Counting Collections K - 7

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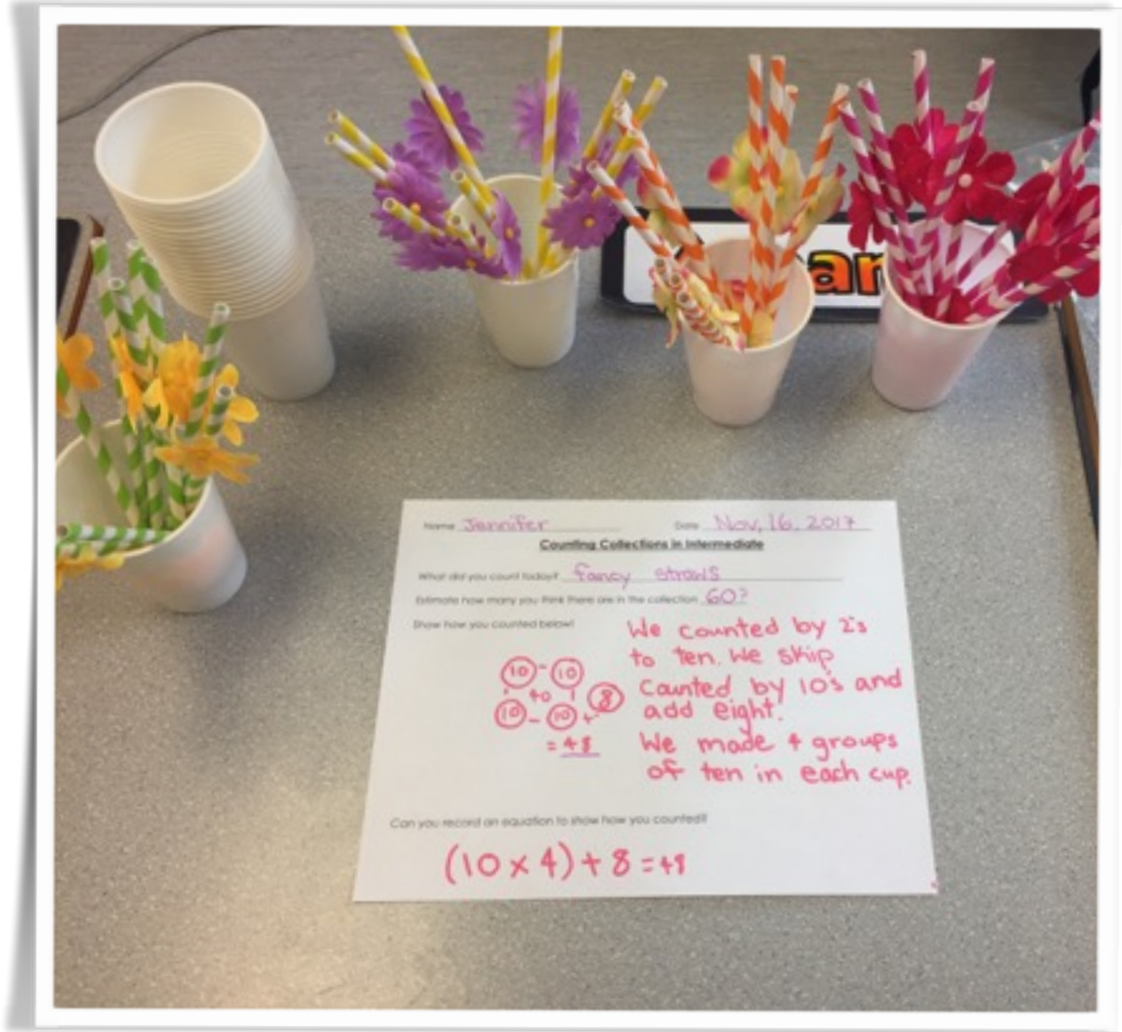
REC 206, Surrey, BC
November 21st, 2018

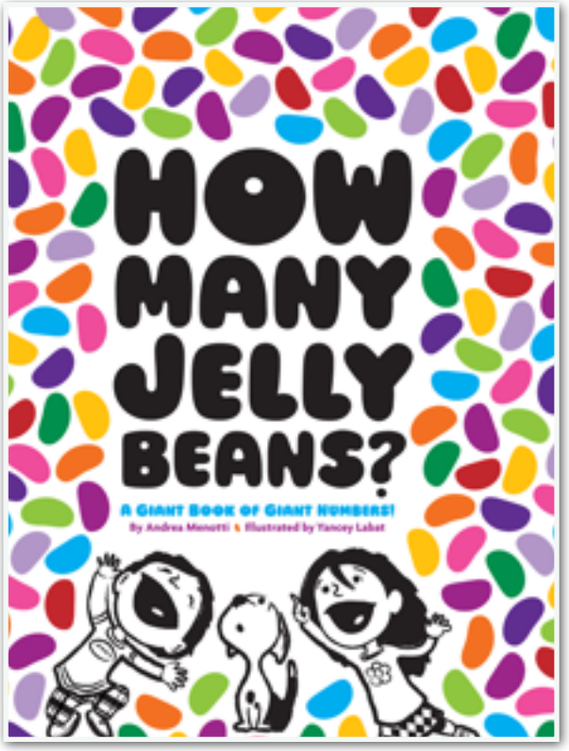
Learning Intentions

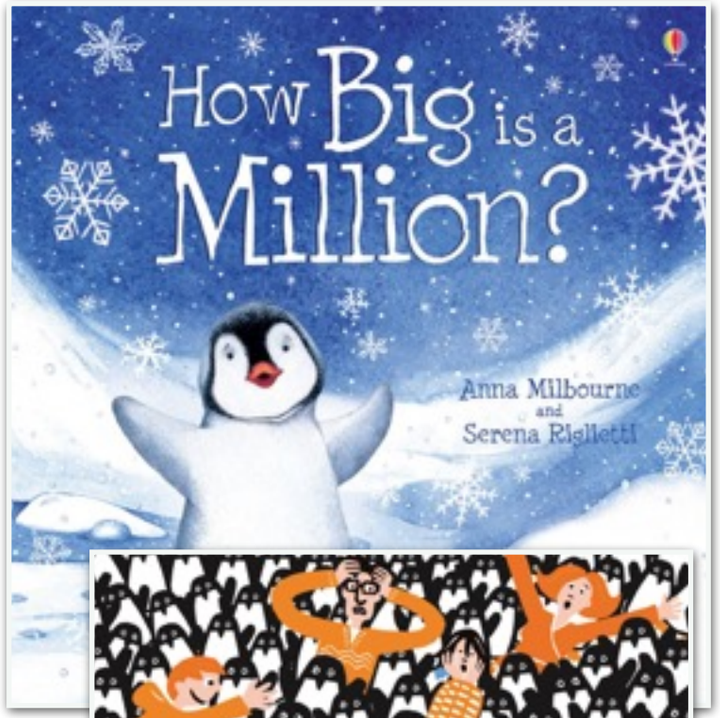
- I understand what Counting Collections are.
- I understand how Counting Collections can be used to develop learning (curricular competencies in connection to content).
- I see how Counting Collections can meet the diverse needs of today's classrooms.
- I understand my role as the teacher in conferring with students while they count to notice, name, and nudge

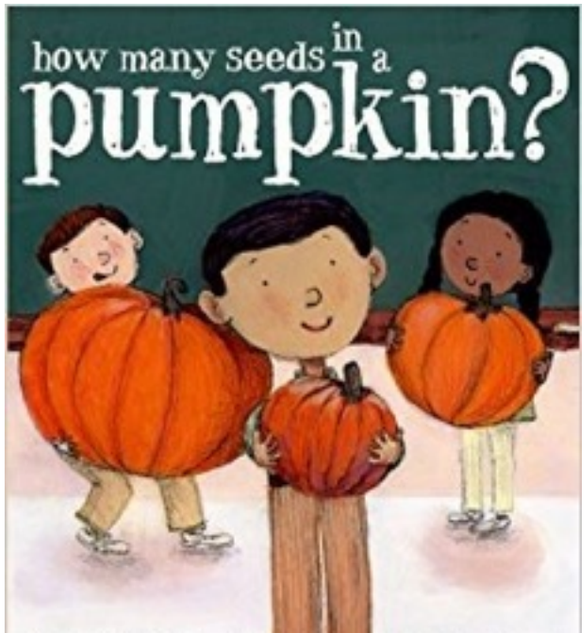
WHAT ARE COUNTING COLLECTIONS?

