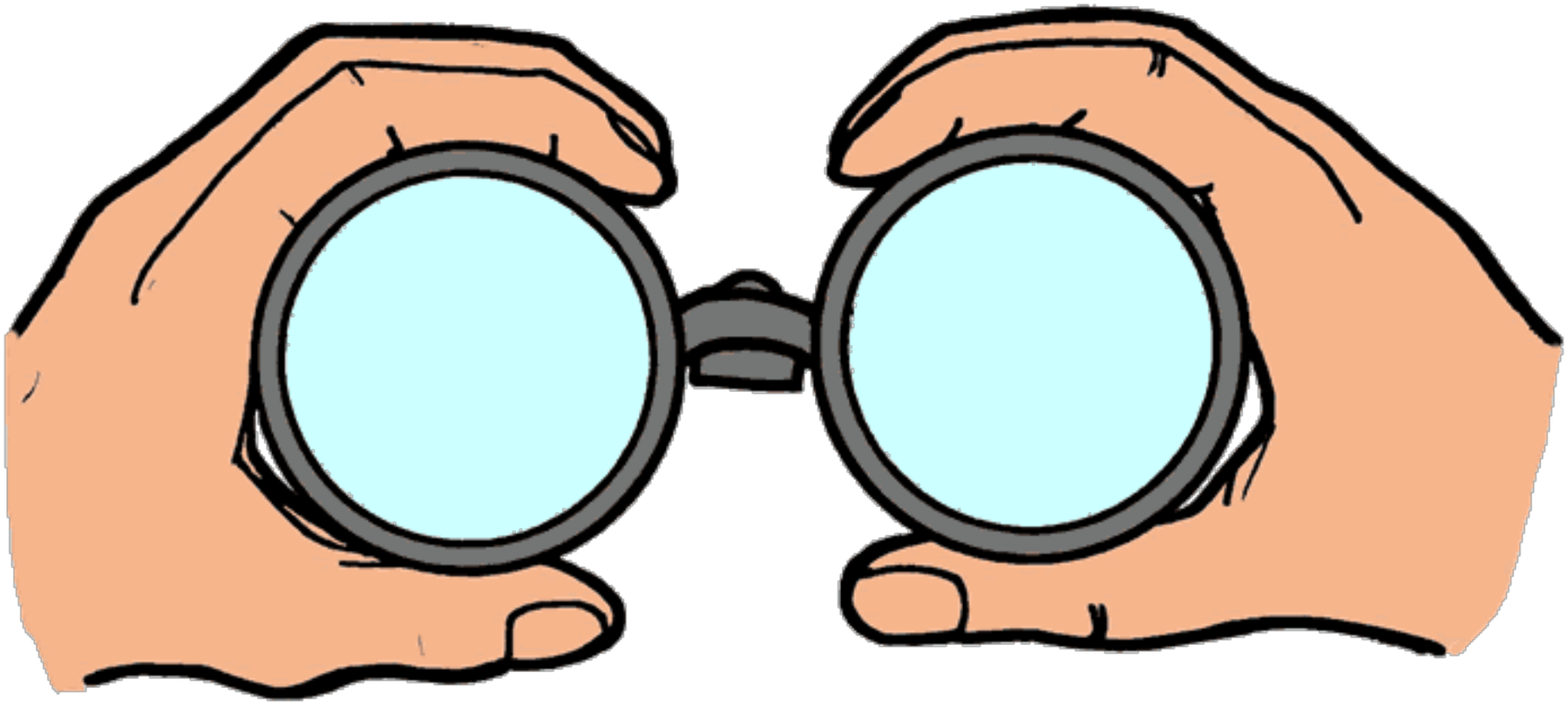

# Counting Collections 3 - 7

Presented by Jen Barker
Green Timbers, Surrey, BC
January 30th, 2018

# A little about Me…

- I am a Numeracy Helping Teacher in
- Have 19 years experience in classrooms K - 5
- Mom to M&M, aged 14 and 12
- Twitter: @BarkerJbarker
- Presentation will be posted on www.meaningfulmathmoments.com
- Email: barker_jennifer@surreyschools.ca
- Believe Math should be meaningful, authentic, engaging and build conceptual understanding

- Thinking like one of your students, how might you count a collection using some of the tools available?
- Use the tools to help you to organize your items in to equal groups.
- How might you record how you counted?



Gallery Walk - Take some time to walk around to each of the tables and look at how your colleagues counted and the different tools they used.

# Learning Intentions

- I understand what Counting Collections are.
- I understand how Counting Collections can be used to develop students' number sense, understanding of operations, computational fluency, fractions, decimals, percent, as well as prime and composite numbers.
- I see how Counting Collections can meet the diverse needs of today's classrooms.
- I understand my role as the teacher in conferring with students while they count to notice, name, and nudge

# How does this relate to the revised Curriculum?

BRITISH COLUMBIA
Ministry of Education

**Area of Learning: MATHEMATICS** **Grade 5**

## BIG IDEAS

| | | | | |
|---|---|---|---|---|
| **Numbers** describe quantities that can be represented by equivalent fractions. | Computational **fluency** and flexibility with numbers extend to operations with larger (multi-digit) numbers. | Identified regularities in number **patterns** can be expressed in tables. | Closed shapes have **area and perimeter** that can be described, measured, and compared. | **Data** represented in graphs can be used to show many-to-one correspondence. |

## Learning Standards

| Curricular Comp | Content |
|---|---|
| *Students are expect to do ing:*<br>**Reasoning and analyzing**<br>• Use reasoning to explore and ections<br>• **Estimate reasonably**<br>• Develop **mental math strategies** and s to make sense of quantities<br>• Use **technology** to explore mathematics<br>• **Model** mathematics in contextualized experiences<br>**Understanding and solving**<br>• Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving<br>• Visualize to explore mathematical concepts<br>• Develop and use **multiple strategies** to engage in problem solving<br>• Engage in problem-solving experiences that are **connected** to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures<br>**Communicating and representing**<br>• **Communicate** mathematical thinking in many ways<br>• Use mathematical vocabulary and language to contribute to mathematical discussions<br>• **Explain and justify** mathematical ideas and decisions | *Students are expected to know the following:*<br>• **number concepts** to 1 000 000<br>• decimals to thousandths<br>• equivalent fractions<br>• whole-number, fraction, and decimal **benchmarks**<br>• addition and subtraction of **whole numbers** to 1 000 000<br>• **multiplication and division** to three digits, including division with remainders<br>• addition and subtraction of **decimals** to thousandths<br>• **addition and subtraction facts to 20** (extending computational fluency)<br>• multiplication and division **facts to 100** (emerging computational fluency)<br>• rules for increasing and decreasing patterns with words, numbers, symbols, and variables<br>• **one-step equations** with variables<br>• area measurement of squares and rectangles<br>• relationships between **area and perimeter**<br>• duration, using measurement of **time**<br>• **classification** of prisms and pyramids |

# What Curricular Competencies are fostered?

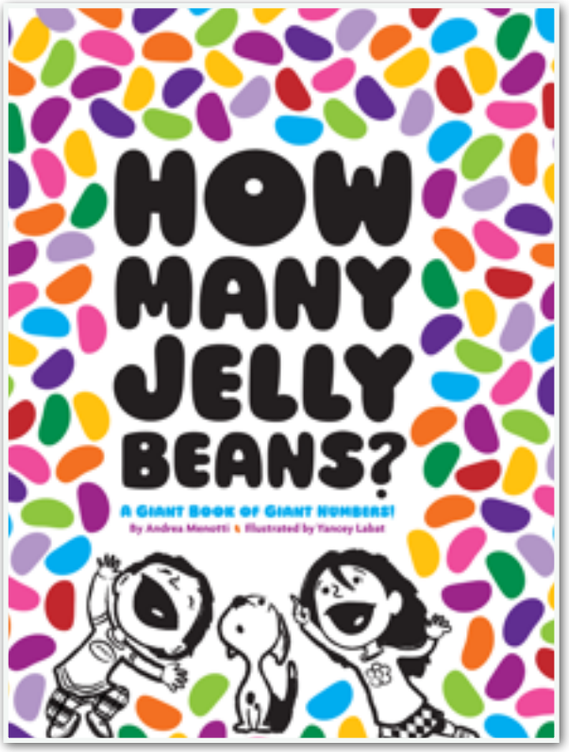
- **Reasoning and Analyzing** through estimating and developing mental math strategies and abilities to make sense of quantities
- **Understanding and Solving** through using multiple strategies
- **Communicating and Representing** their thinking not only orally but through concrete materials, pictorial representations, and symbolically
- **Connecting and Reflecting** through visualizing and describing mathematical concepts, connecting mathematical concepts, and sharing and reflecting upon their thinking

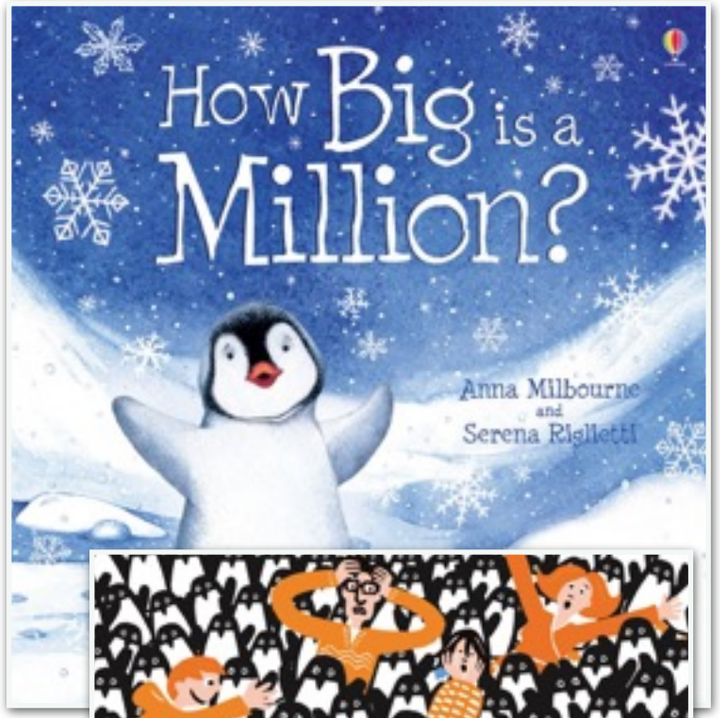
# What is the purpose of Counting Collections in Intermediate?

**They can assist students in developing:**

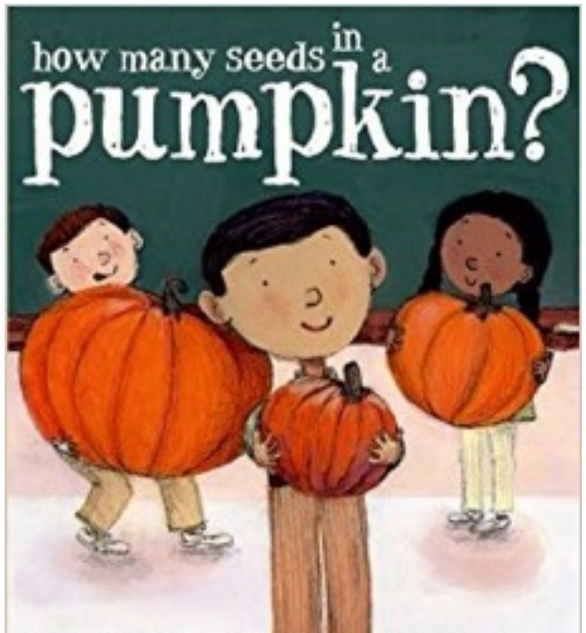
- Relative size
- Comparing and ordering numbers
- Skip counting
- Place Value
- Estimation skills
- Multiplicative thinking
- Understanding of how division and multiplication are connected
- Understanding that fractions, decimals, and percent are numbers that represent equal parts of a whole
- Understanding of factors and multiples in relation to prime and composite numbers

