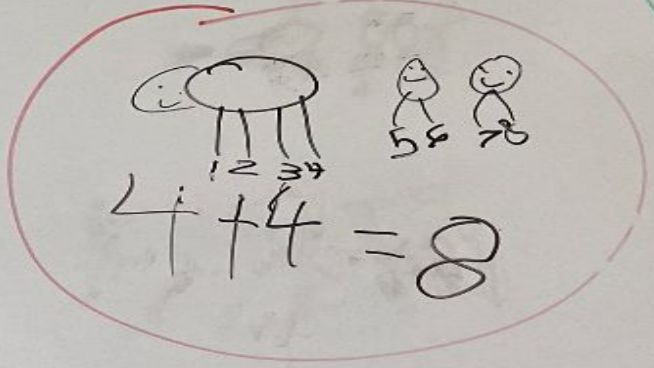
4 chickens

4 + 4  
2 cows

$$2 + 2 + 4$$

2 chickens

1 cow





Take 10 cards numbered 0 to 9.



Pick 3 cards with a total of 12.  
You can do it in 10 different ways.  
How many can you find?

8 9

$$5 + 6 + 1 = 12$$

$$4 + 6 + 2 = 12$$

$$9 + 3 + 0 = 12$$

$$9 + 1 + 2 = 12$$

$$8 + 1 + 3 = 12$$

$$8 + 0 + 4 = 12$$

$$4 + 5 + 3 = 12$$

$$7 + 2 + 2 = 12$$

$$5 + 3 + 4 = 12$$

$$0 + 7 + 5 = 12$$

$$9 + 2 + 1 = 12$$

$$3 + 4 + 5 = 12$$

$$4 + 7 + 1 = 12$$

$$4 + 8 + 0 = 12$$

$$8 + 3 + 1 = 12$$

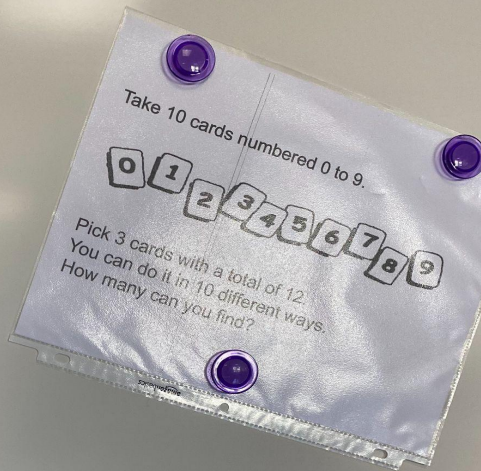
$$7 + 3 + 2 = 12$$

$$6 + 5 + 1 = 12$$

$$9 + 3 + 0 = 12$$

$$4 + 6 + 2 = 12$$

$$7 + 5 + 0 = 12$$



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**Where these structures  
show up in other parts of the  
day**

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# Using BTC in Other Subjects

- Practice Foundation spelling patterns
- Word webs for vocabulary
- Brainstorming before writing on a topic
- Science - drawing life cycles and other diagrams
- Teaching from various points of view in the classroom
  - Elimination of “the back of the class”

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# Reflections/Suggestions

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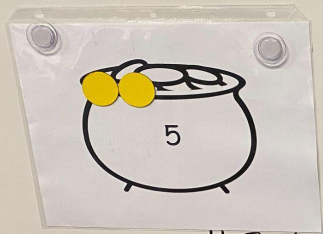
# Some things we learned along the way

- Consider the students in your class/building and their needs
  - Student(s) in wheelchairs
  - Student(s) who might need to work in a quieter space
- Busy yourself away from the students for the first 5-7 minutes so they can talk through the task and get started without interruption
- Even our youngest students can work for 45-minutes if the task is engaging
- Always plan an extension
- Handing out the cards after the task was delivered worked better than when they came in the door
- Purchase plenty of expo markers and erasers
- Magnetic manipulatives are a must