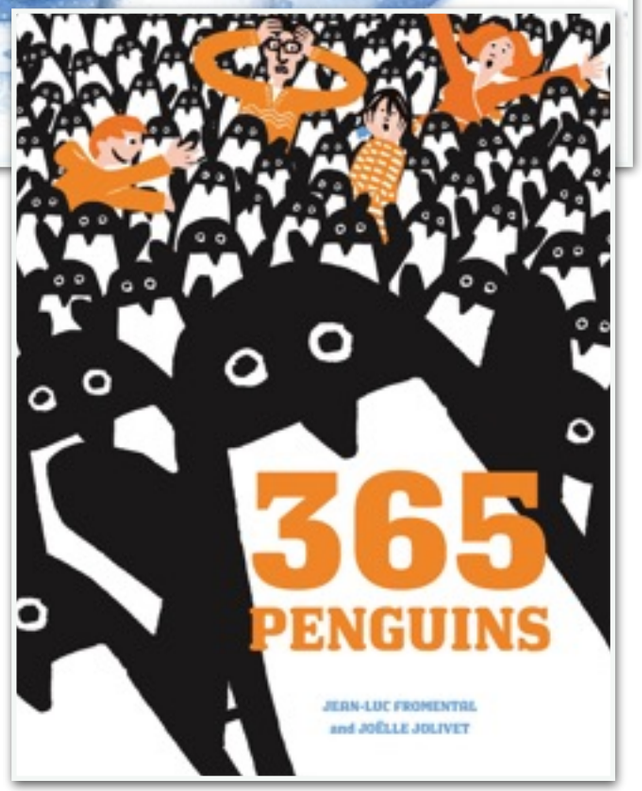


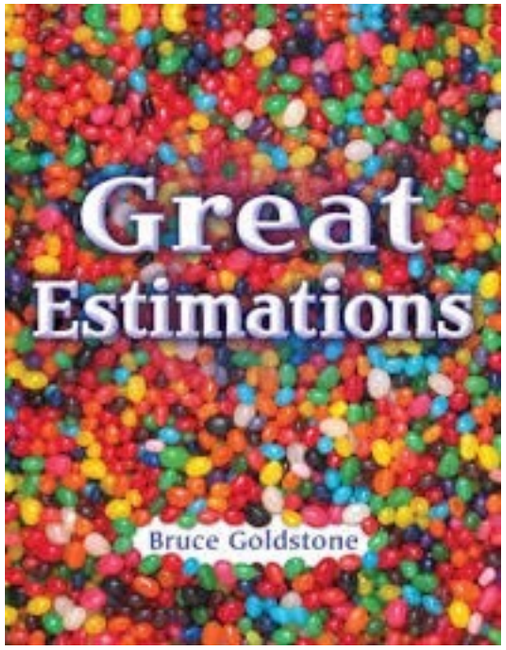
Launch with a Counting Book

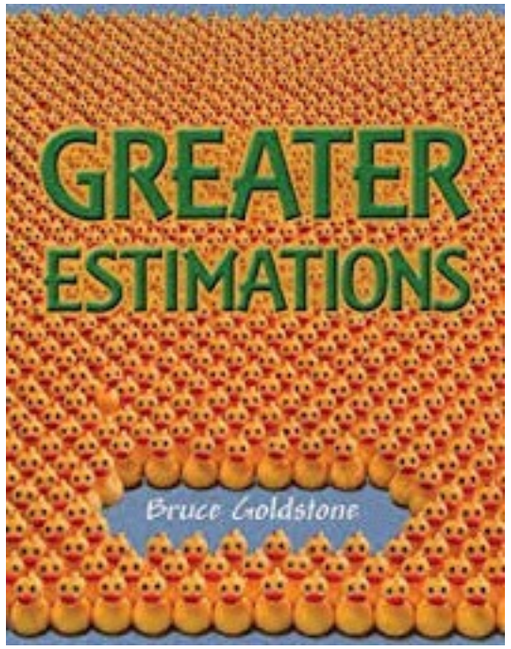










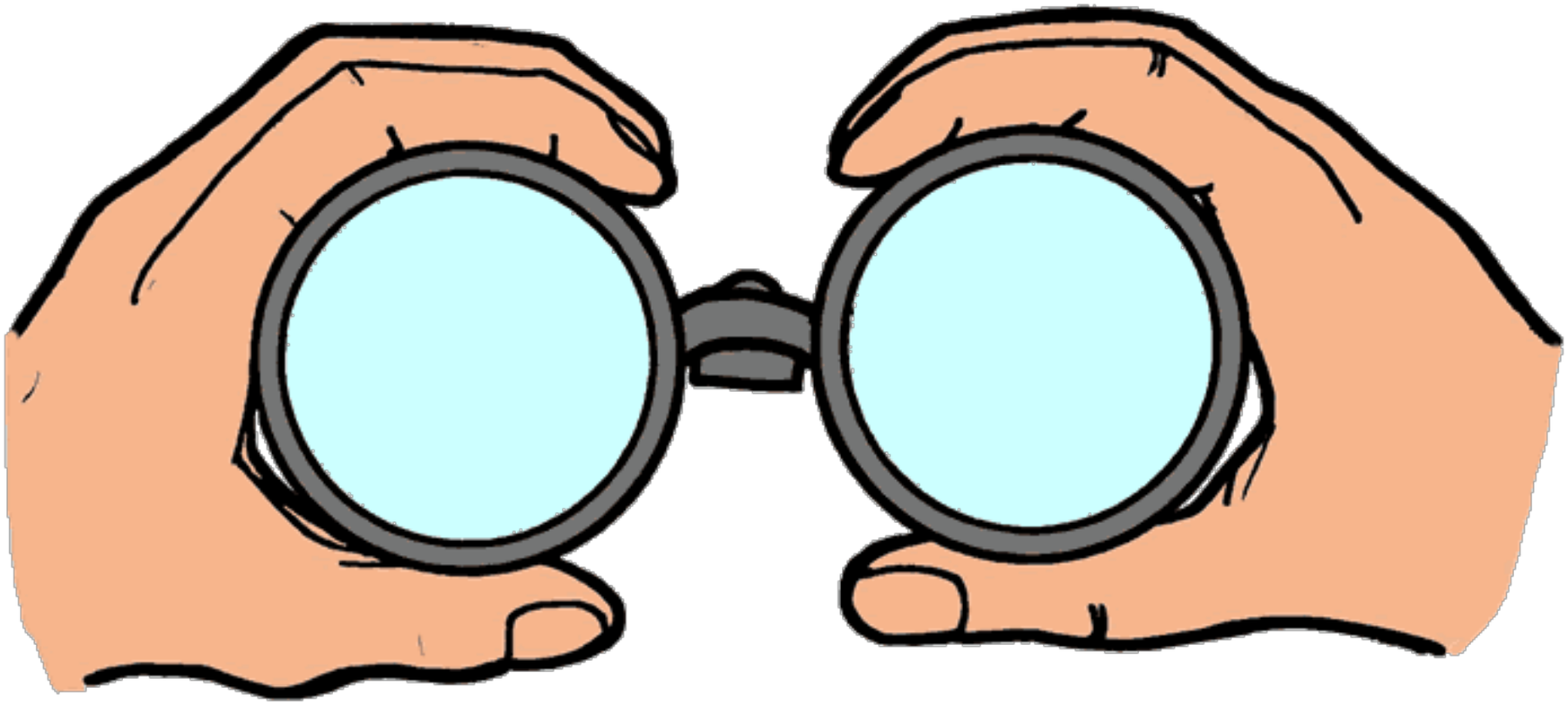


Tools help mathematicians to organize and keep track of their counting!

How will you count your collection?

Is there a tool you think could help you?

What other ways could you count?



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.

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

What Curricular Competencies are fostered?

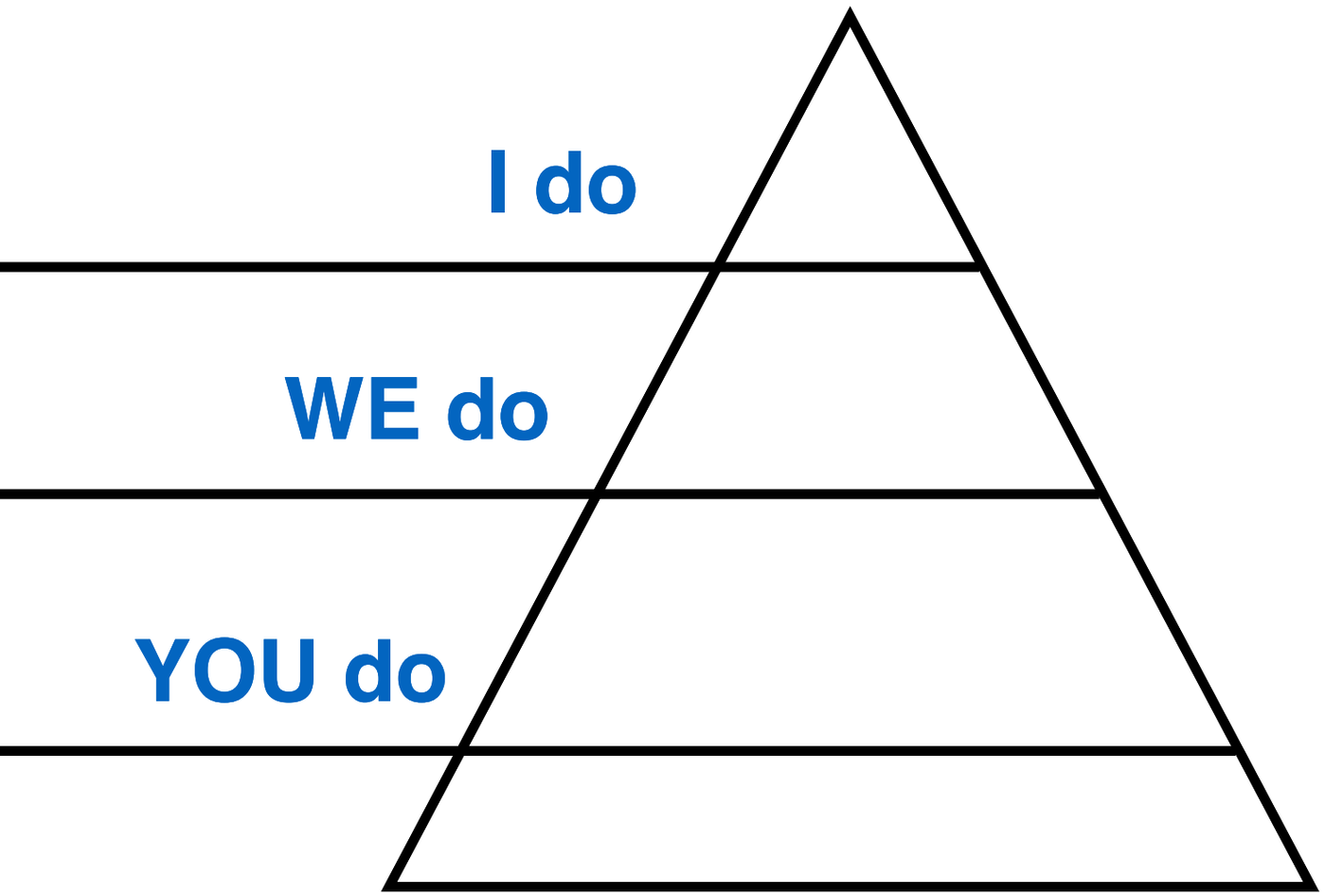
- **Reasoning and Analyzing** through estimating and developing mental math strategies and abilities to make sense of quantities
- **Understanding and Solving** through using multiple strategies
- **Communicating and Representing** their thinking not only orally but through concrete materials, pictorial 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?

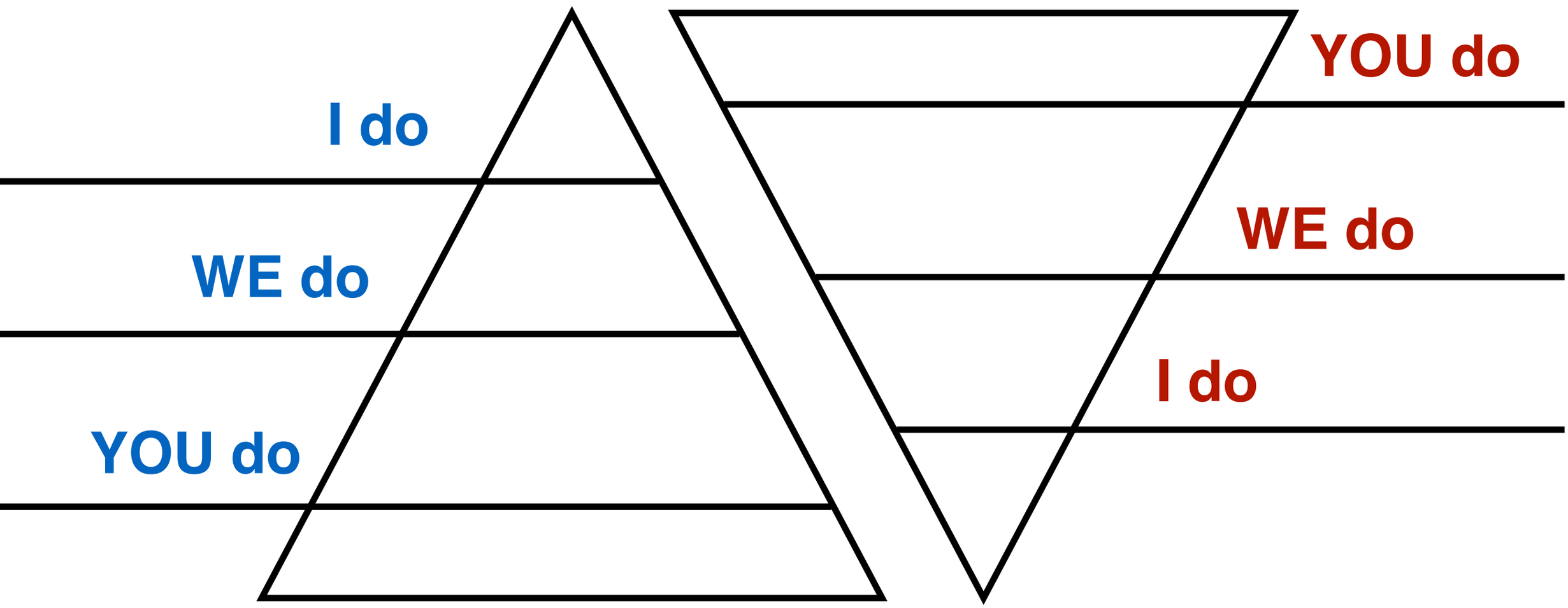
They can assist students in developing:

- 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

Gradual Release Flipped



Gradual Release Flipped



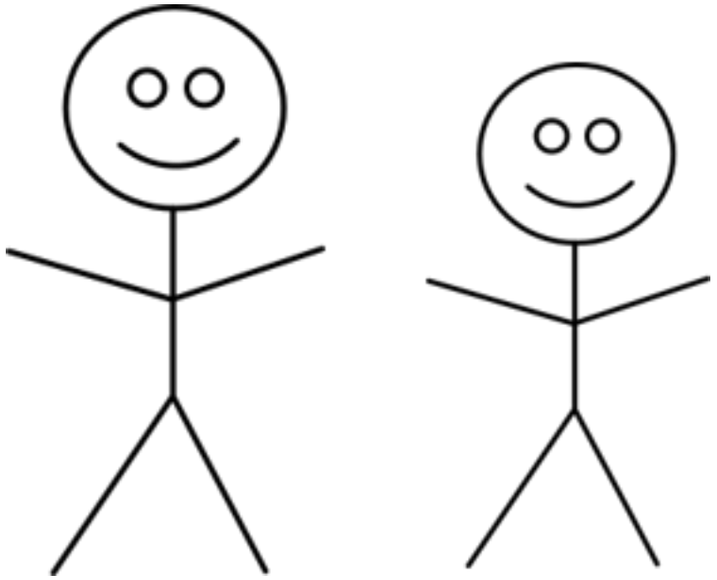
“It takes an abiding faith in the constructivist nature of learning to be a listener first and, only then, to tailor cove rations with students to what they are teaching us they can do and what they may need next. When the child can discover and create new knowledge for himself, out of a need to replace and old way of thinking with a new one, learning is integrated.”