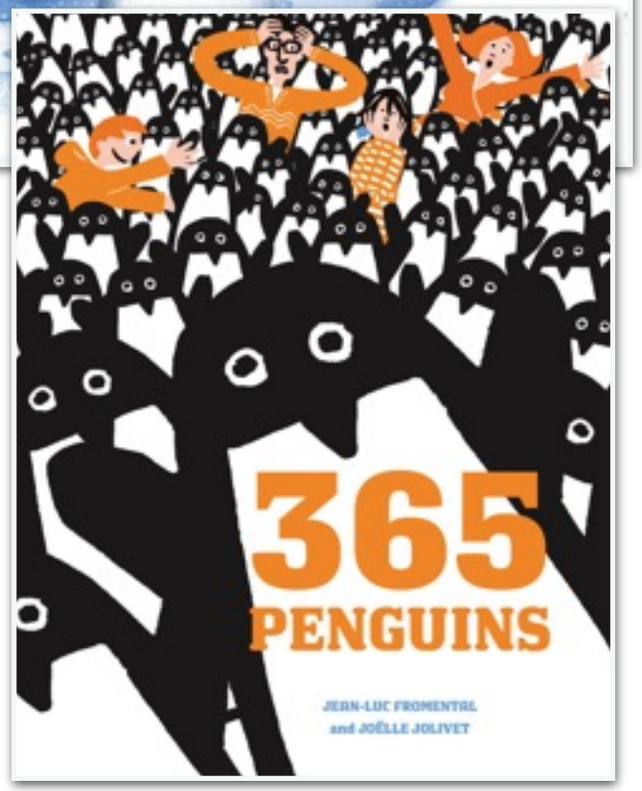
# Launch with a Counting Book

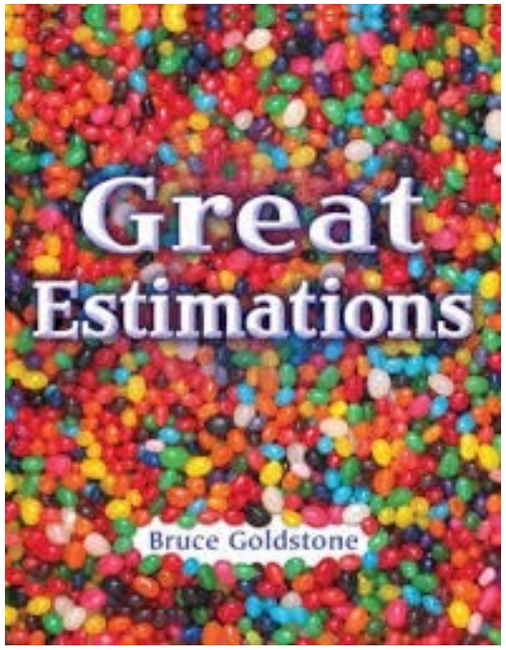


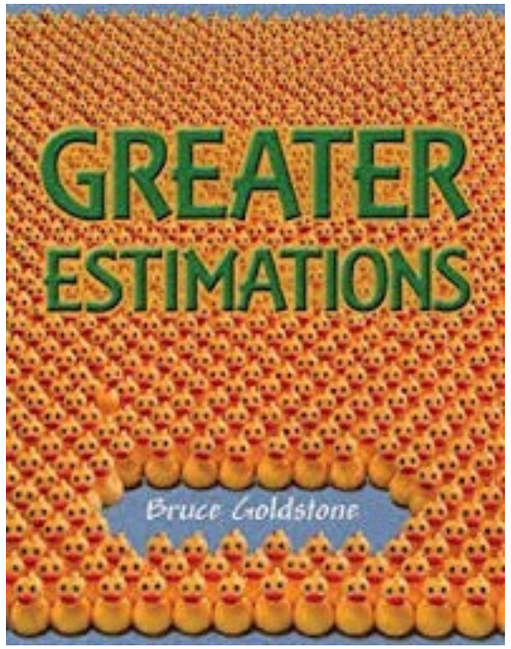





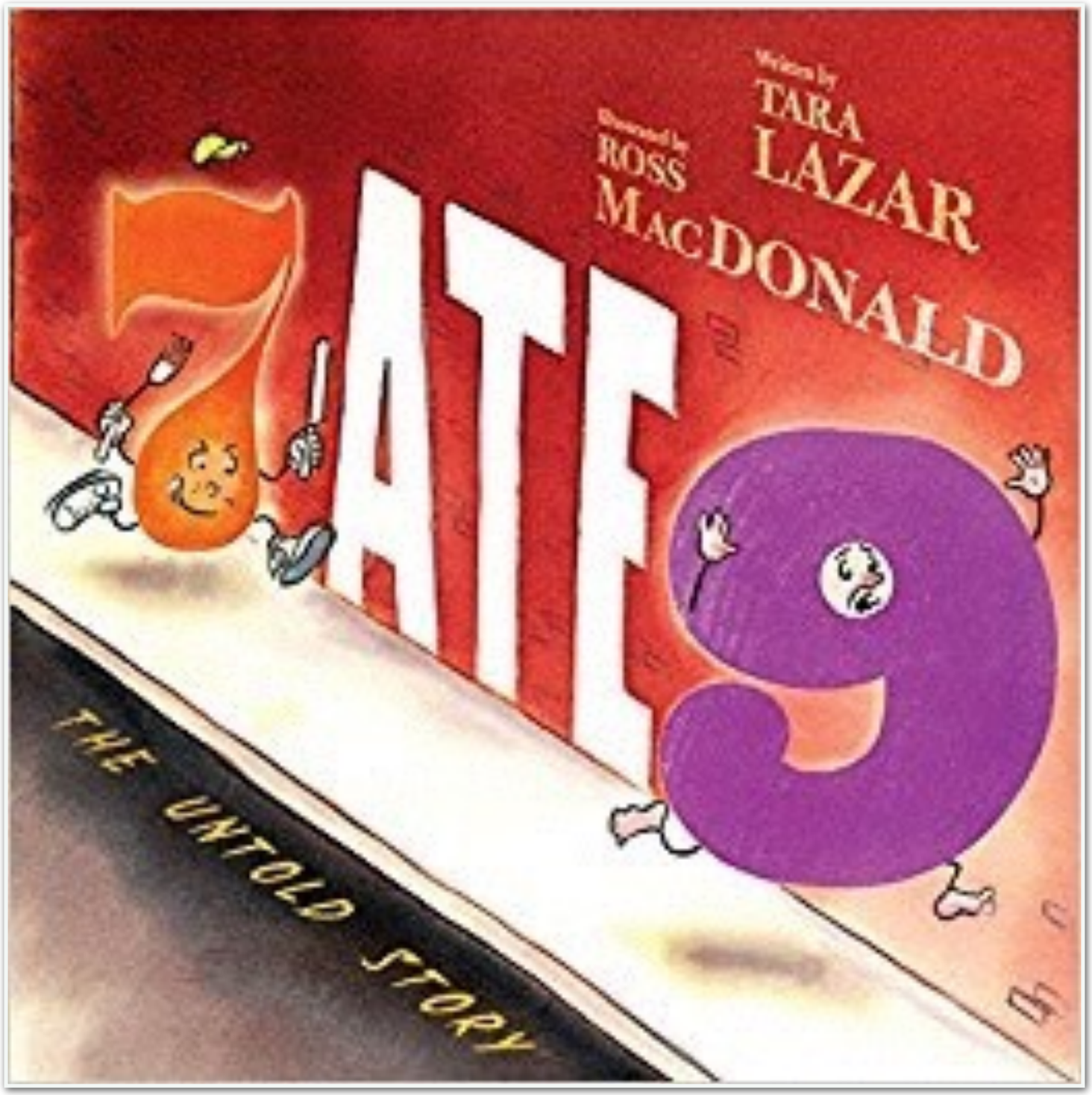



What provocations might you offer for counting collections after reading aloud this book?

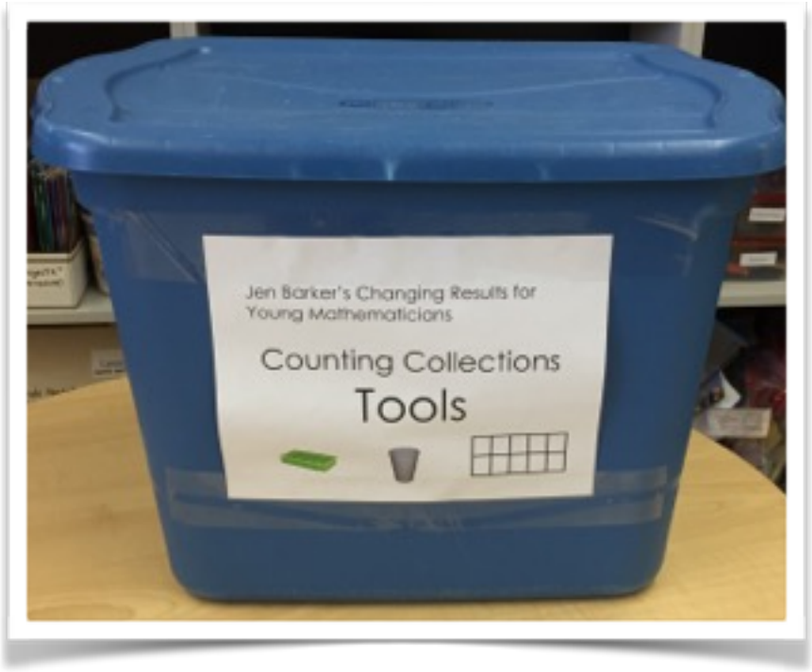


# HOW DO YOU INTRODUCE COUNTING COLLECTIONS

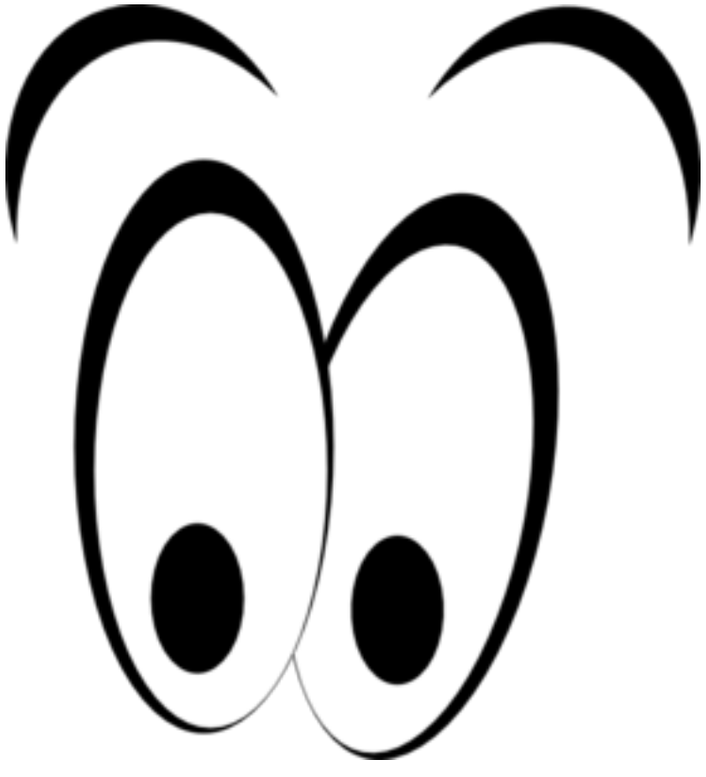

Items you could use:

- anything - straws, bottle caps, buttons, pompoms, craft sticks, beans, beads, toothpicks, mini-erasers, play cards, small animals

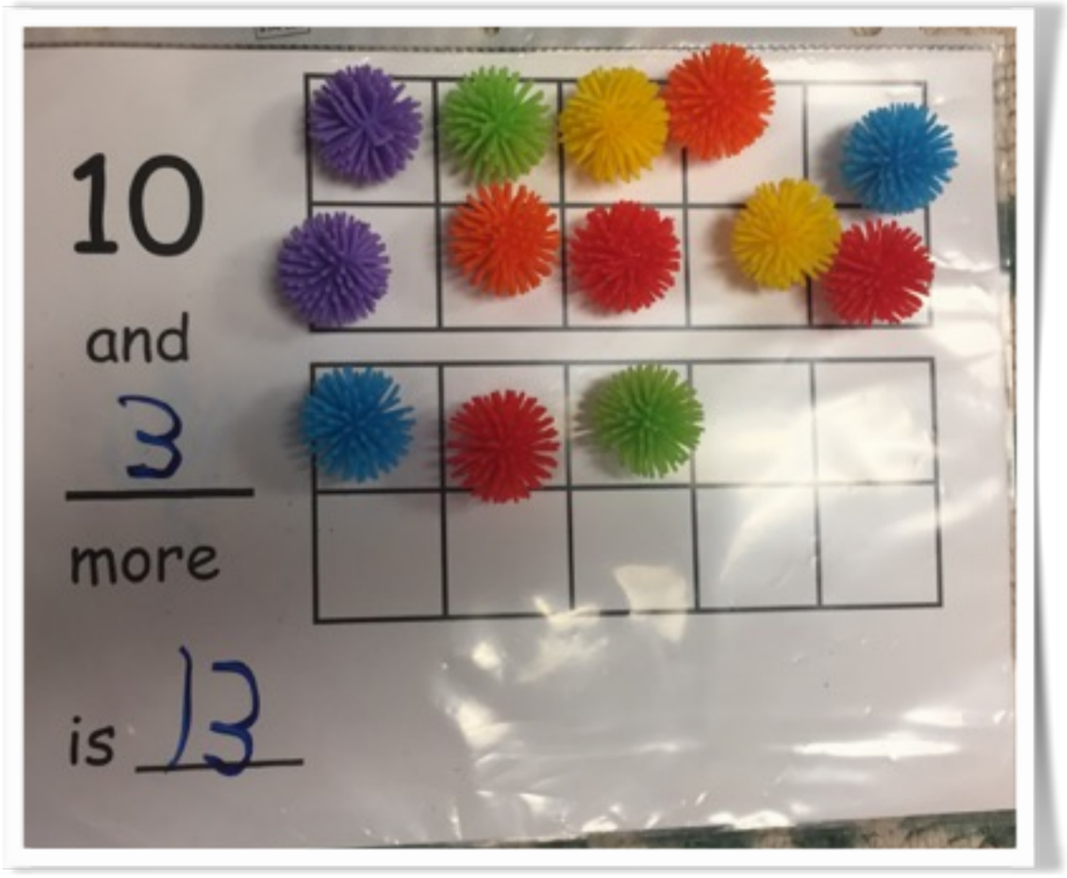
# Why might we choose to use tools when we count? How can we use different tools?