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# Student Work Examples

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$$\begin{aligned} 5 - 4 &= 1 \\ 5 - 3 &= 2 \\ 5 - 2 &= 3 \end{aligned}$$

$$5 - 5 = 0$$

$$5 - 5 = 0$$

$$5 - 4 = 1$$

$$5 - 4 = 1$$

$$5 - 4 = 1$$



BLO



RAP



RAP



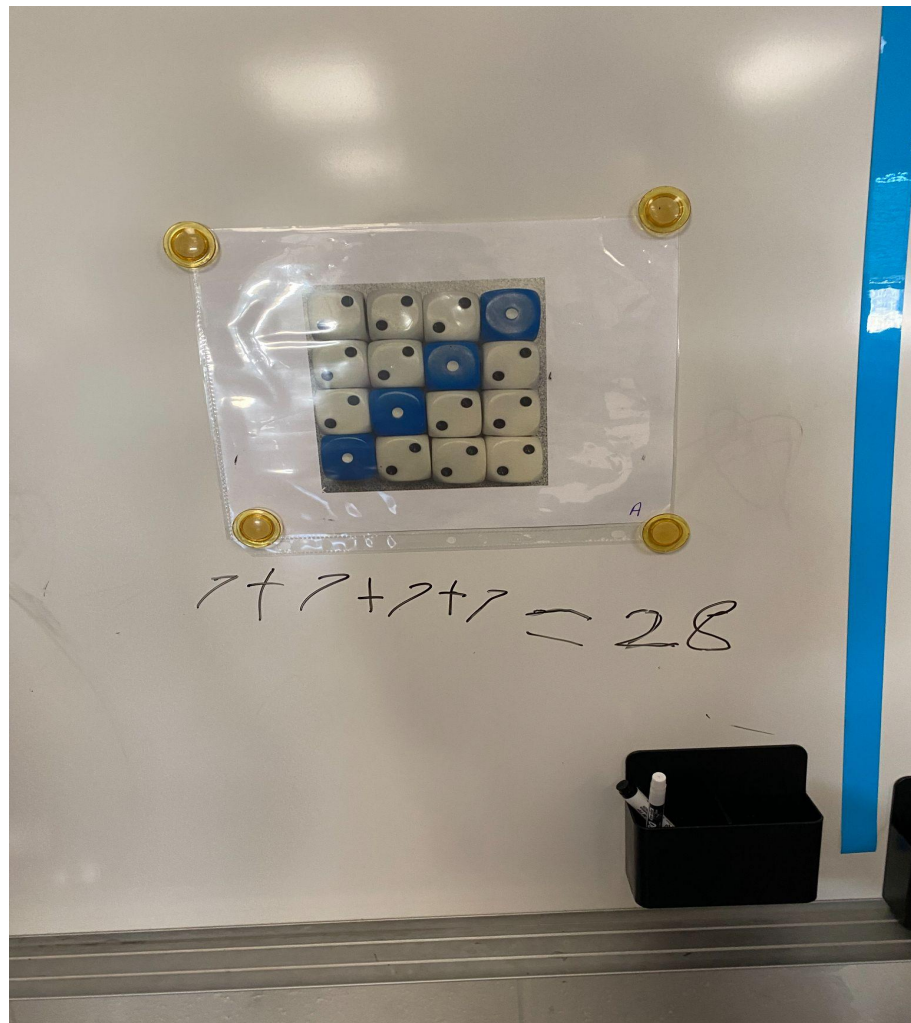
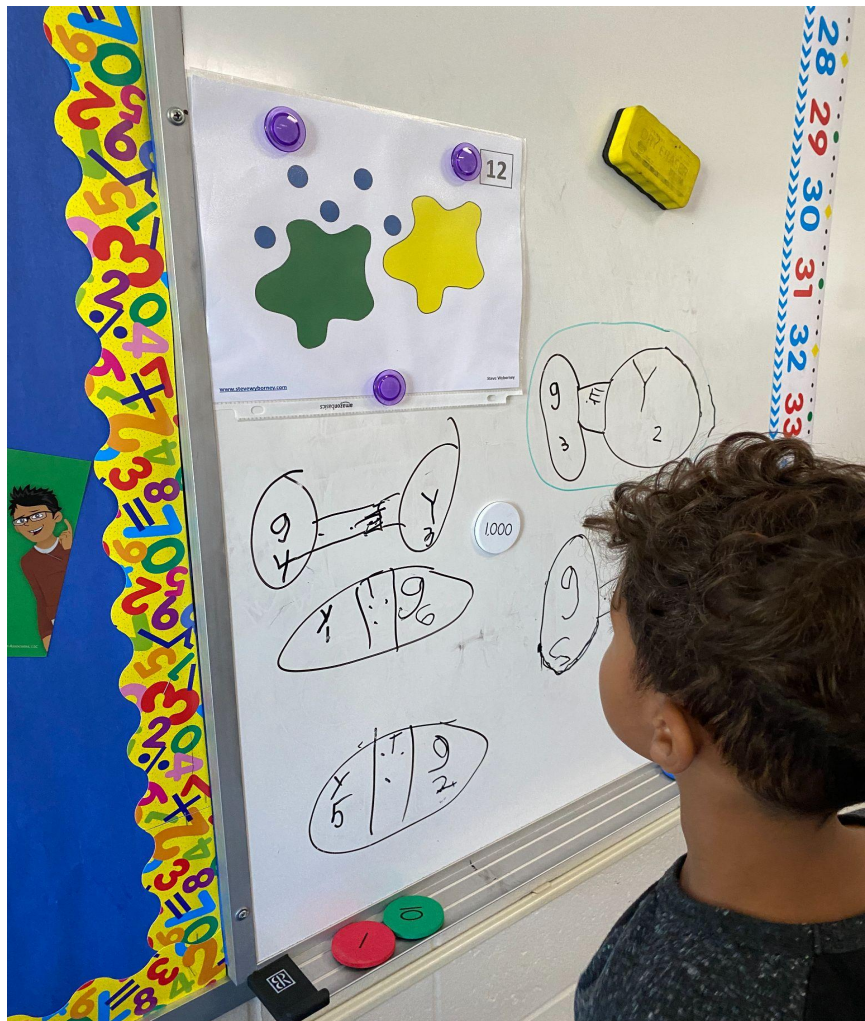
BLO