- Franke, Kazemi, Turrou (2018) p.g. 62

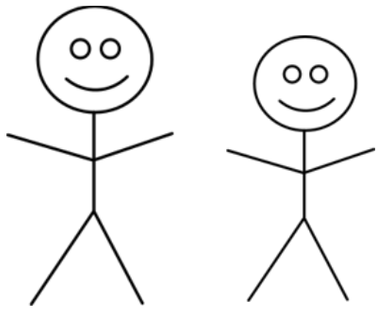
Working with a partner

The pair work is a vital mechanism for learning to orient to someone else's idea because partners share ideas with one another, negotiate, sometimes restart, and problem-solve as they encounter challenges in how to count their collections and record their count.

- Franke, Kazemi, Turrou (2018) p.g. 6



A Focused Mini-Lesson:

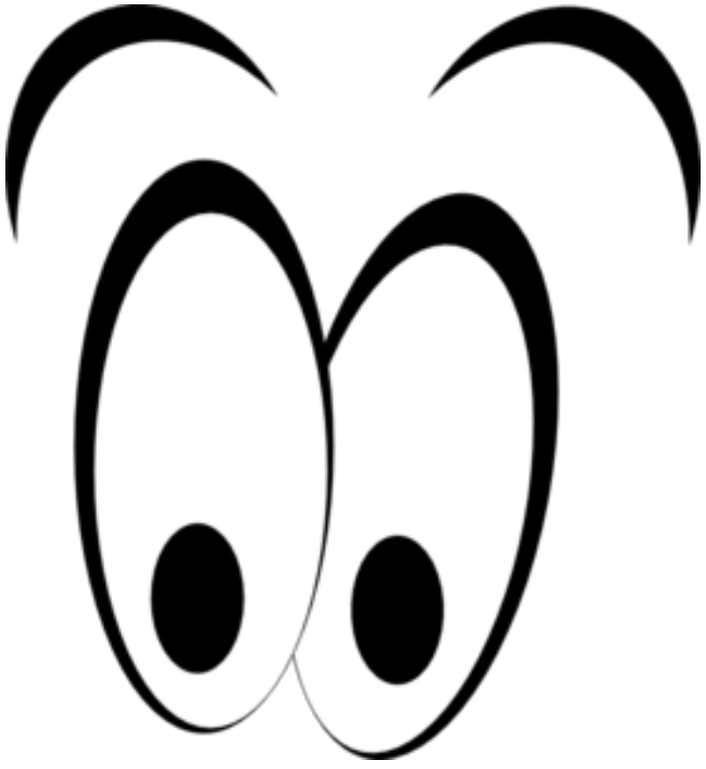


- How can you be a good math partner?
- What might it look like to count together?
- How can we make sure both partners are counting?
- How can we make decisions together about how or what we count?

Direct conversations in the moment:

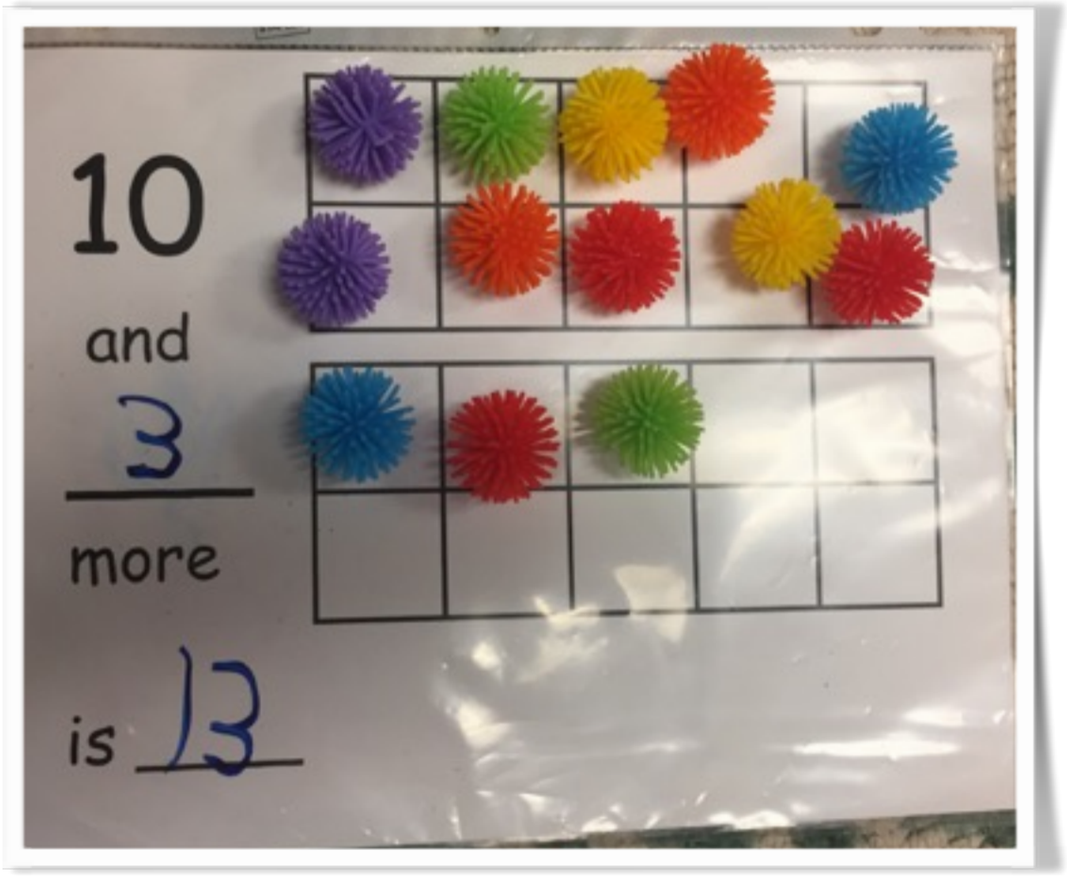
- Is there a way you can count together?
- How did you two decide what to count by?

LET'S LOOK AT SOME EXAMPLES




TH-CAL
WEST
85

If students are challenged to write a numeral, how might you support them?



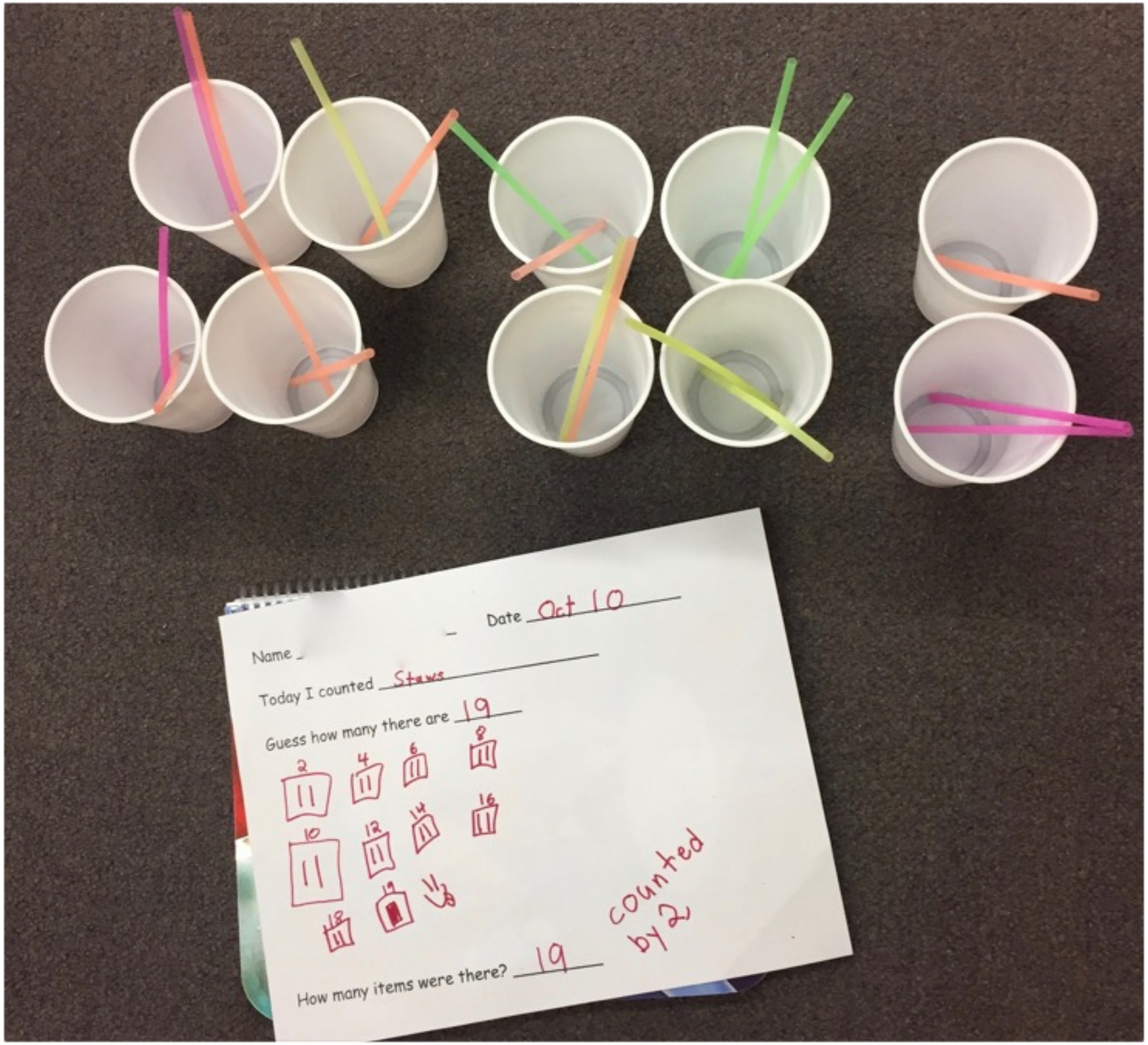
There are many entry points for student's learning that is engaging and productive for learning in children of all ages.

- Franke, Kazemi, Turrou (2018) p.g. 6

Skip Counting: Counting by 10's

Place Value: How many tens and ones?