# LET'S LOOK AT SOME EXAMPLES ACROSS THE GRADES








Learning is developmental!

Skip Counting: Counting by 10's

Place Value: How many tens and ones?

How many more do you need to make 100? 500? 100?

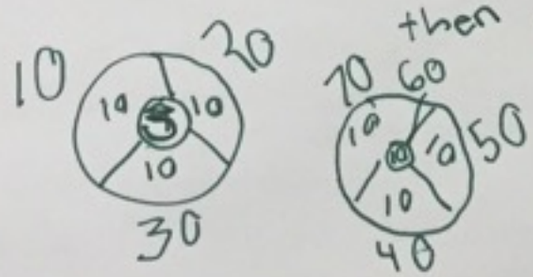
Name _____ Date _____

**Counting Collections in Intermediate**

What did you count today? I think 51

Estimate how many you think there are in the collection 51

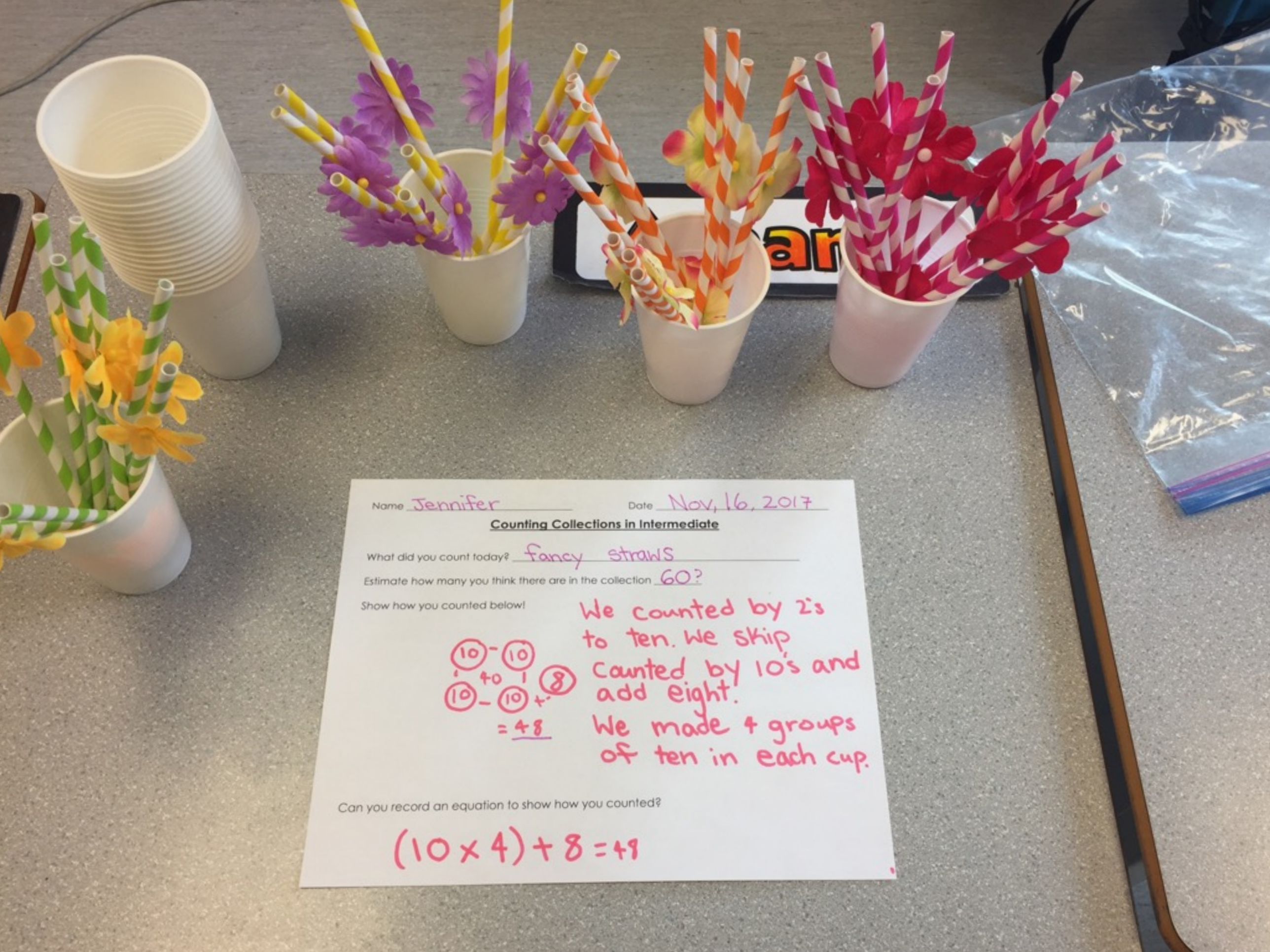
Show how you counted below! I counted by 1 to make 10 then we counted by 10




70 and 3

Can you record an equation to show how you counted?

I counted by



Name Jennifer Date Nov, 16, 2017

**Counting Collections in Intermediate**

What did you count today? fancy straws

Estimate how many you think there are in the collection 60?

Show how you counted below!

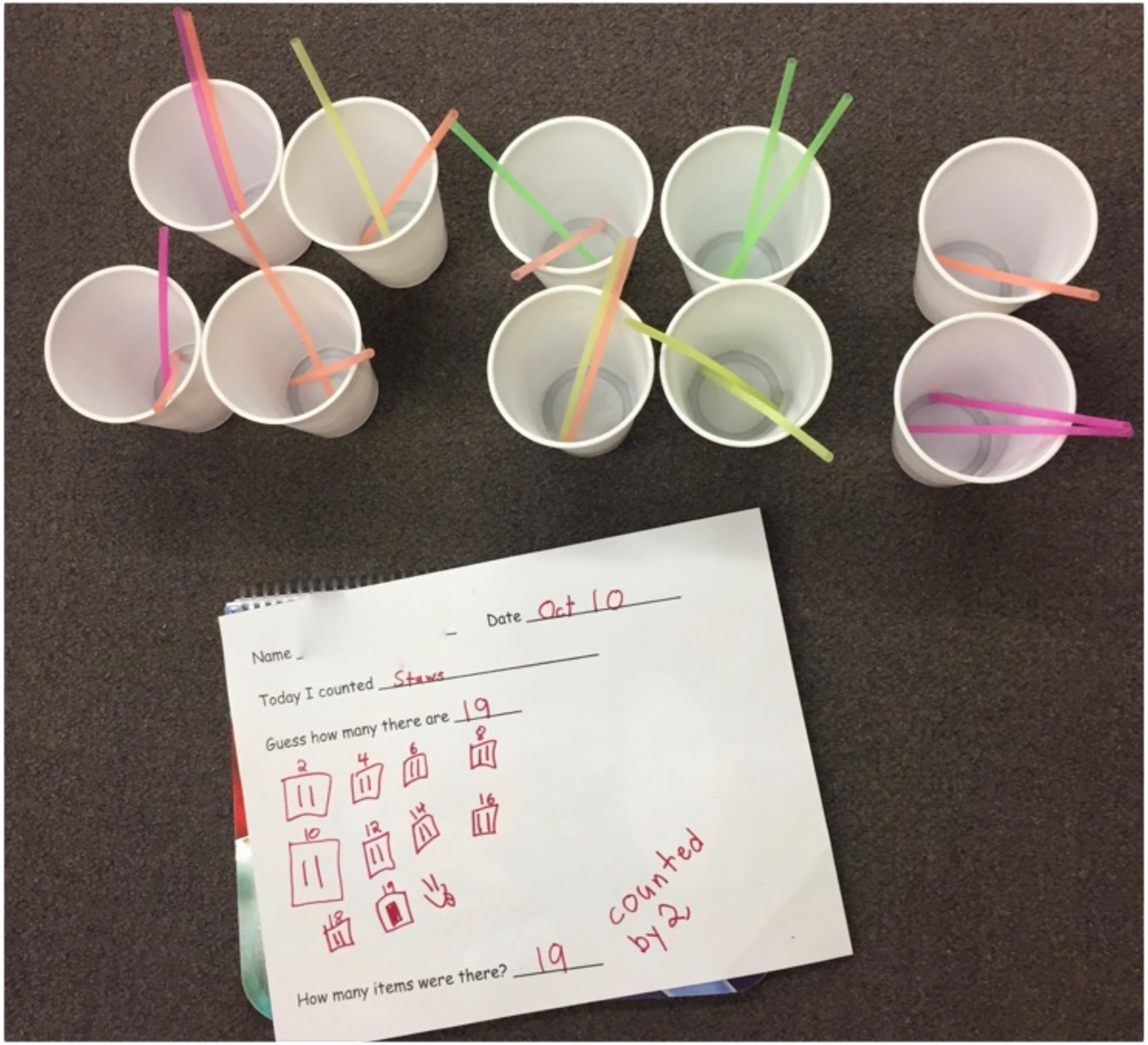
10 - 10
40
10 - 10 + 8
= 48

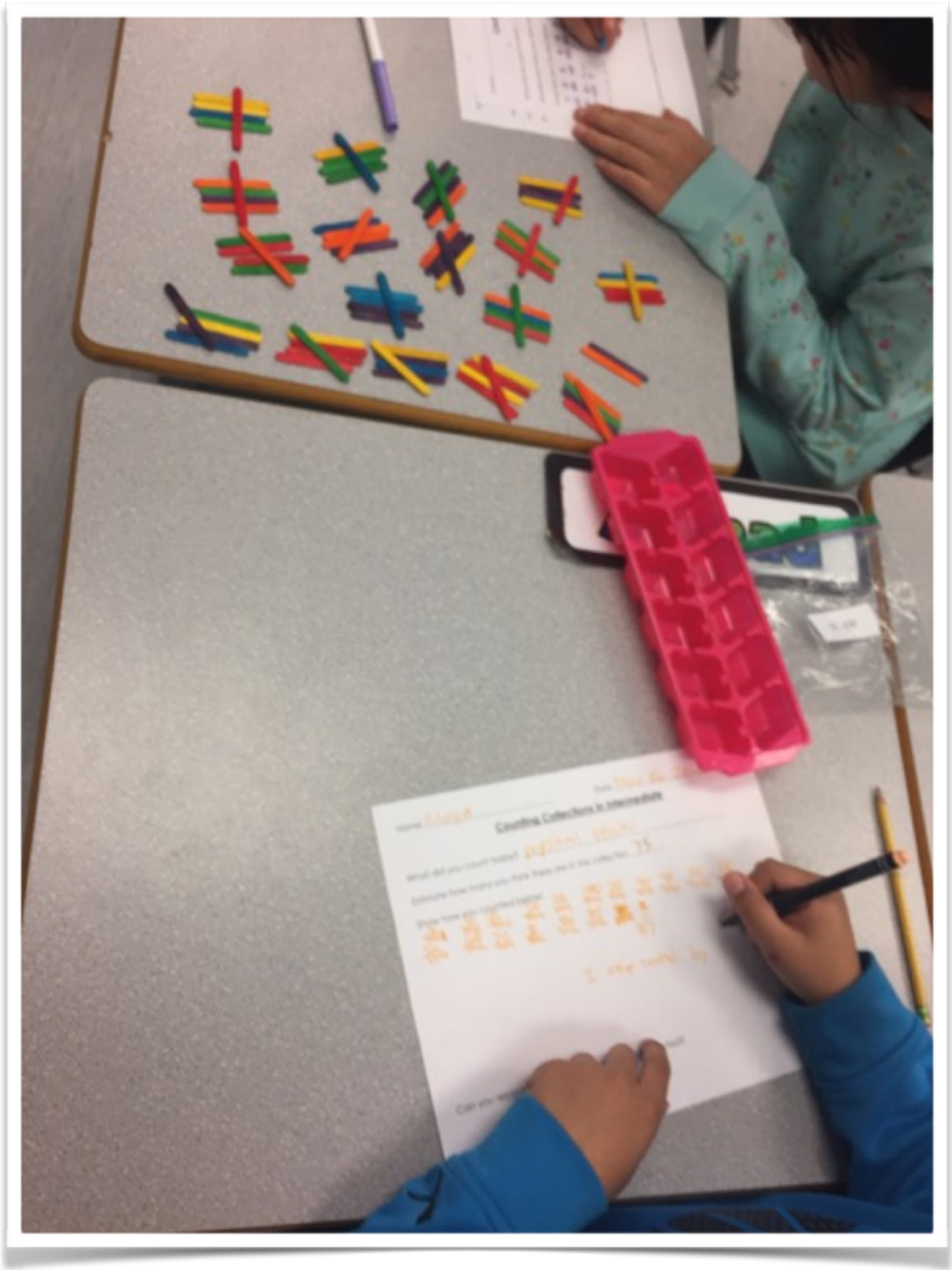
We counted by 2's to ten. We skip counted by 10's and add eight.

We made 4 groups of ten in each cup.

Can you record an equation to show how you counted?