RAP

$$E + S = 5$$





Things got a little crazy in the North Pole as Santa got ready to deliver presents. The reindeers and elves were all mixed up. Santa counted 22 legs. How many reindeer and elves could there be?



$$2x + 2y = 22$$

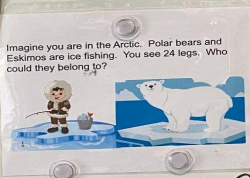
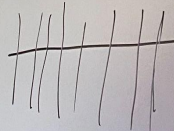
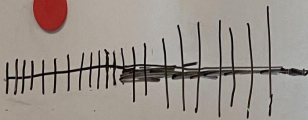


elves  
3  
4  
-

reindeer  
4  
3  
5

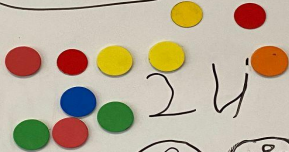


4 reindeer



12 Eskimos.

0 polar bears.

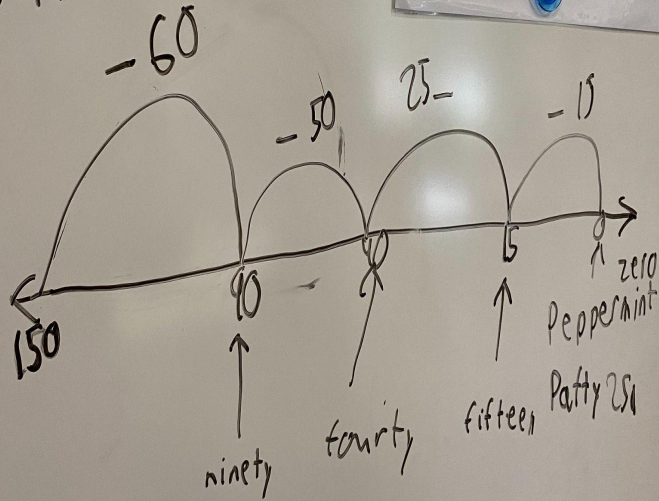


24

$$4 + 4 + 2 + 2 + 4 + 2 + 4 + 2 = 24$$



150 became 50 ↓  
Apple 50 ↓ number jump



Use the Read, Draw, Write process to solve.

64 kids have milk with lunch.

27 kids have punch.

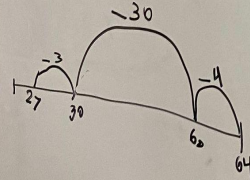
How many more kids have milk than punch?

There are 37 Milk With lunch  
Then punch

$$60 - 20 = 40$$

$$4 - 7 = -3$$

$$40 - 3 = 37$$



Graphic Organizer - Change Problems (Add To)

Beginning: 64 → Change + or -: - ? → Ending: 27

Equation:

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Graphic Organizer - Change Problems (Add To or Take From)

Beginning: ○ → Change + or -: ○ → Ending: ○

Equation:

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# Questions & Answers

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# Contact

Robyn Tedesco  
Daniels Farm School  
Trumbull, CT

[rtesesco@trumbullps.org](mailto:rtesesco@trumbullps.org)

<https://www.robintedesco.com>

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