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


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

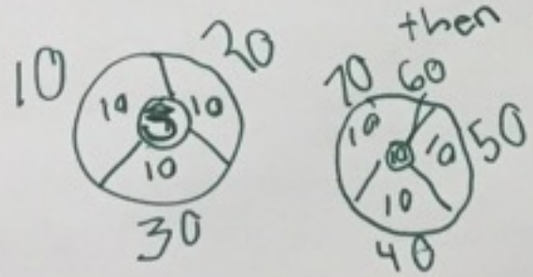
Name _____ Date _____

Counting Collections in Intermediate

What did you count today? I think 51

Estimate how many you think there are in the collection 51

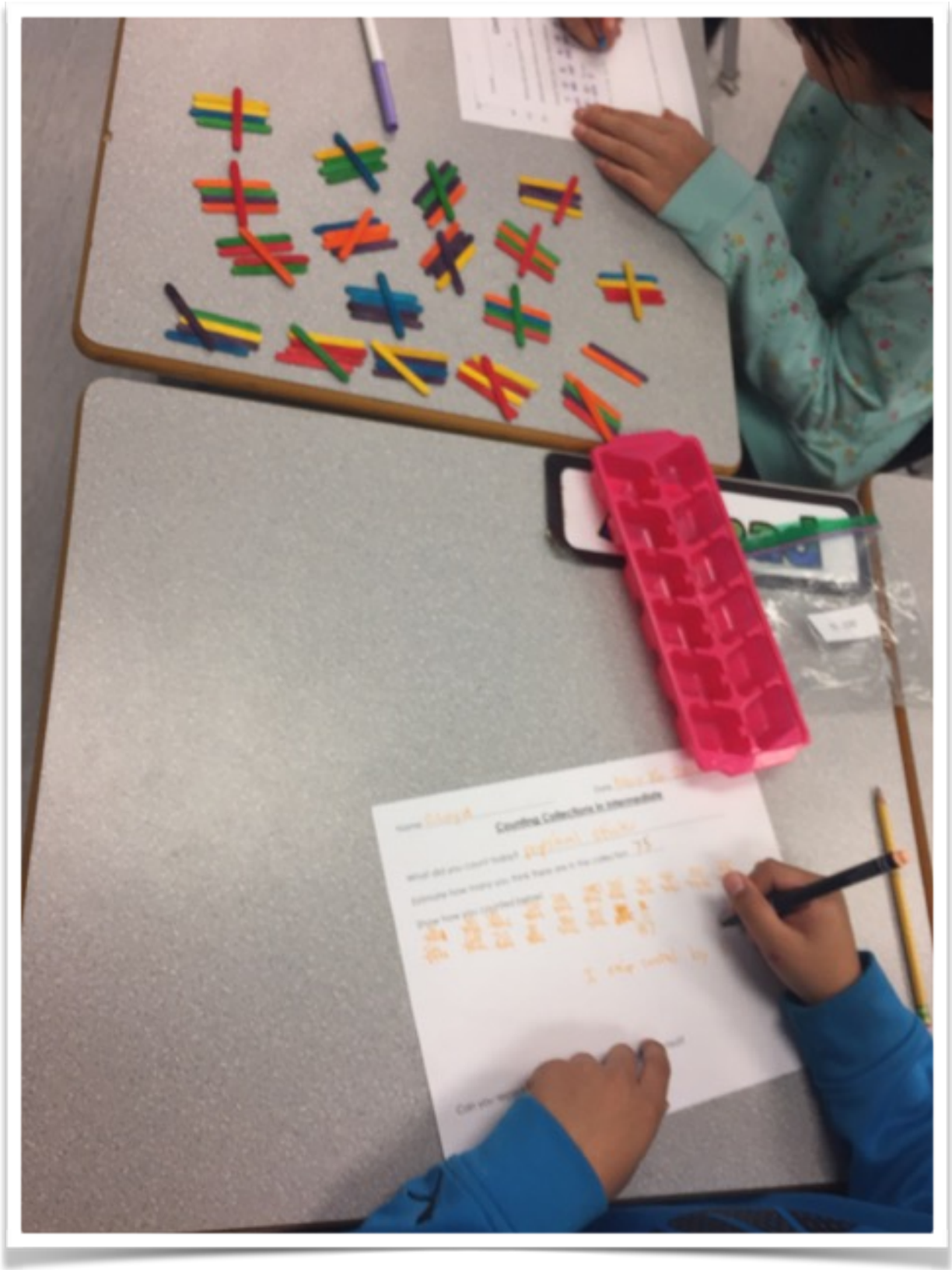
Show how you counted below! I counted by 1 to make 10 then we counted by 10



70 and 3

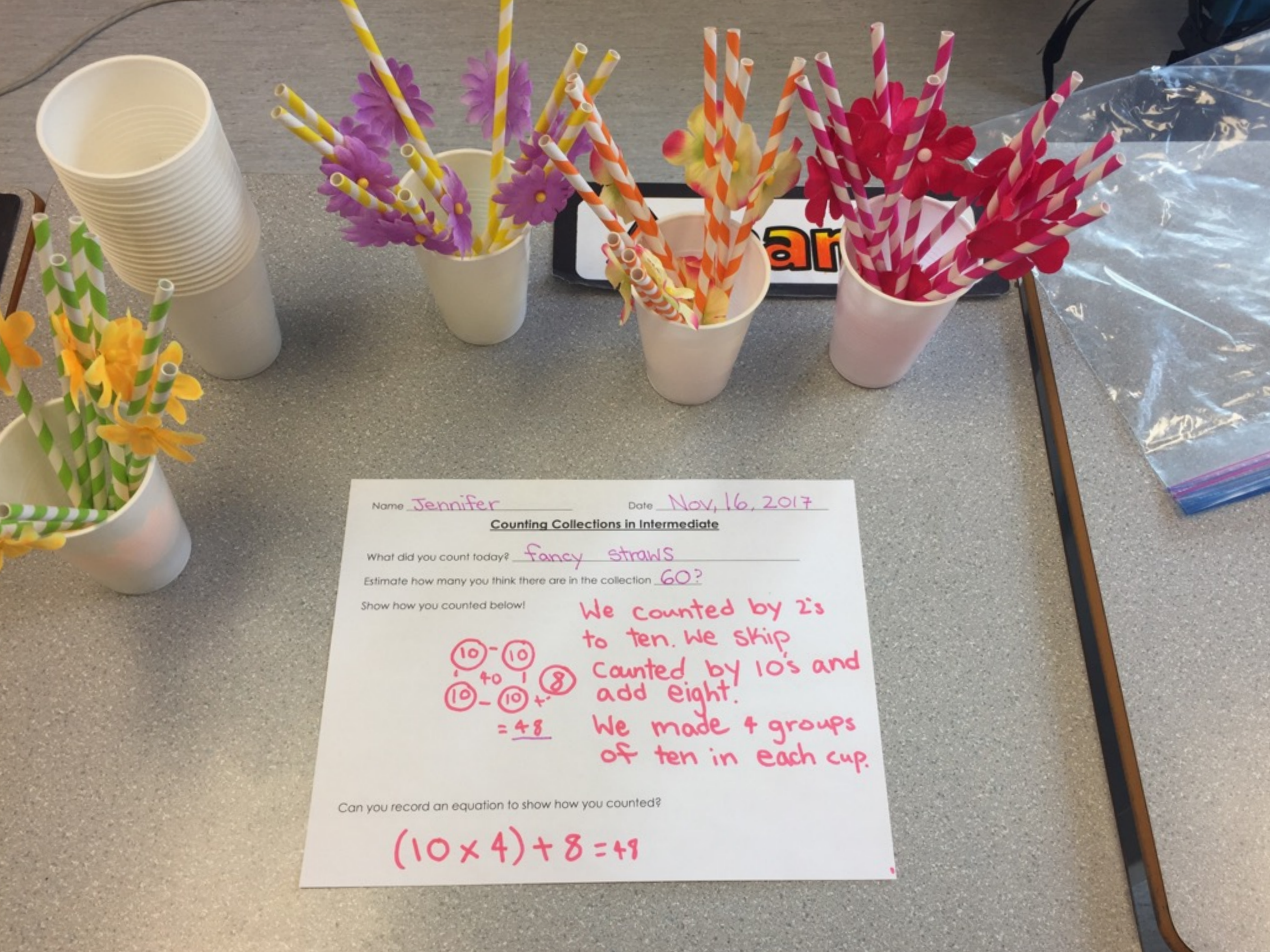
Can you record an equation to show how you counted?

I counted by



How did you decide how to group the popsicle sticks?

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



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

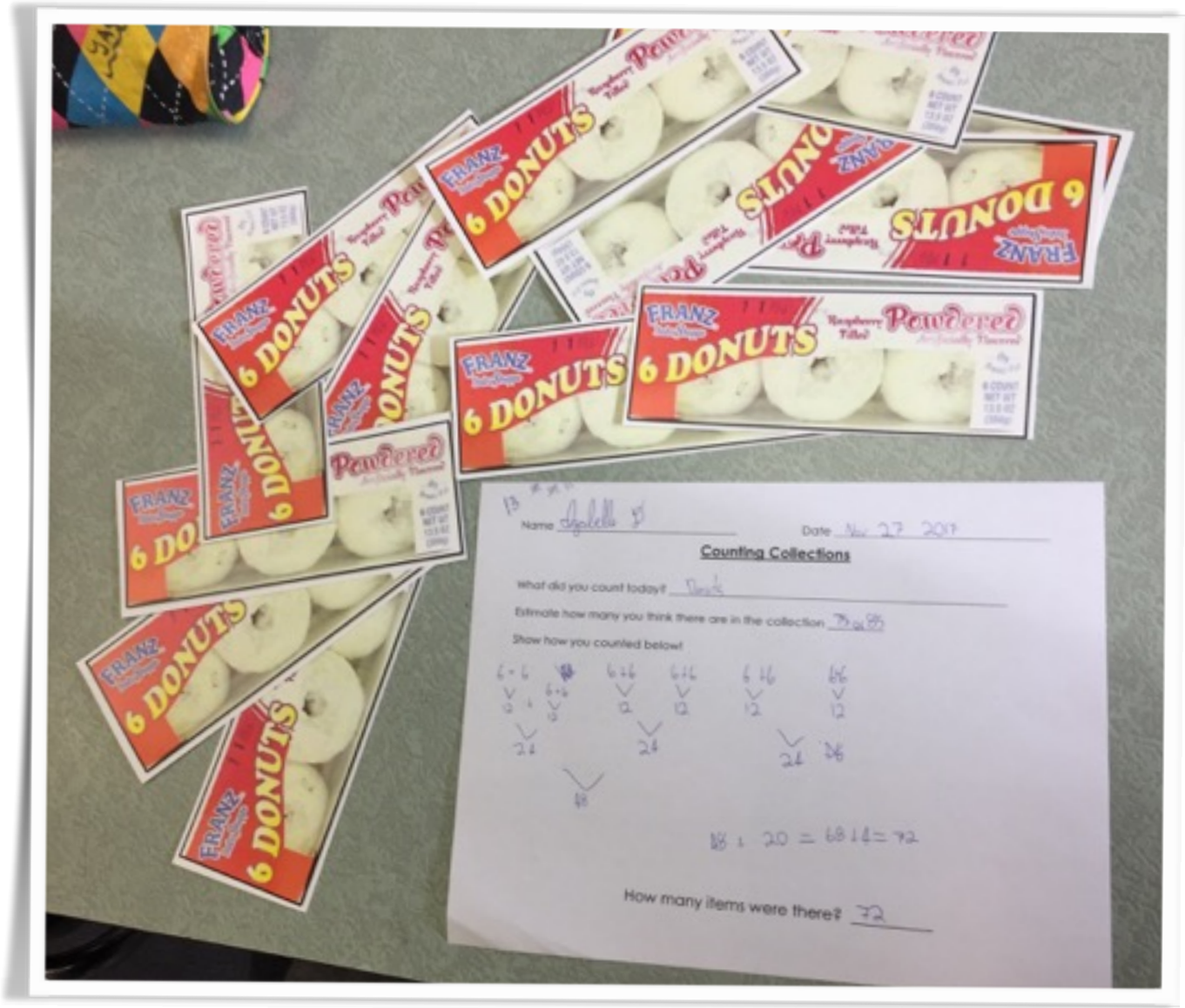
We counted by 2's to ten. We skip counted by 10's and add eight.

We made 4 groups of ten in each cup.