$(10 \times 4) + 8 = 48$


Date Oct 10
Name
Today I counted Straws
Guess how many there are 19
How many items were there? 19
counted by 2



How did you decide how to group the popsicle sticks?

How could we record how you counted using “groups of”?

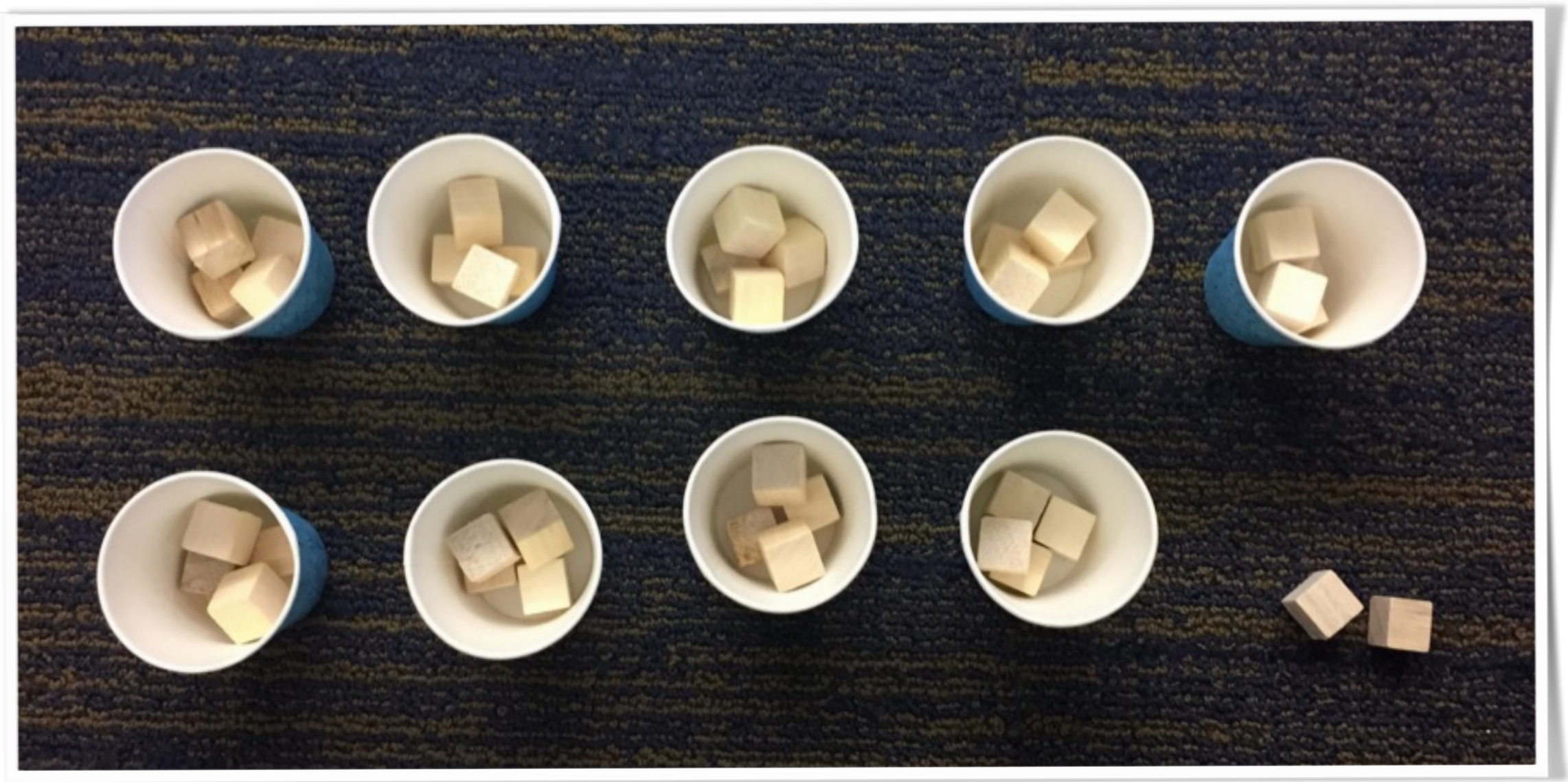
Tell me about how you organized your collection?

How does this connect to multiplication?

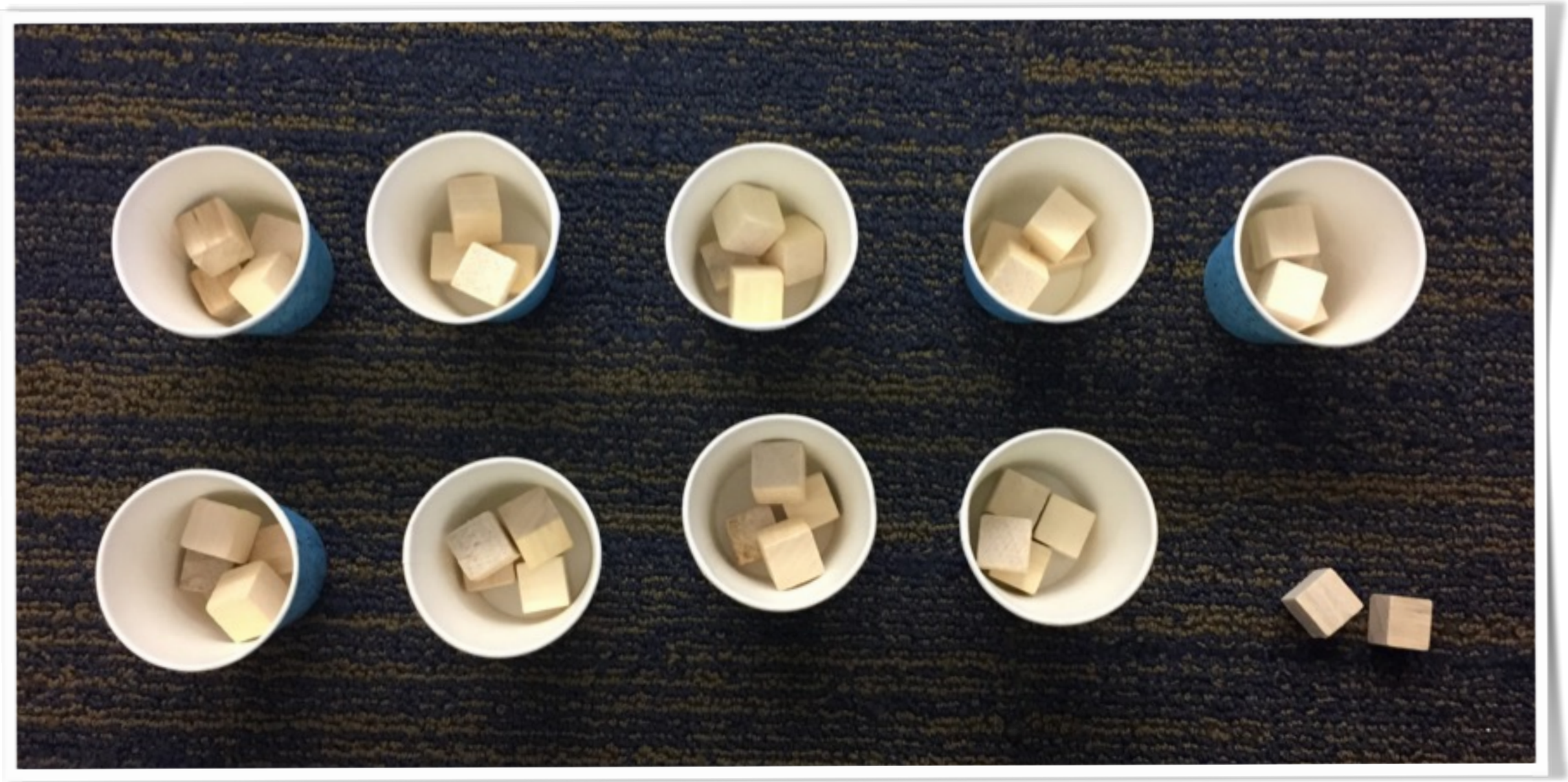
You described this as
(6 x 5) + 1
Can you describe it another way?

How might you describe how you counted using division?

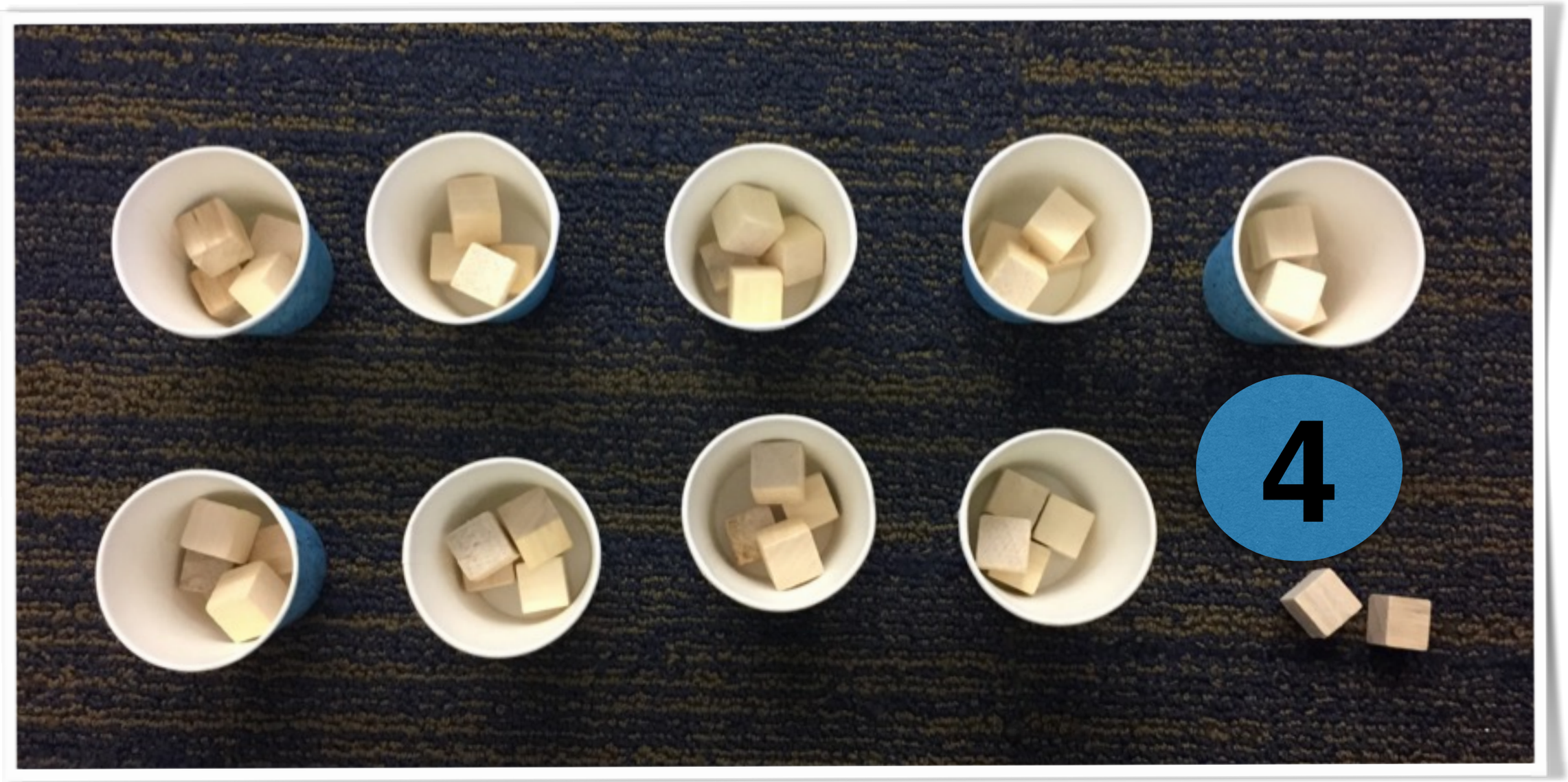

# What questions could we ask in our conferral?



Tell me about your collection.
How many groups do you have?
How many are in each group?
If you don’t know the answer to 9 groups of 4,
could you think about another question you do know?



I also know how to multiply by 10.
I could add another cup.
(10 x 4) + 2  - 4 =
(10 x 4) - 2 = 38



I know 4 x 4 = 16

How might we record that?

9 x 4 = (4 x 4) + (4 x 4) + 6

How might this strategy help you with other multiplication questions you are unsure of?

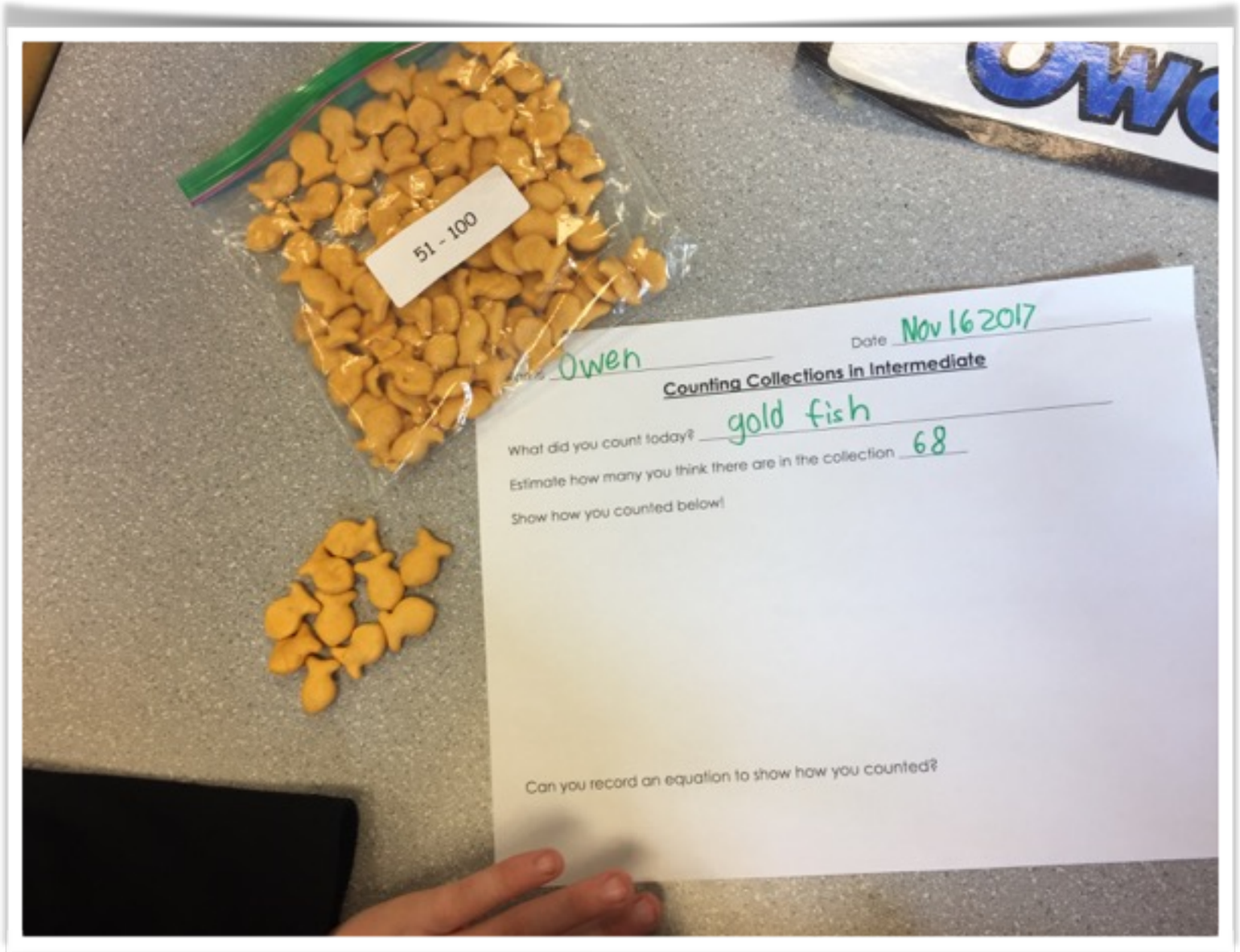
# BEFORE:
# A Focused Mini Lesson

- How might we estimate?
- What is a range?
- How could we use this new tool?
- How might we record how we counted?

- What could I use to help me skip count beyond what I know?
- How does organizing our collections in groups of and/or arrays help us with think about multiplication? And division?
- How might I use multiplication facts I know to help me answer questions I don’t know?

- How could you describe how you counted your collection through the lens of division?
- How many different related equations can you record that show how you counted your collections?
- How might we use our collections to think about factors and multiples?
- How might you count your collections through the lens of fractions of a set?
- If 100 items were considered to be one whole, what fraction do you have? What if 10 items were considered a whole?
- Being responsive - I've been noticing… and I'm wondering…

# What will help us to estimate?



# DURING: Students are engaging in counting

- In partners choose a collection and a tool. Note - tools are not always needed. It depends on the learning intention.
- After students have confirmed their total, they record how they counted.
- Lastly, they raise their hand or signal they are ready for the teacher to come and confer with them.

# DURING : Teacher's Role

Our goal is to build content understanding and build their identity as mathematicians. We do this by:

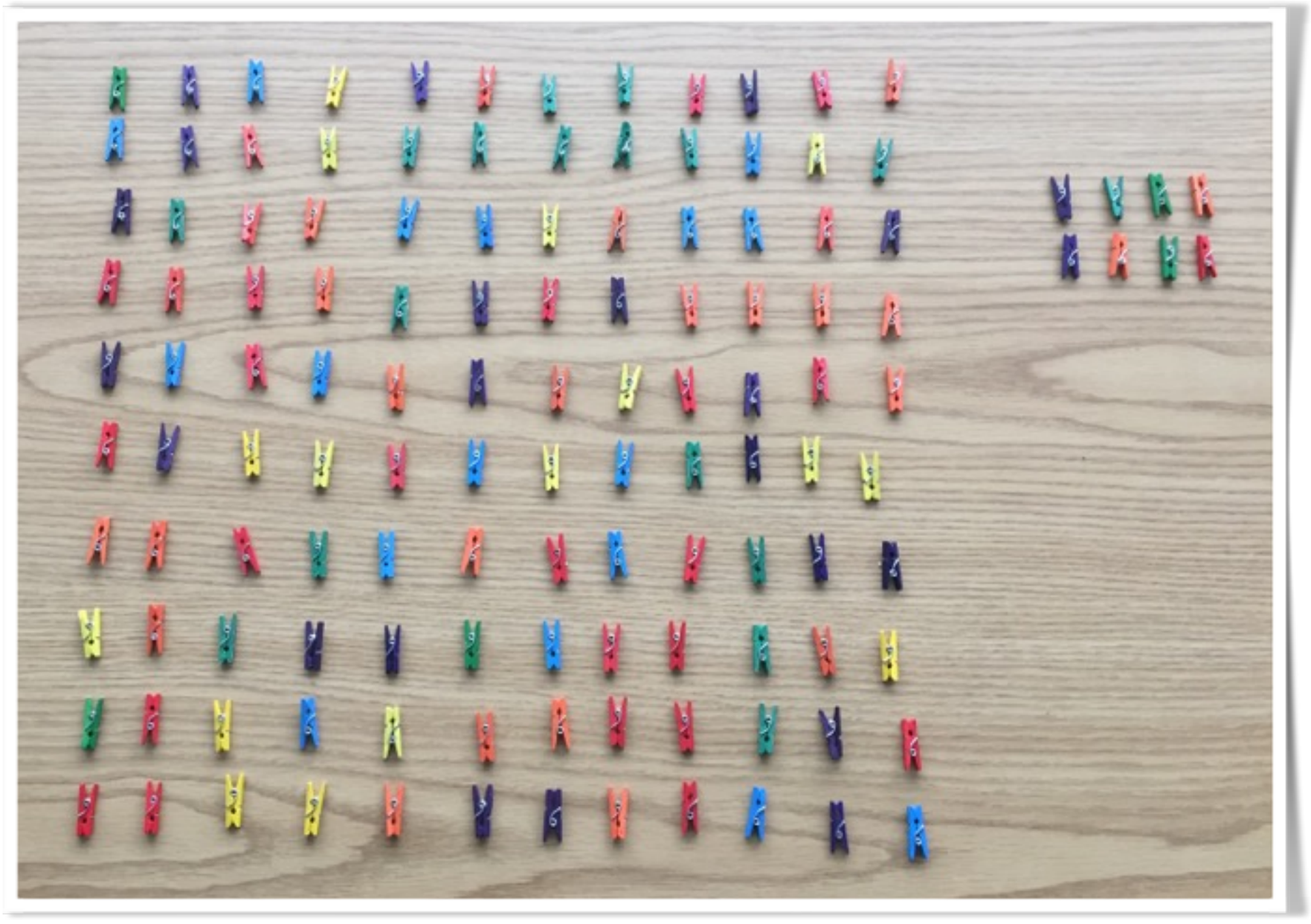
- Ask open questions to get an idea about where their understanding is.
  - How's it going?
  - What are you thinking about?
  - What are you working on figuring out?
  - What are you wondering about?
- Notice the strategies and name them.

# While watching, consider:

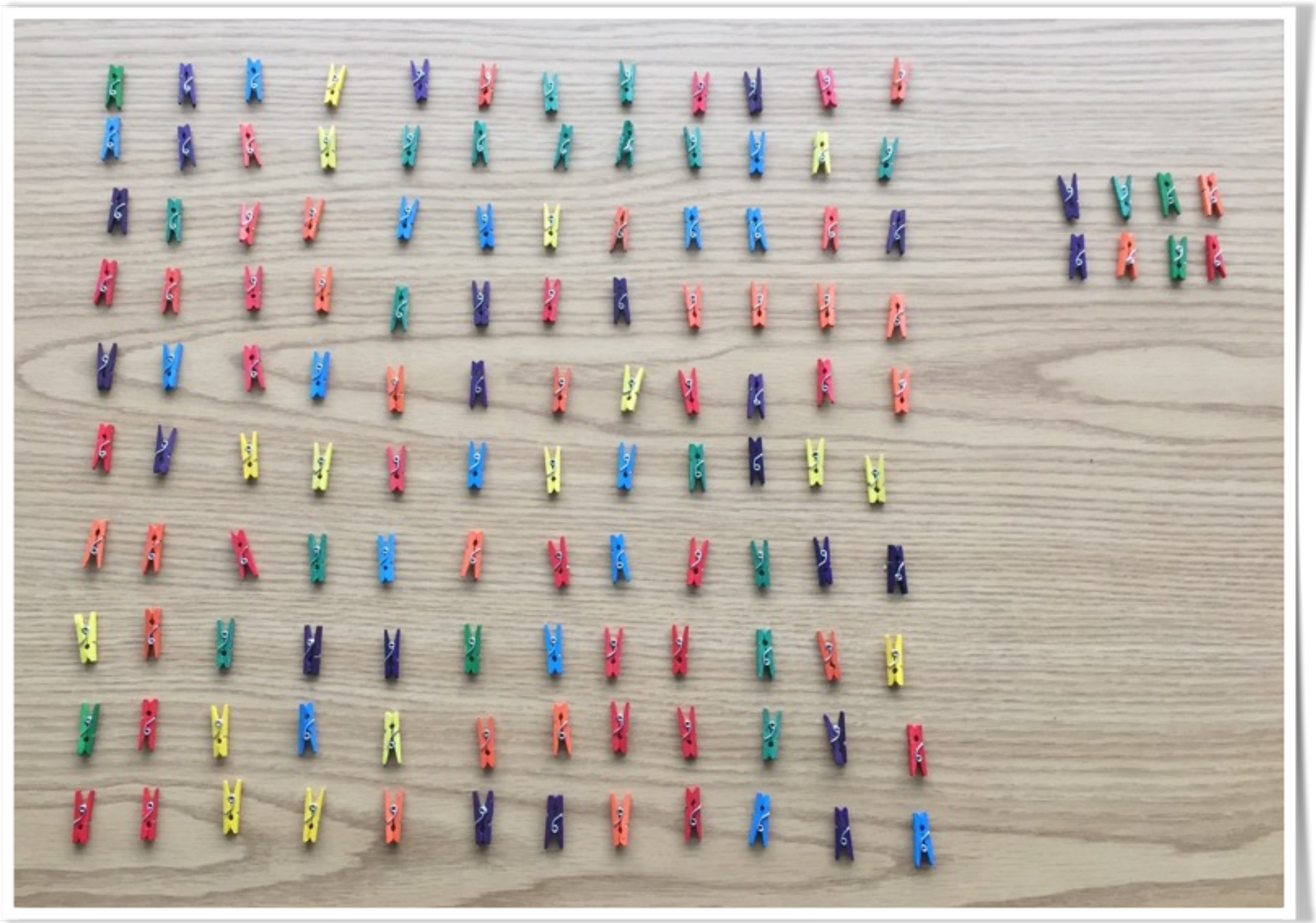
How did the teacher discover what the students understood?