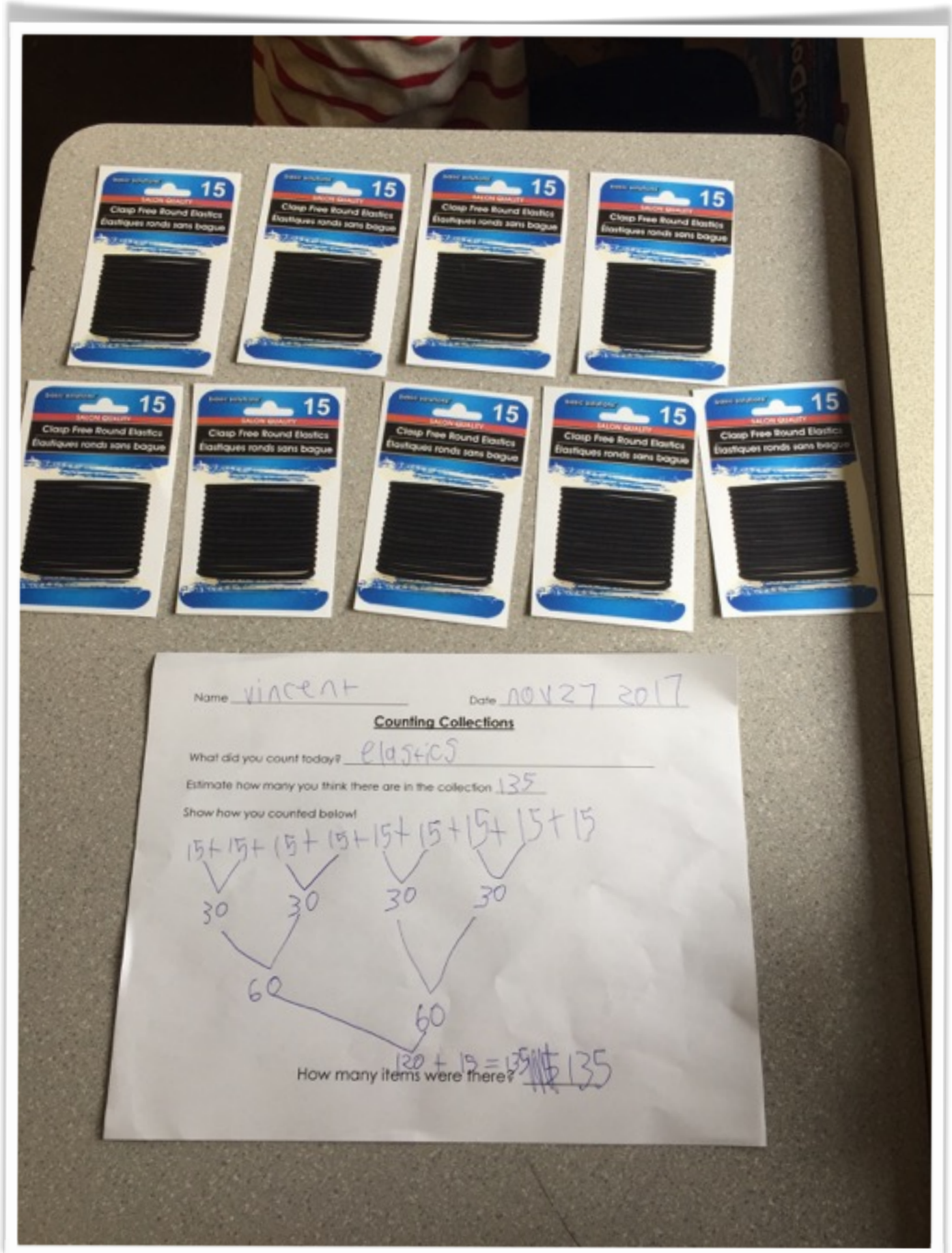
Can you record an equation to show how you counted?

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

Counting Unopened Packages



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



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

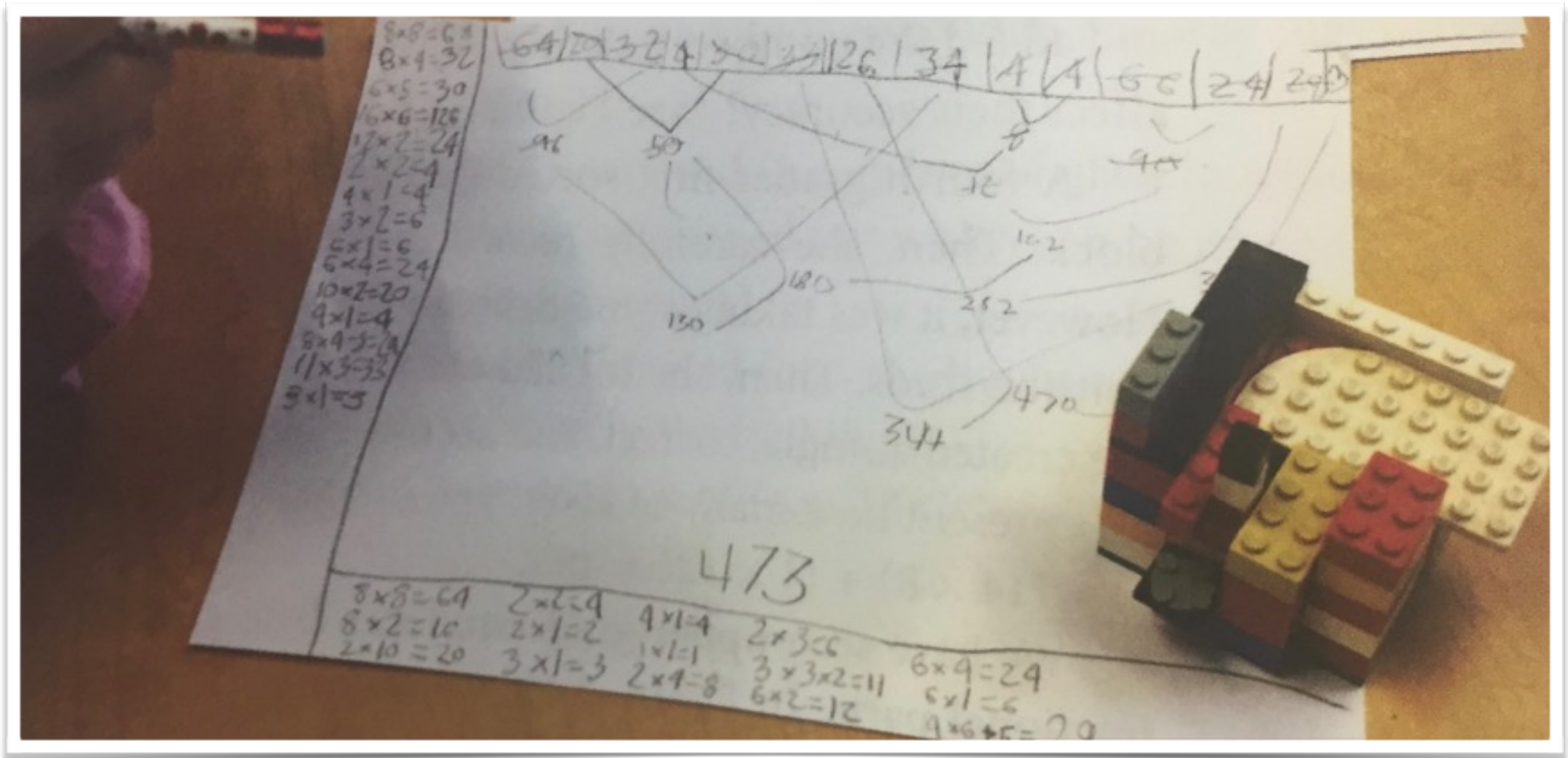
Is this student ready to apply multiplication?

Tell me about how you organized your collection?

How does this connect to multiplication?

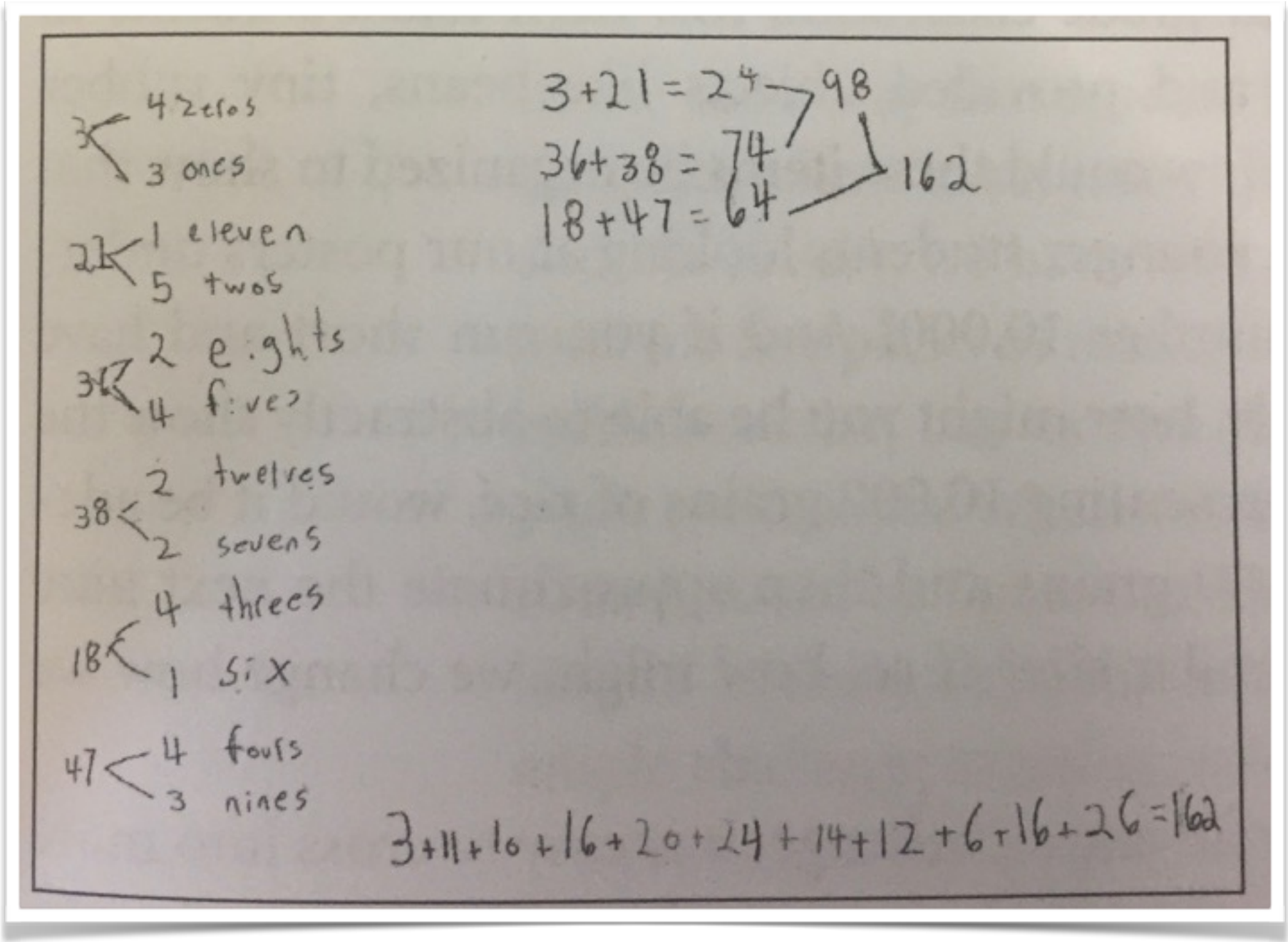
You described this as
six times five plus one
Can you describe it another way?

How might you describe how you counted using division?



Students counted how many circular nubs were on the Lego pieces.