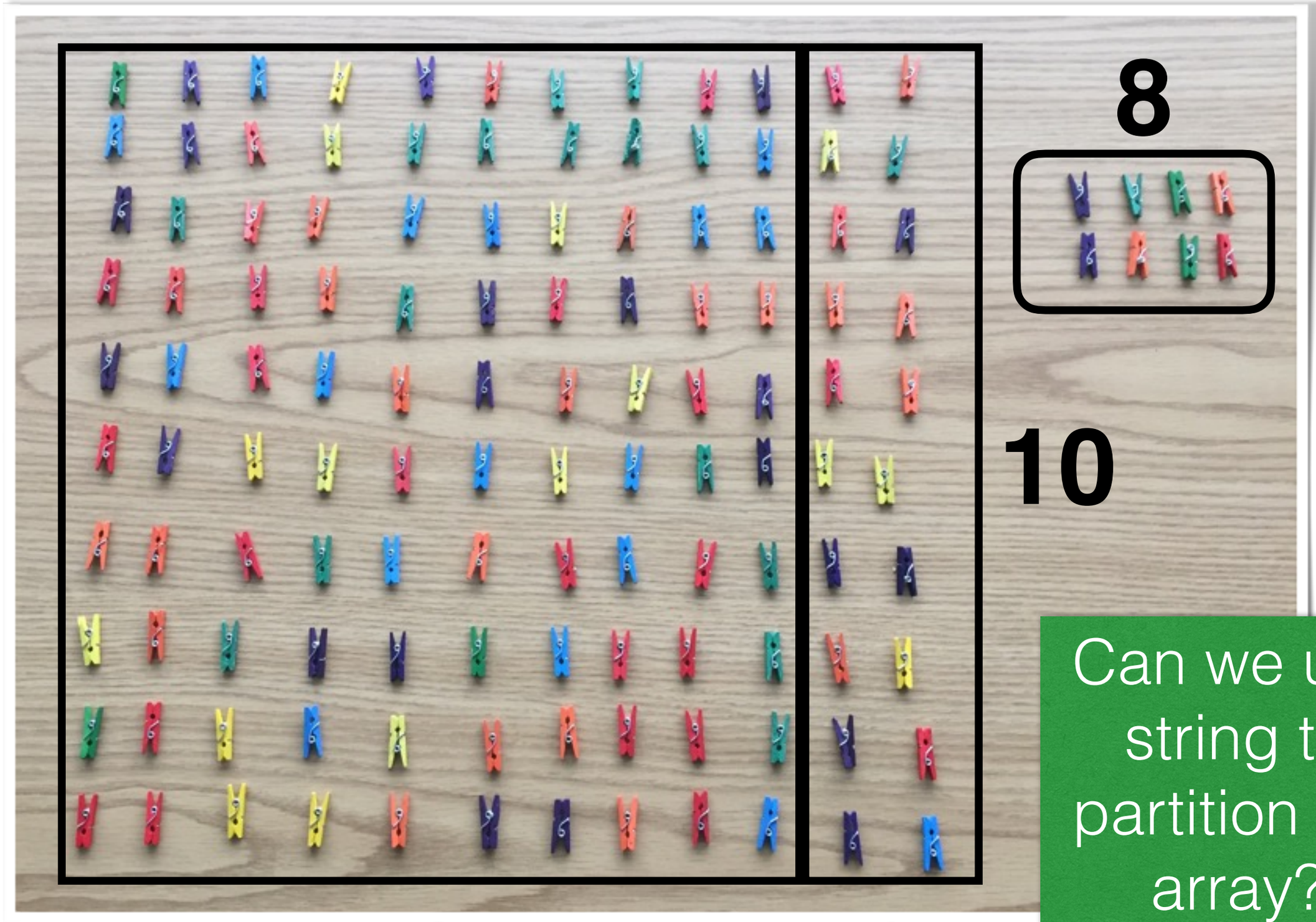
How did she nudge their learning?

Tell me about your collection.
How many groups do you have?
How many are in each group? How did you decide to how many to put in each group?



# What is your plan?
# What are you thinking about?

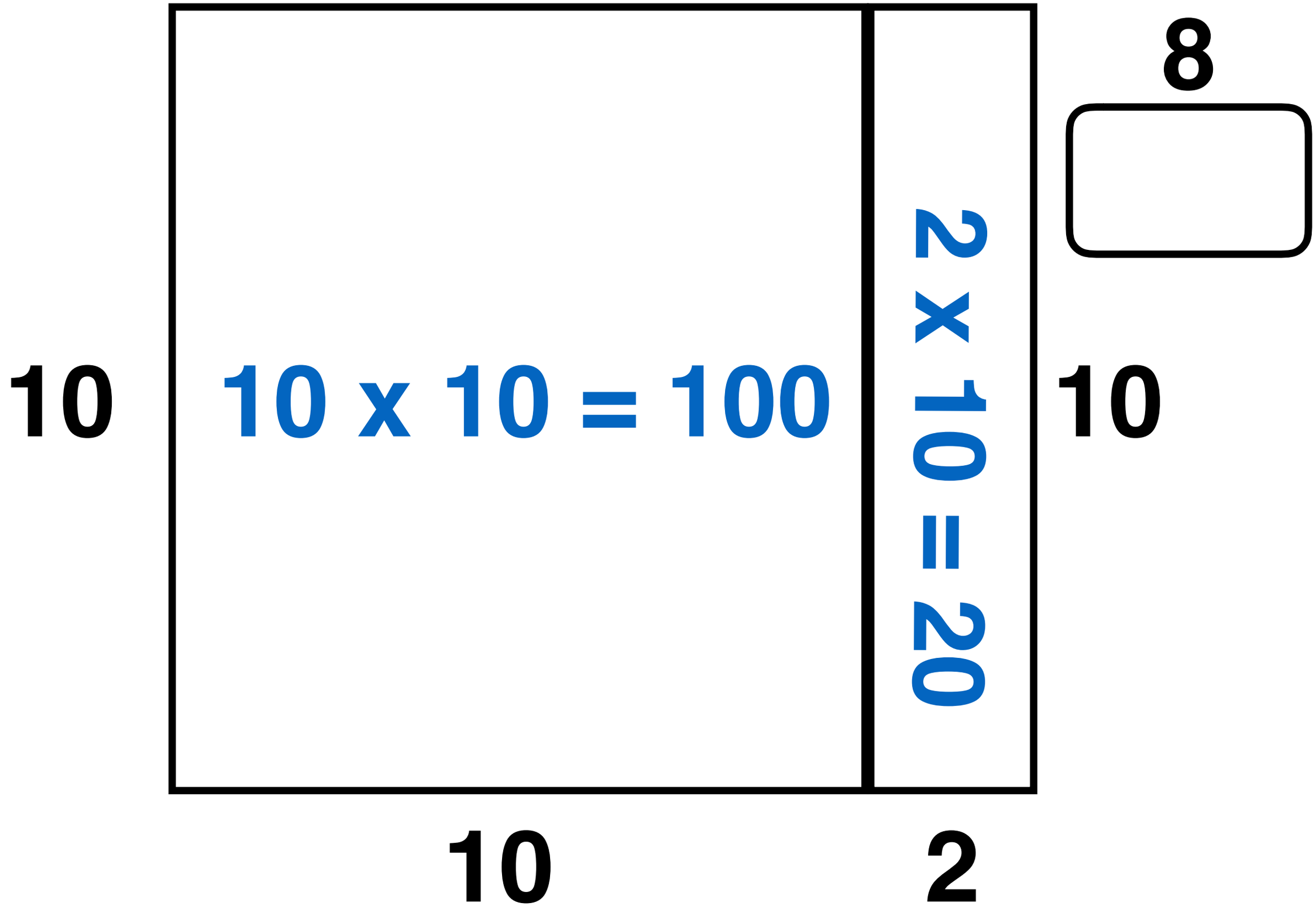





Can we use string to partition the array?

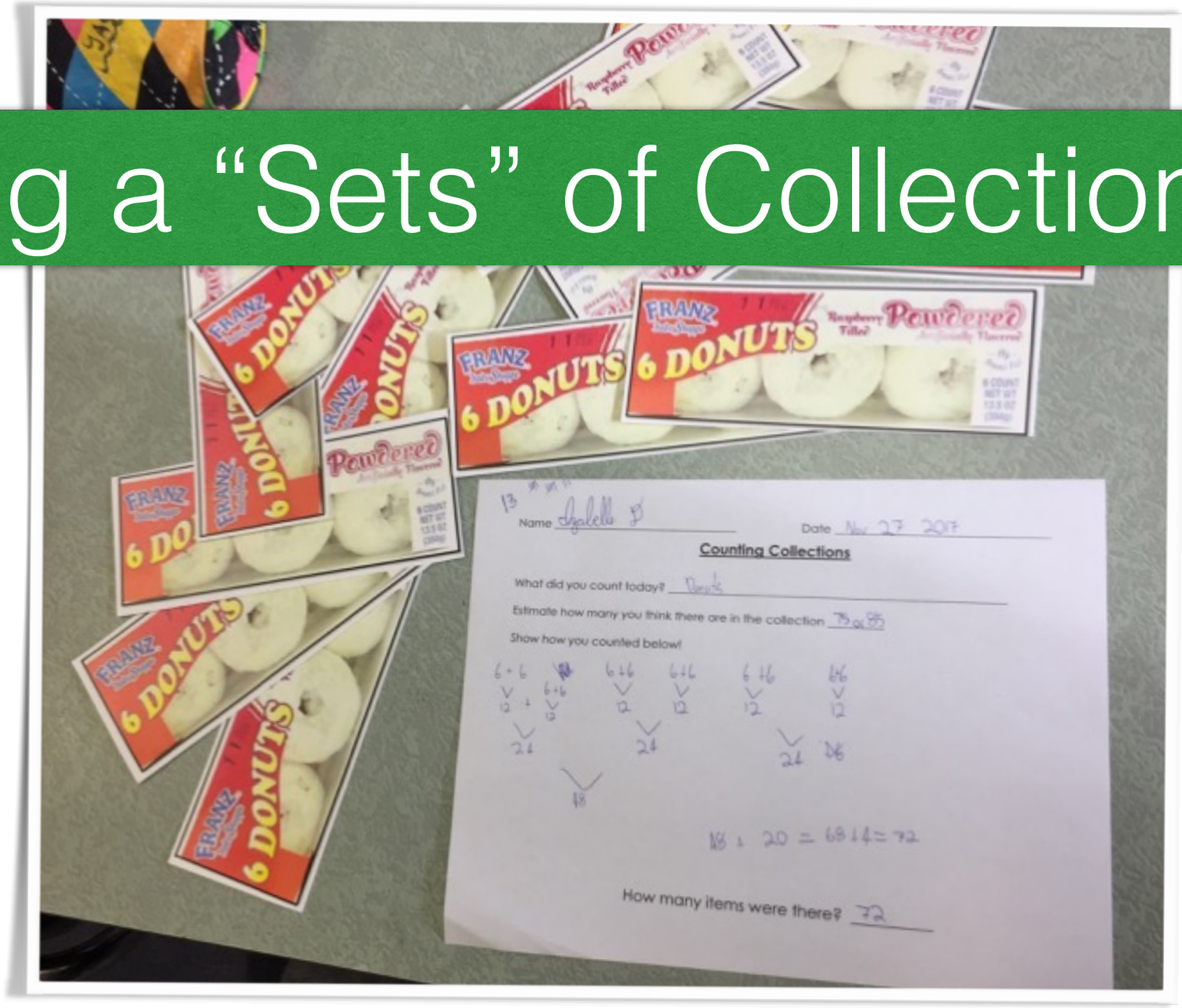
**10** **2**

"I know 10 x 10 = 100"

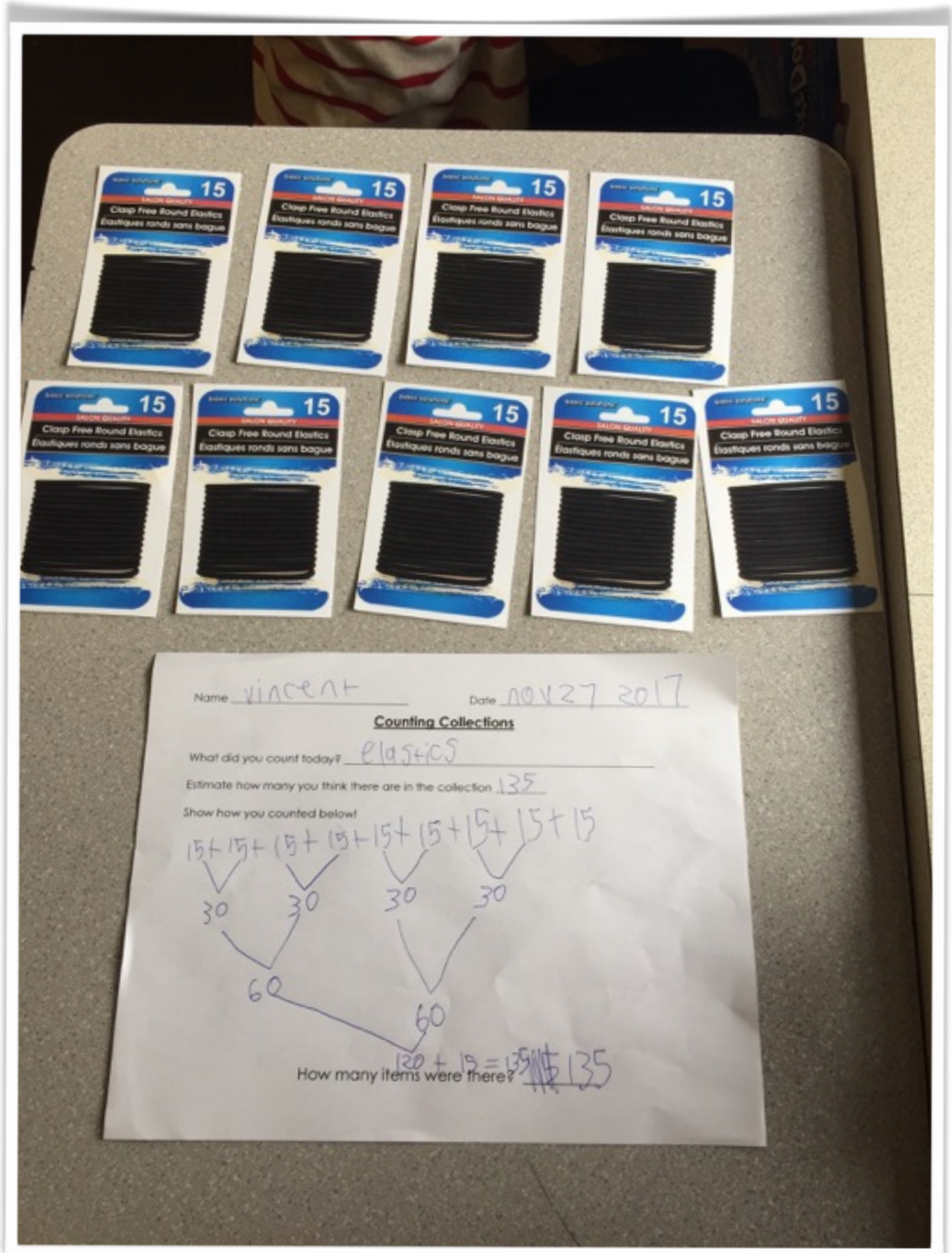



$$(12 \times 10) + 8 = (10 \times 10) + (2 \times 10) + 8$$

# Using a “Sets” of Collection




Students typically will begin by using repeated addition and adding in flexible ways.




What questions might you ask? How could you provide a nudge?

Is this student ready to apply multiplication?

Looking at this collection through the lens of fractions, how might you count them?

What fraction of the set of ducks is white? And yellow?

What fraction of the ducks have a blue bowtie, red bowtie, and no bowtie?

I heard someone describe each coloured group of ninjas as 4/24 of the set. Is there another way we could describe each colour group of ninjas?

Mon

## Counting Collections

My Estimate 21-22 Actual Count 35

What did you count today? Baby Bottles

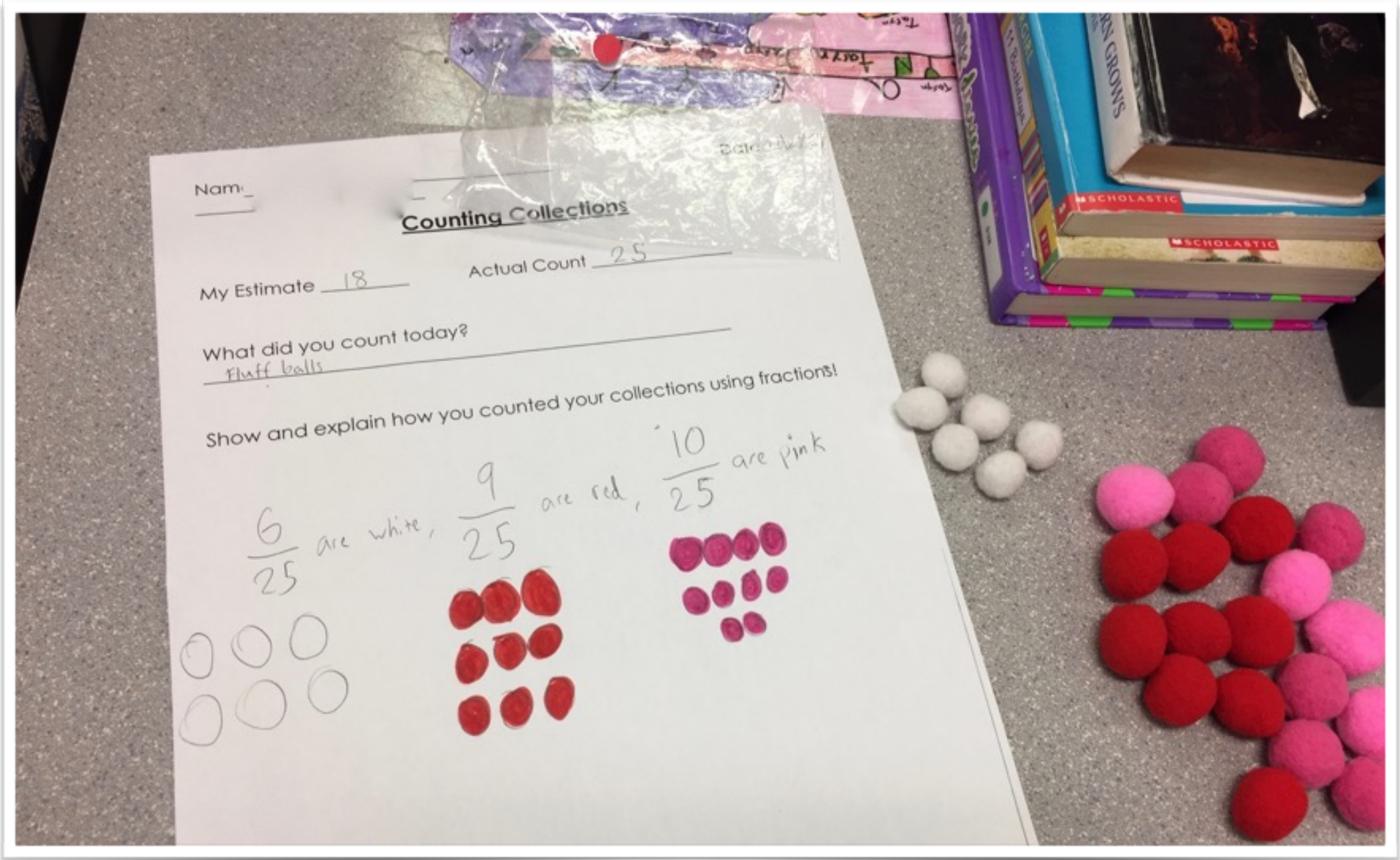
Show and explain how you counted your collections using fractions!

We seperated into color group

$\frac{7}{35}$ or $\frac{1}{7}$ or $\frac{7}{7}$

$\frac{7}{35}+\frac{7}{35}+\frac{7}{35}+\frac{7}{35}+\frac{7}{35}=\frac{35}{35}=1$

# What question could we ask to nudge this student's thinking forward?



# How might you use your collection to think about factors?

“I can make one long row of 40 so I know 1 and 40 are factors. I can make 2 equal rows of 20 so I can add 2 and 20 as factors.”

“I know 3 is not a factor of 40 because I could not make equal groups. I had (3 x 13) + 1 = 40

4 and 10 are factors.

Name Sarah

Date J.18

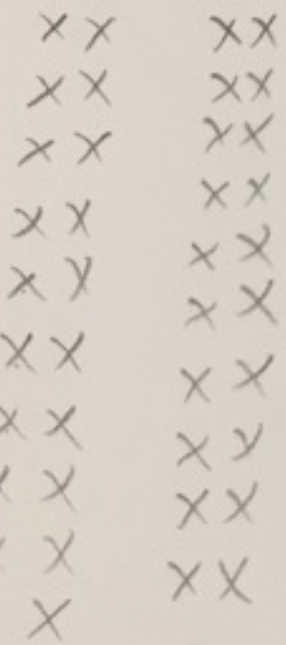
## Counting Collections

My Estimate Range 40-45

Actual Count 40

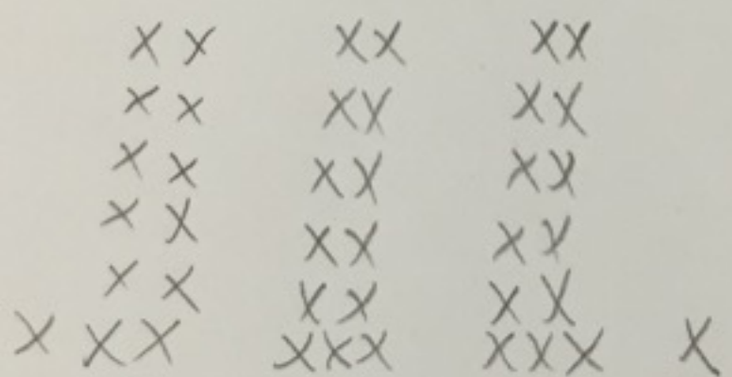
What did you count today? daisies

Show and explain the different ways you counted your collections below!



(2×10) + (2×10)

4×10=40



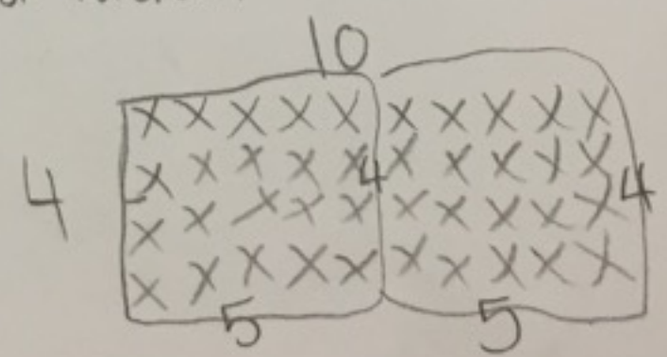
(3×13) + 1 = 40.

3 is not a factor.

Factor

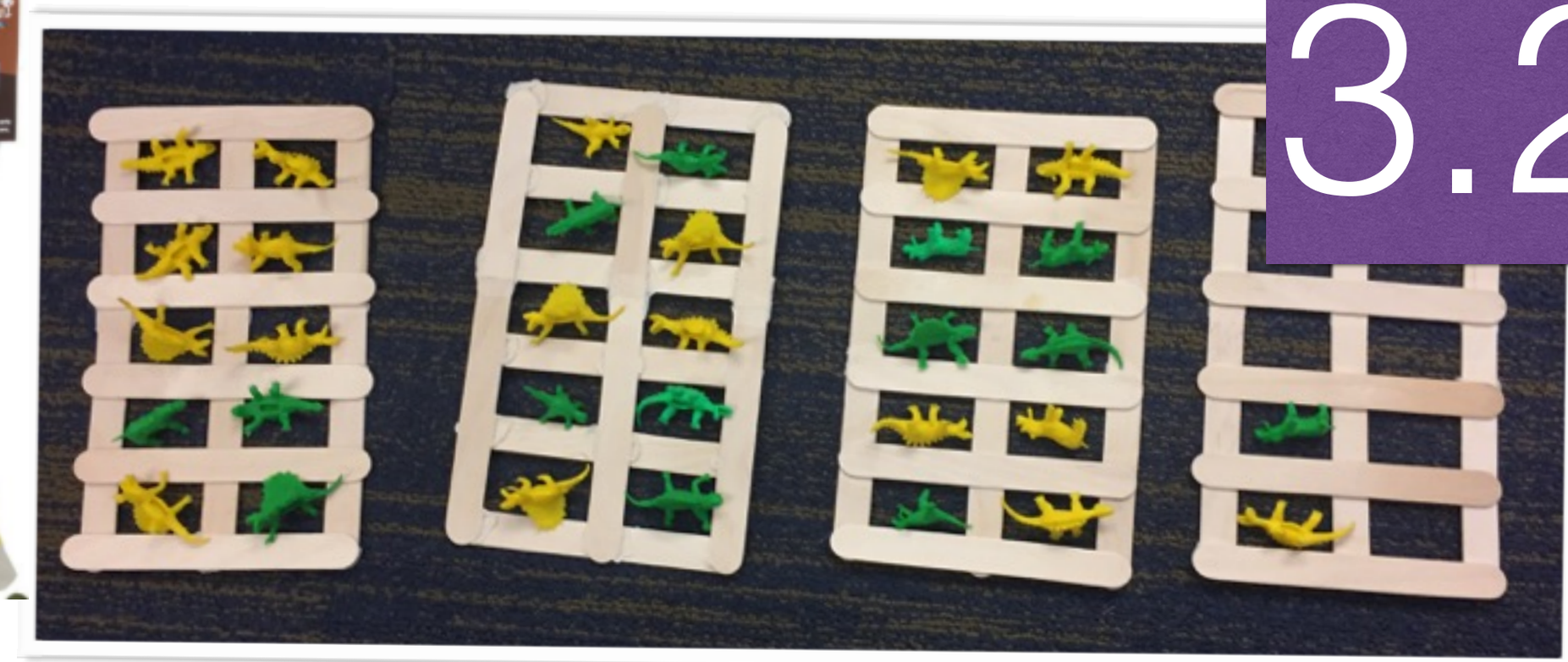
1, 40, 2, 20

4, 10, 5, 8



# How can the tools help us to view our collections through a lens of decimals?

What if bags of dinosaurs came in a package of ten. Then  a full ten frame represented a whole.
How many full bags do I have?