- Franke, Kazemi, & Turrou (2018), p.g. 72



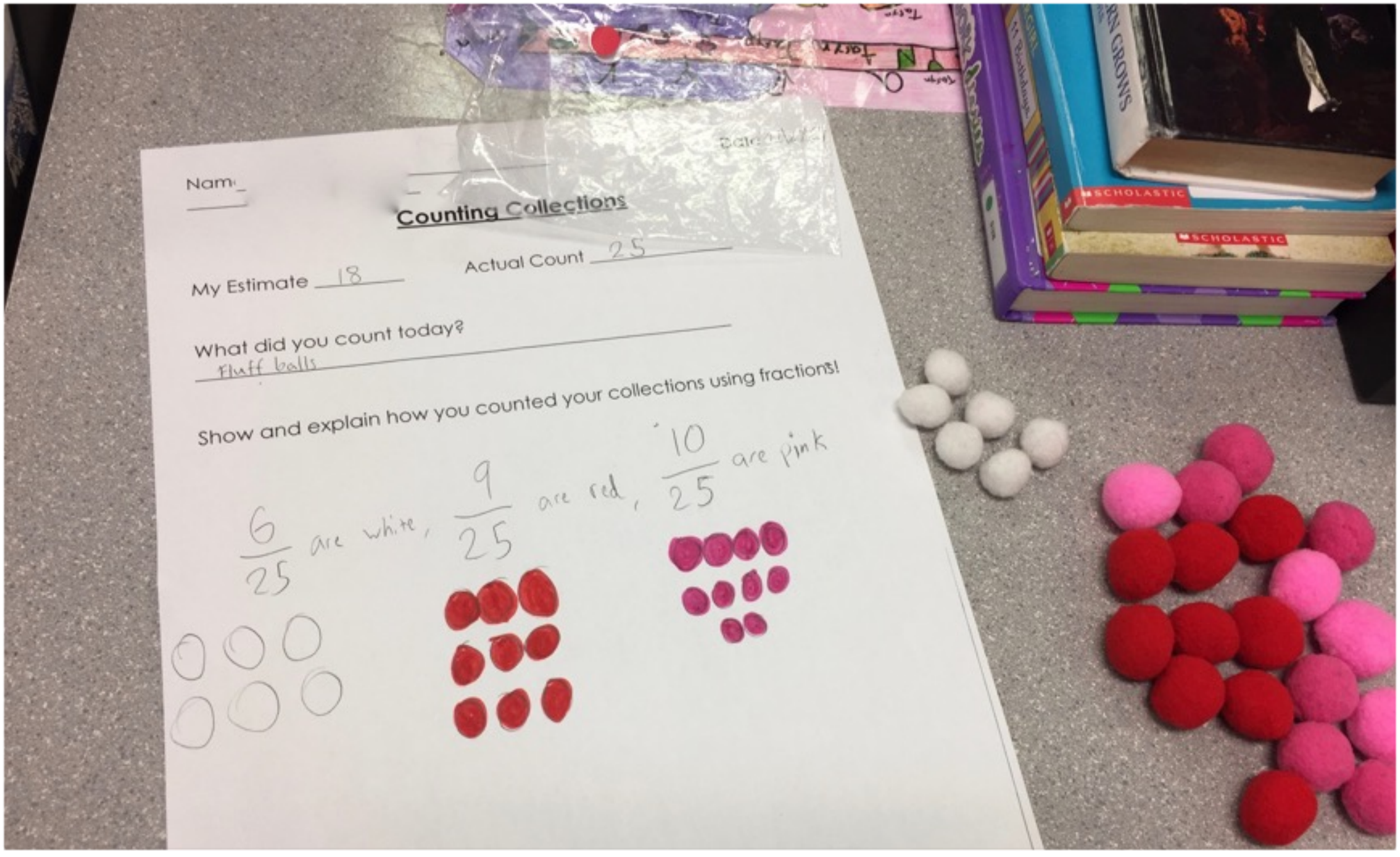
Students counted the dots on a set of dominoes.

- Franke, Kazemi, & Turrou (2018), p.g. 72

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?


Name
Counting Collections
My Estimate 18
Actual Count 25
What did you count today?
Fluff balls
Show and explain how you counted your collections using fractions!
6/25 are white, 9/25 are red, 10/25 are pink
SCHOLASTIC
SCHOLASTIC

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 $\frac{7}{7}$

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

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?

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 three groups of 13 and one was left over”.

4 and 10 are factors.

Name Sarah

Date J.18

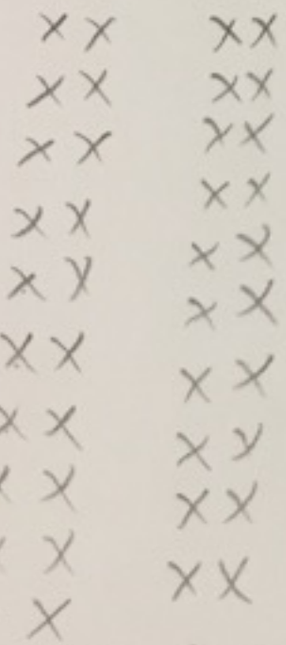
Counting Collections

My Estimate Range 40-45

Actual Count 40

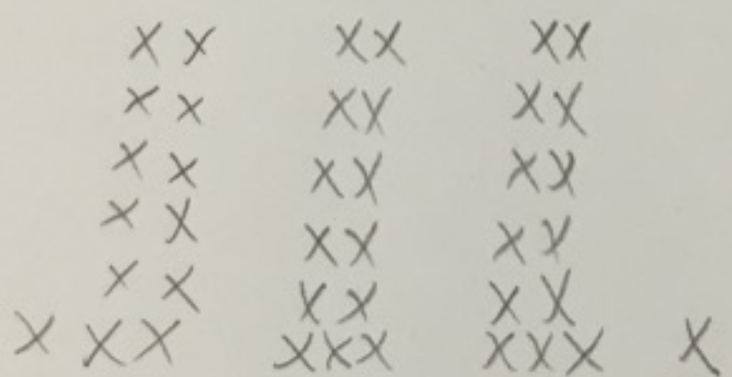
What did you count today? daisies

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



(2×10) + (2×10)

4×10=40



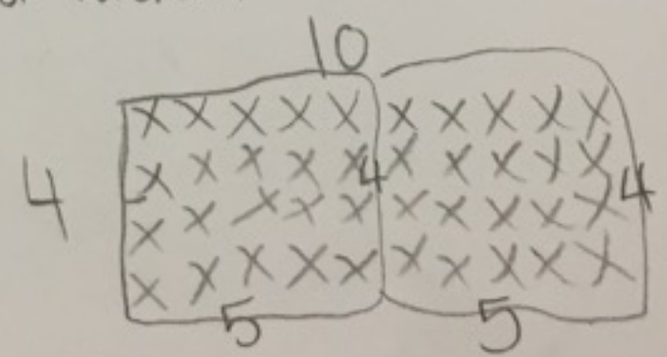
(3×13) + 1 = 40.

3 is not a factor.

Factor

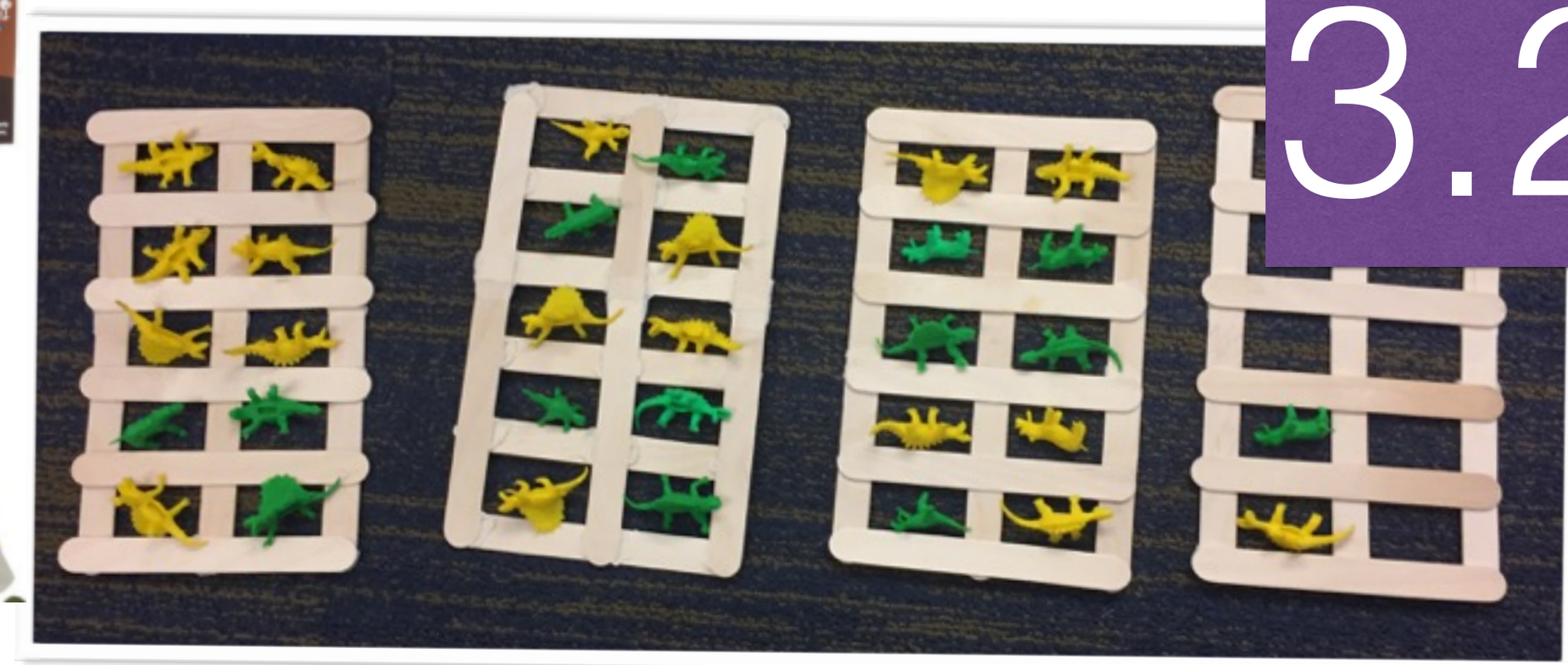
1, 40, 2, 20

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. If a full ten frame represented a whole, how many full bags do I have?

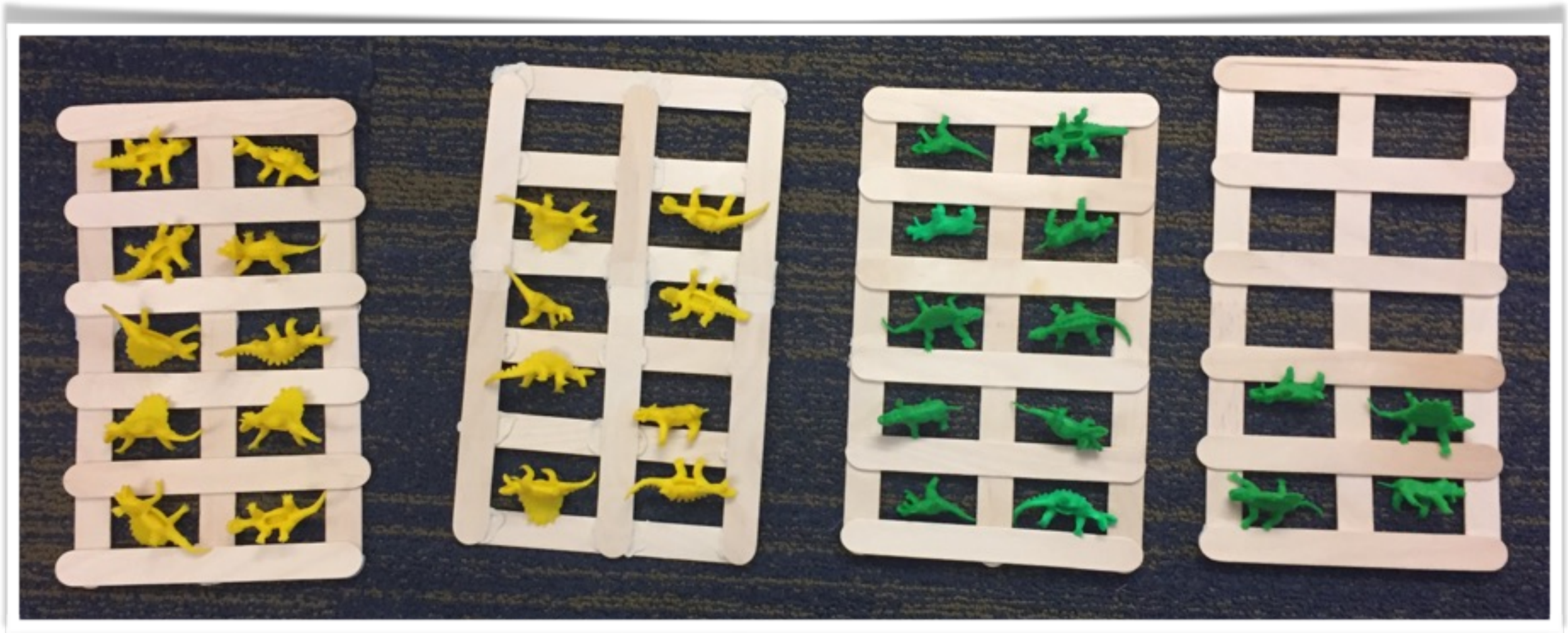


3.2

What other questions could we ask?