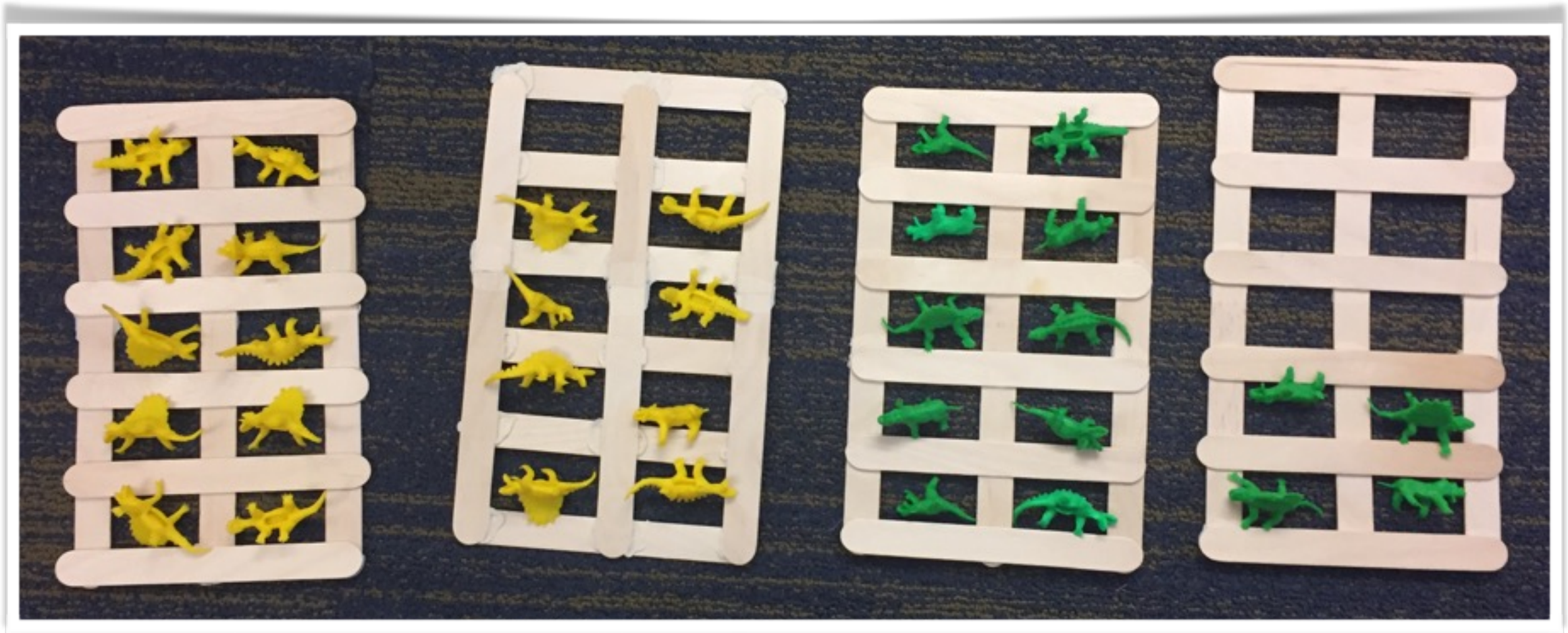



3.2

What could be my next question?

How many are yellow? 1.8

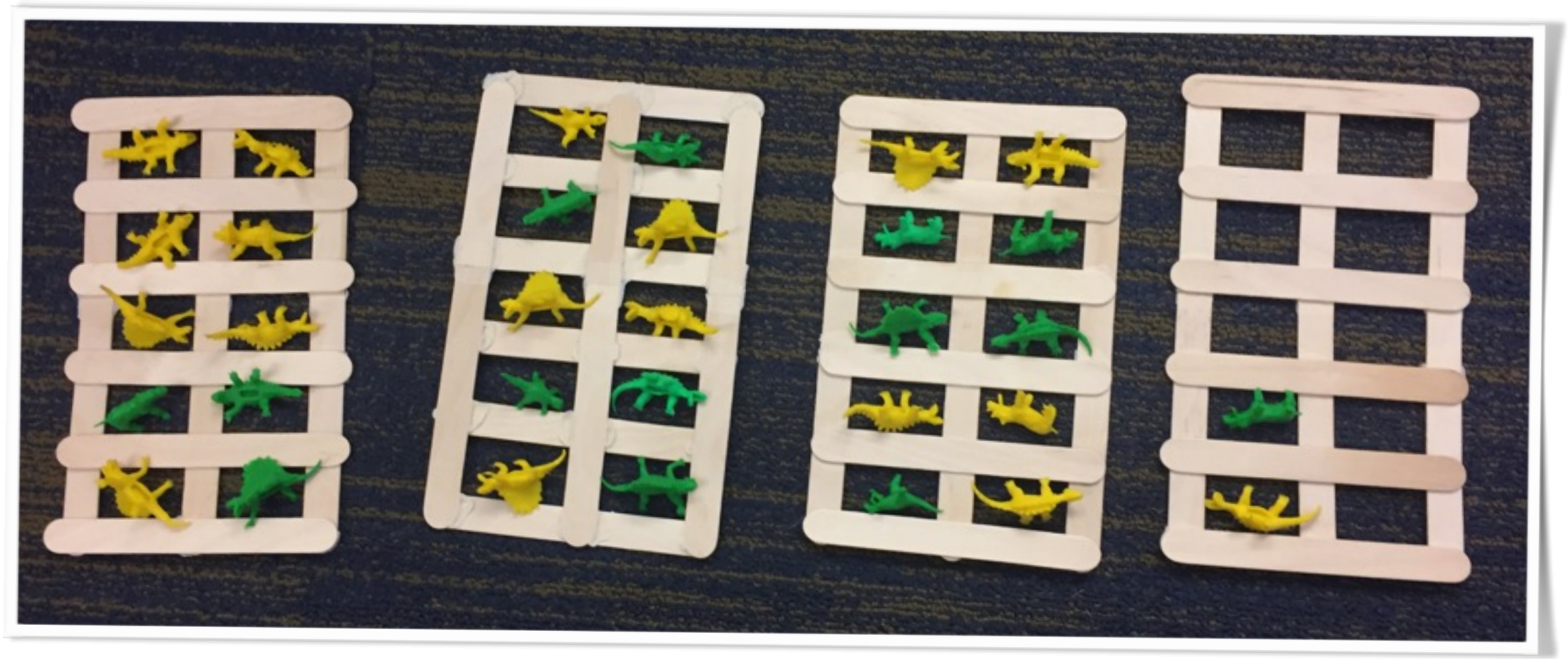
How many are green? 1.4



How might we record this?

1.8 + 1.4 = 3.2

# What if packages came with 100? Then how many would I have?



# How could we describe a collection using percent?

- using base 10 blocks, geoboard, 10x10 grid to represent whole number percents
- finding missing part (whole or percentage)
- 50% = 1/2 = 0.5 = 50:100

Grade Six

ber *percents* and percentage discounts

- conversions, equivalency, and terminating versus repeating decimals, place value, and benchmarks
- comparing and ordering decimals and fractions using the number line
- ½ = 0.5 = 50% = 50:100
- shoreline cleanup

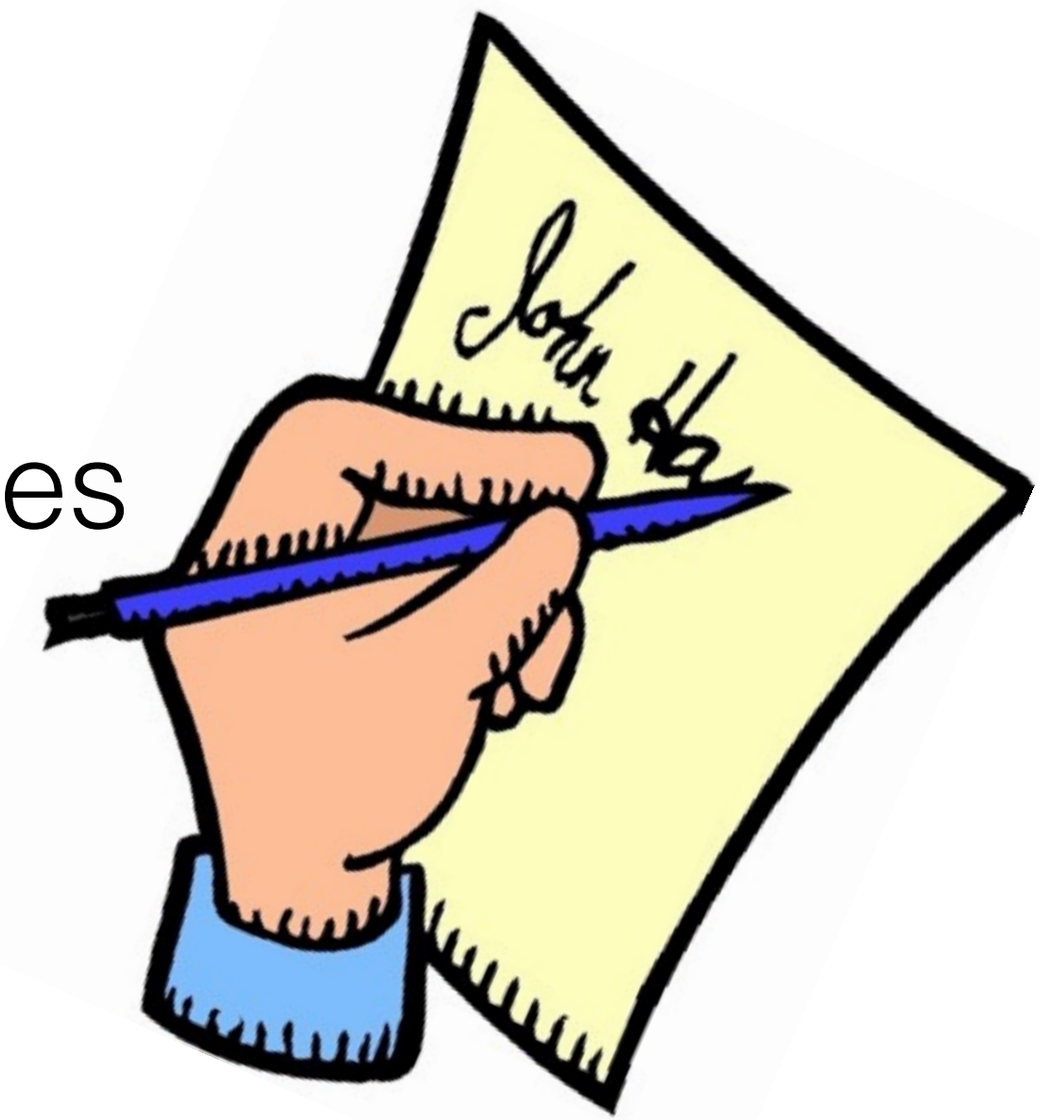
Grade Seven

*relationships* between decimals, fractions, ratios, and percents

Consideration: There is a different between find the percentage of 14/ 20 or 76/100, as compared to finding the percentage of 13/17

# How can we document the learning and understanding?

- photos
- videos
- student work samples
- anecdotal notes
- Fresh Grade



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## Mathematics Instructional Activities

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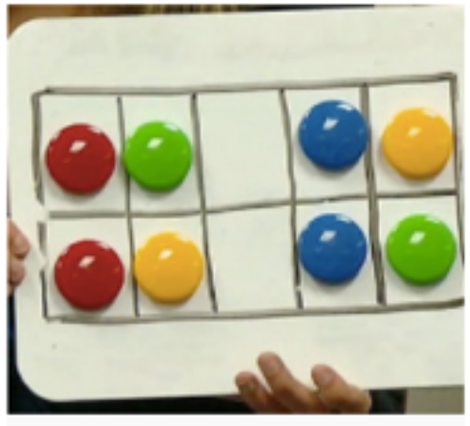

### Quick Images

In Quick Images, children are shown pictures displaying groups of objects or symbols, viewing each for only a few seconds. The short period of time encourages children to find efficient strategies to determine how many symbols there are, rather than counting one-by-one.

Read more

### Counting Collections

Counting Collections is a structured opportunity for children to count a collection of objects. They might count the items one-by-one or skip-count by groups. After children have organized and counted the collection they record how they counted.

Read more

### Choral Counting

Choral Counting is an activity in which the teacher leads children in counting aloud together by a given number. As the class calls out each number the teacher records the count on the board, pausing the count at strategic moments.

Read more

Getting Started

Share a Resource for One of the Math Instructional Activities

Create a New Instructional Activity

### The TEDD Vision of Mathematics Instruction

The Common Core State Standards call for students to engage in rigorous content work, developing both conceptual and procedural understandings of mathematics and applying their understanding to solve authentic problems. Our vision of ambitious mathematics instruction is guided by a set of principles about children and the work of teaching.

These include viewing children as sense-makers and knowing students as individuals


ABOUT THIS ACTIVITY

INTRODUCE

PREPARE

2

Prepare

Helping Teachers to Prepare to Enact

**Resources**

- Facilitator Plan
- Planning Protocol
- Facilitator Presentation
- Sample Plan for Counting Collections
- Tips for Getting Started with Counting Collections
- Extensions for Intermediate Grades

ENACT

ANALYZE


ABOUT THIS ACTIVITY

INTRODUCE

PREPARE

ENACT

3

Enact

Supporting Teachers to Enact Ambitious Teaching

**Resources**

- Student Recording Sheet
- Teacher Recording Sheet
- Launch and Wrap Up Discussion Prompts - MP4
- Conferring Discussion Prompts - MP4

ANALYZE

# Let’s brainstorm what free items we could use!

What is available in our classroom?

What is available in our schools?

What about our parent community? Perhaps a letter…

What is available in our community?

# Any Questions…

When might I use Counting Collections?

How often?

Do students always have to record how they counted?

Always with a partner?

Thanks so much for sharing your time with me!

The only way
to learn
**mathematics**
is to do
**mathematics.**

PAUL HALMOS