How many are yellow? 1.8

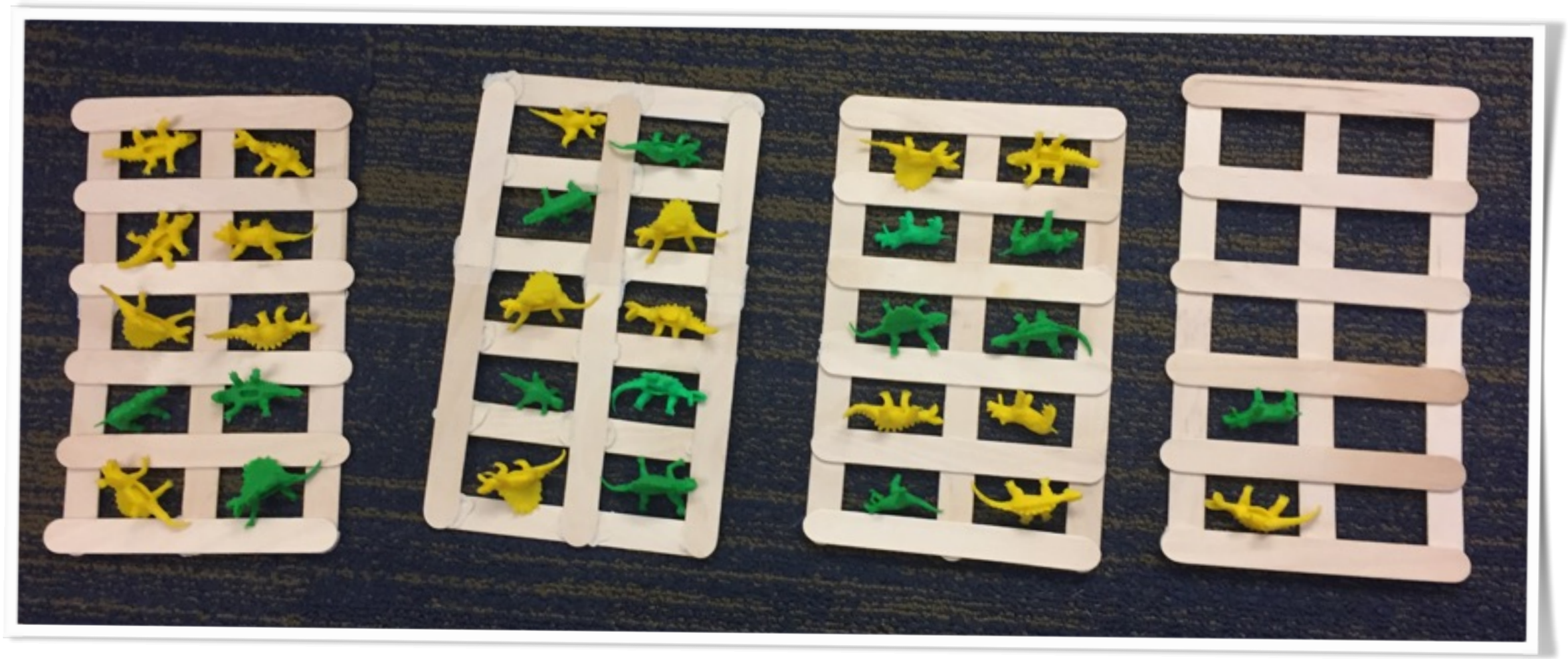
How many are green? 1.4



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

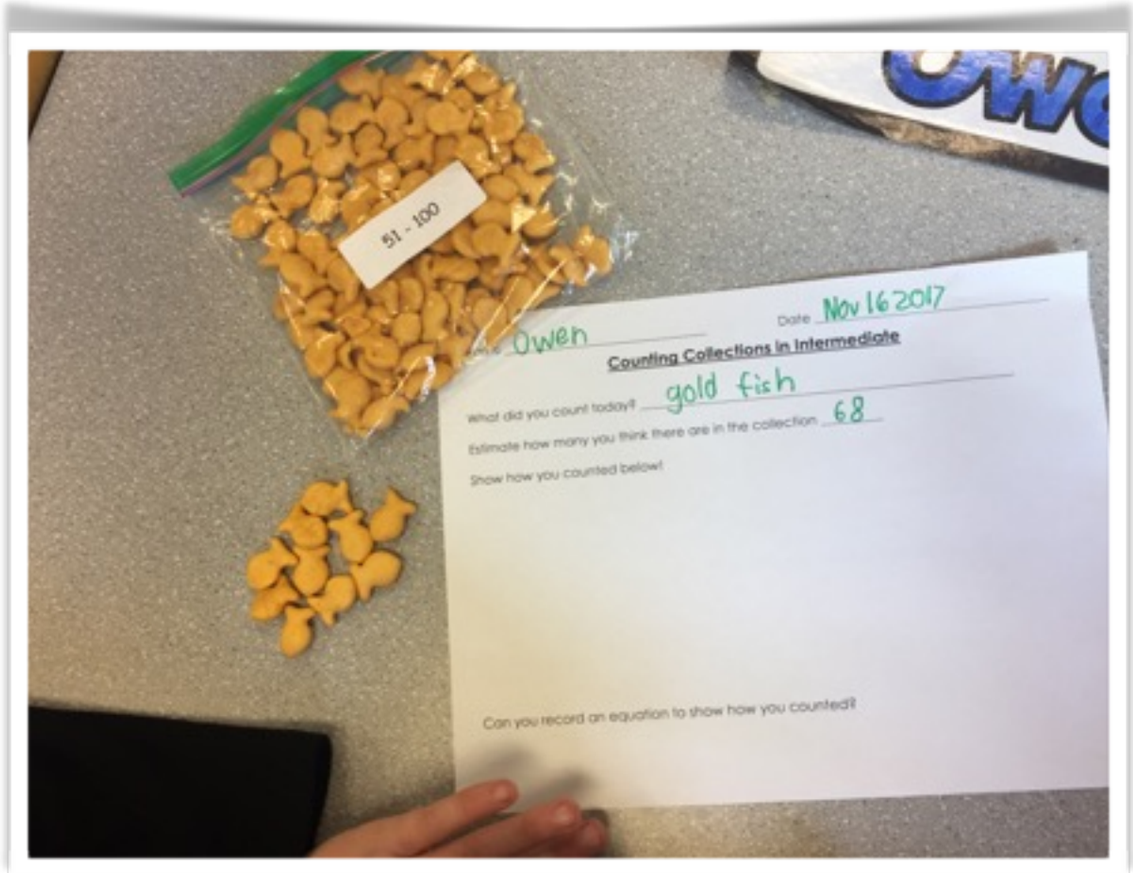
Grade Seven

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

BEFORE:
Mini Lessons - Being Responsive
“I’m NOTICING… I’m WONDERING…”

- How do we work respectfully with a partner?
- How could we count?
- How might we estimate?
- What is a range?
- How could we use this tool?
- Reflecting on recordings…



Mini Lessons Potential Ideas:

- What if you lost _____ from your collections, how many would you have then?
- 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?

DURING: Students are engaging in counting

- In partners choose a collection and if they wish a tool. Teacher may wish to predetermine partners and the type of collection to be counted (e.g. quantities and/or kinds of objects)

- 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 help students articulate what they are doing, consider how it is working for them, and possibly refine or extend their strategy in a way that builds on what they can already do. 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.

DURING : Asking Effective Questions Role

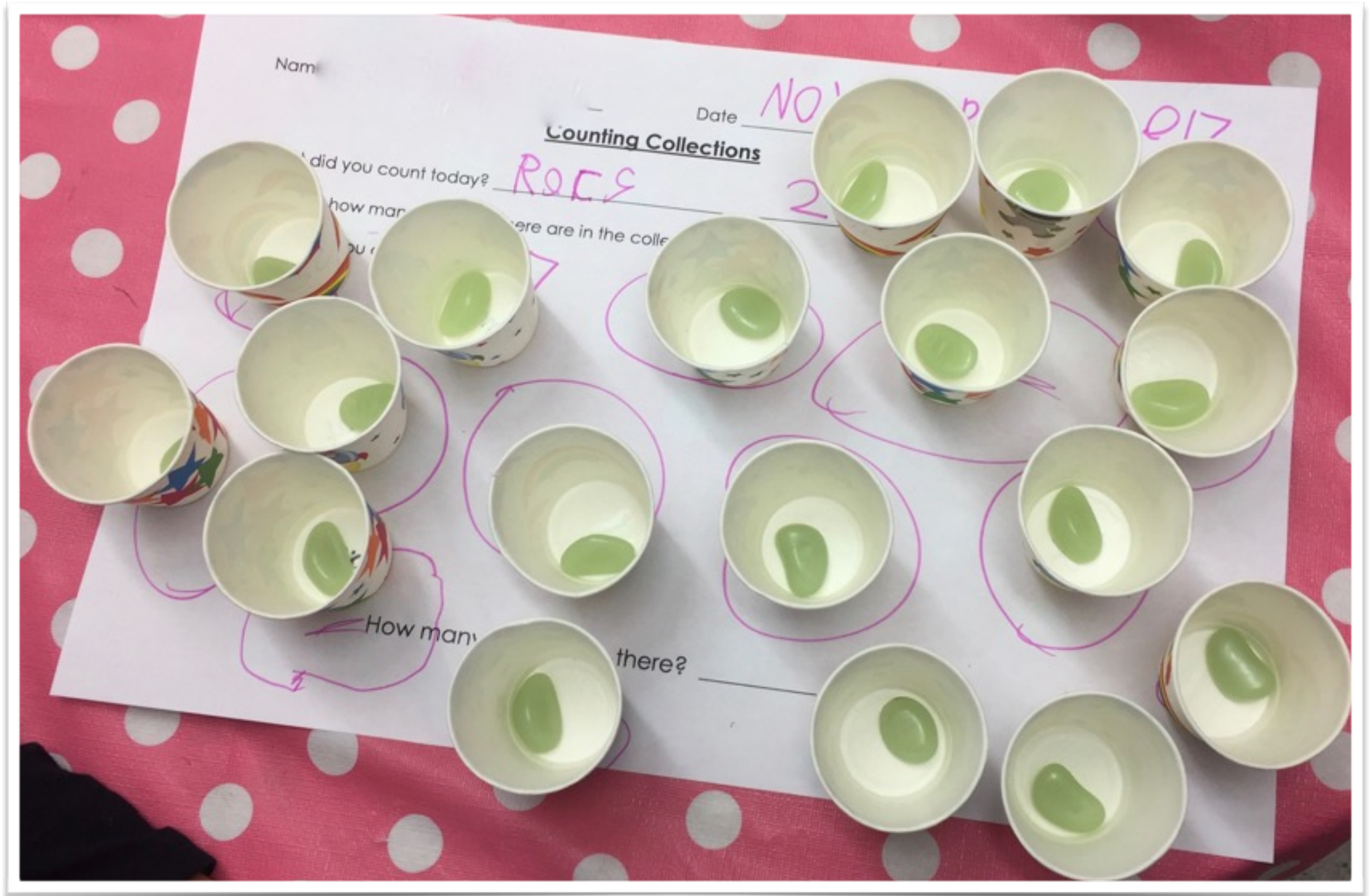
- I see you've already counted 250. How many more do you think will be in the whole set?
- How did you decide where to start?
- How could you count in a way that challenges you?
- Is there a way to count that might be more efficient?
- What will be your next step?

While watching, consider:

How did the teacher discover what the students understood?

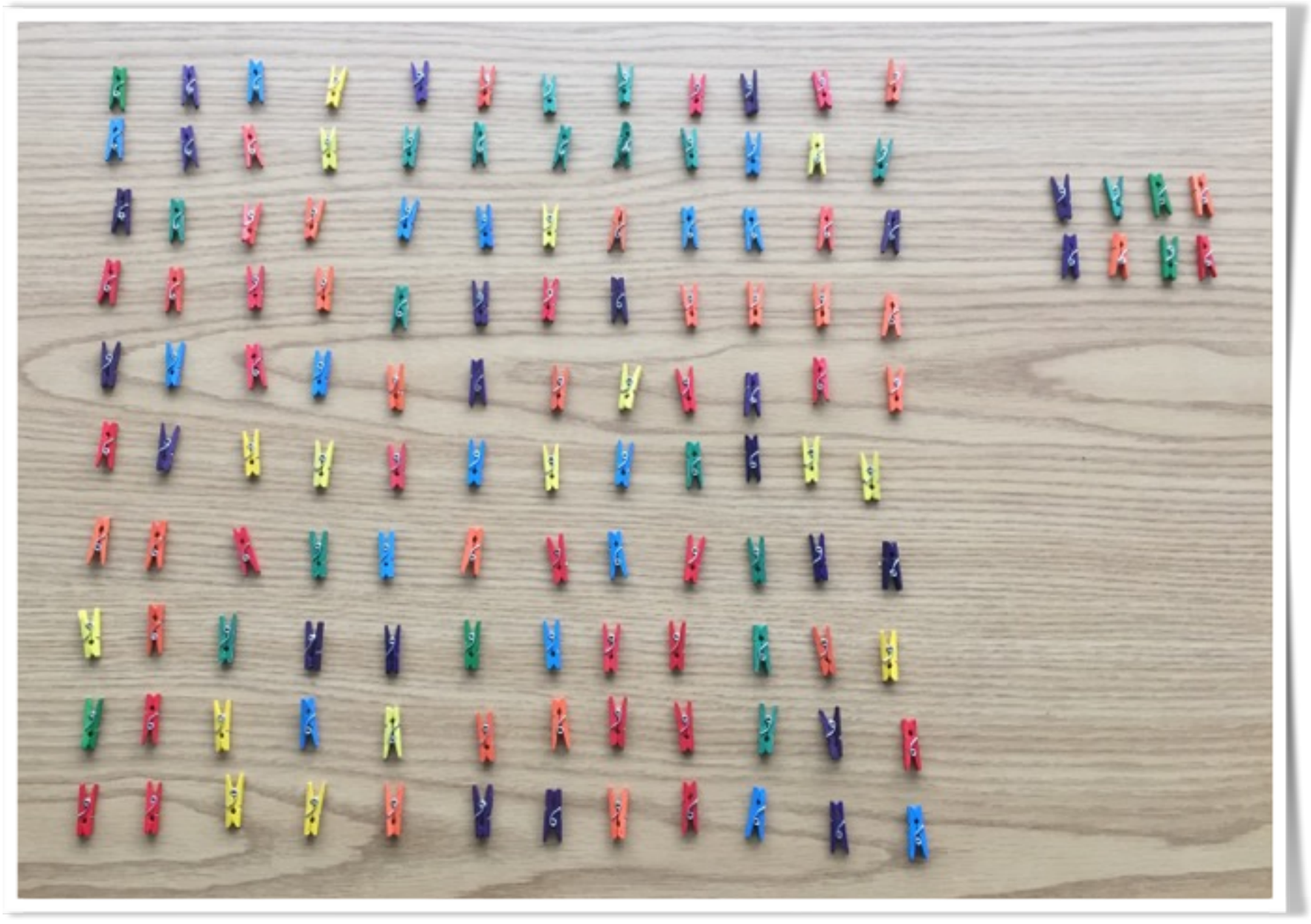
How did she nudge their learning?

SPOTLIGHT

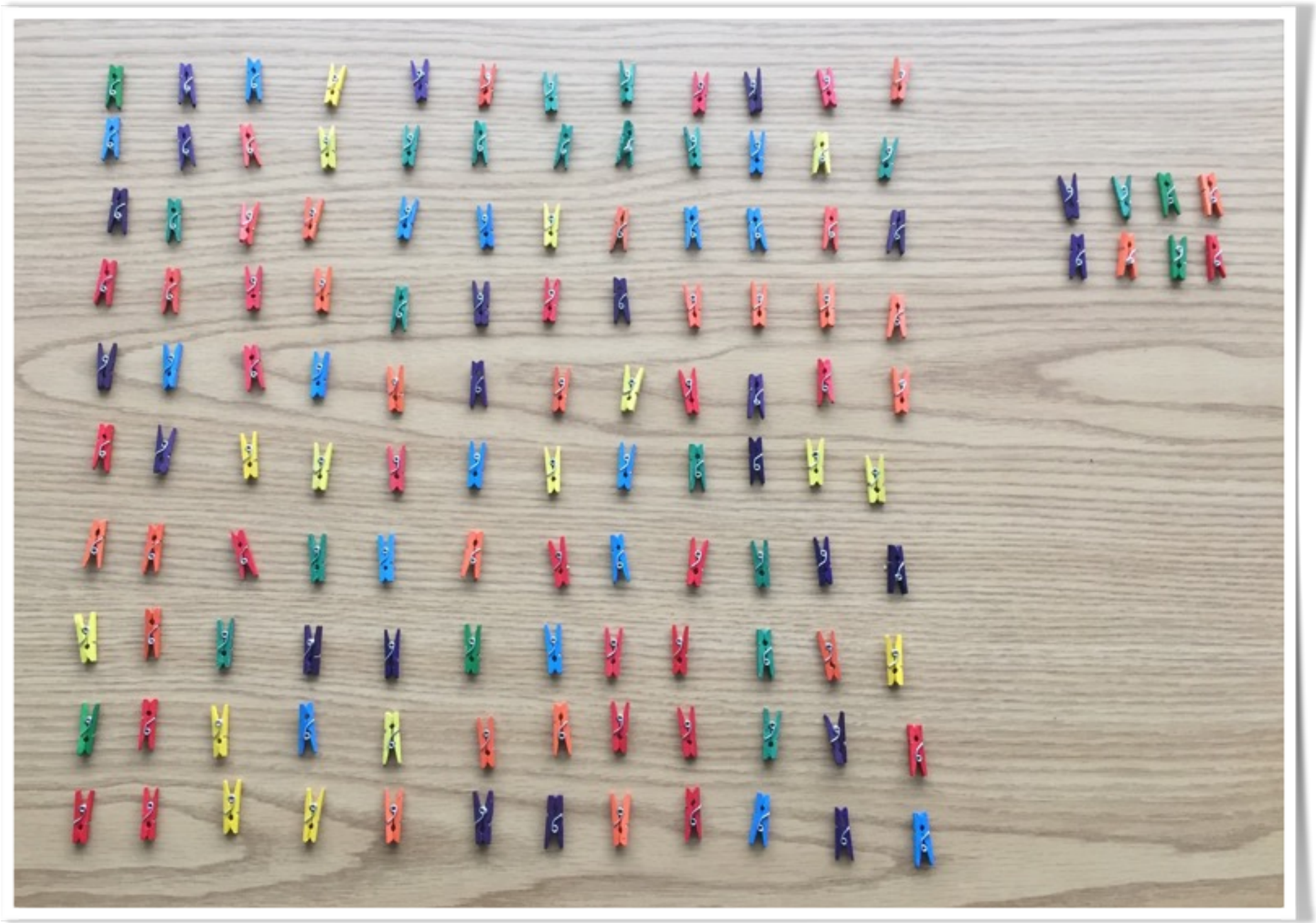


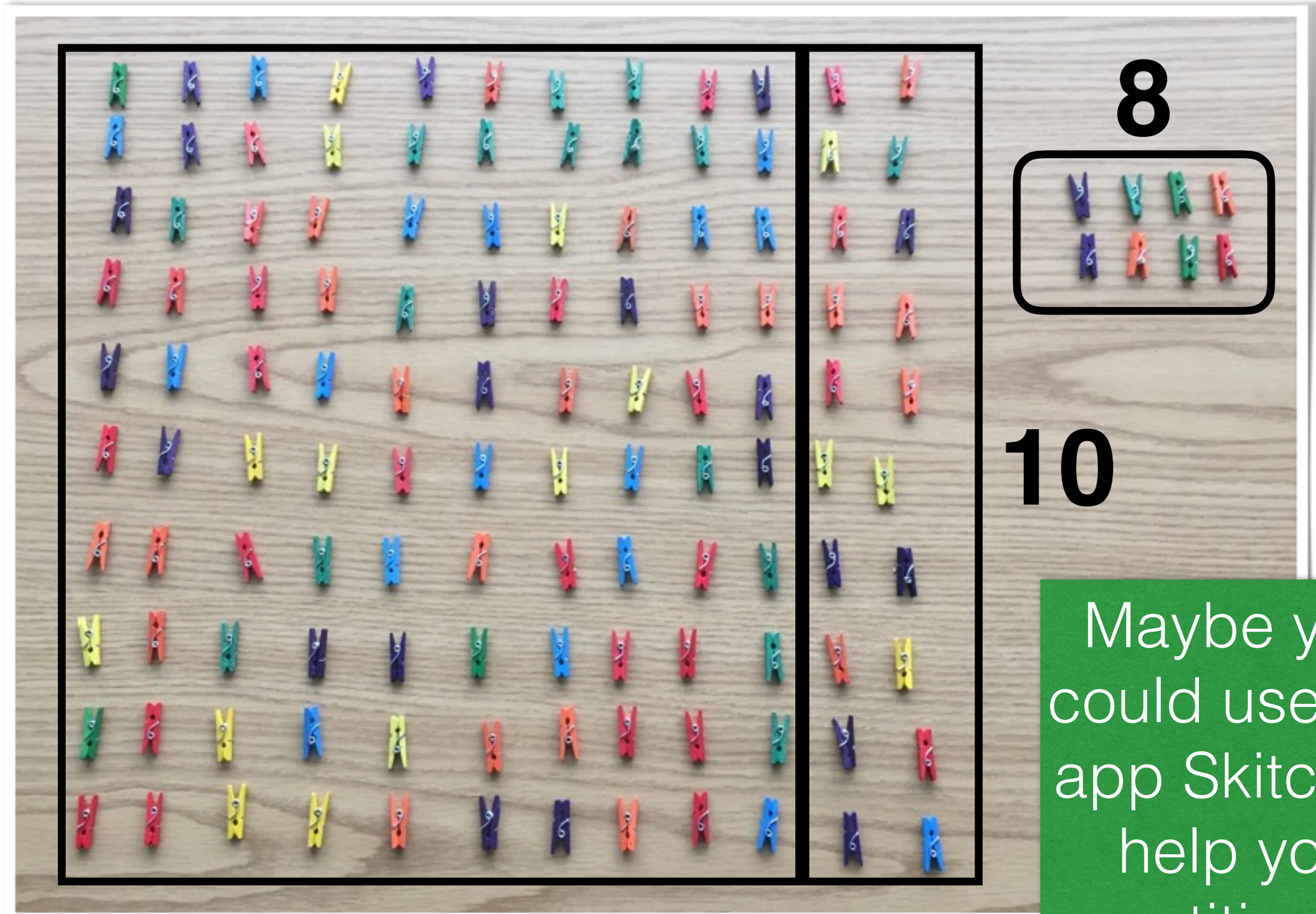
How might we nudge the learning?

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?





Maybe you could use the app Skitch to help you partition…

“I know 10 x 10 = 100…”

Recording Templates

Name _____ Date _____

Counting Collections

What did you count today? _____

Estimate how many you think there are in the collection _____

Show how you counted below!

How many items were there? _____

Name _____ Date _____

Counting Collections

What did you count today? _____

Estimate how many you think there are in the collection _____

Show how you counted below!

How many items were there? _____
Can you write an equation to show how you counted?

Name _____ Date: _____

Today I counted _____

My estimate is _____

My reasoning for my estimate is_____

Here is a picture of how I organized my objects

I counted by _____

My repeated addition sentence is _____

I have _____ groups of _____ so my multiplication sentence is _____

AFTER: Students are engaging in counting

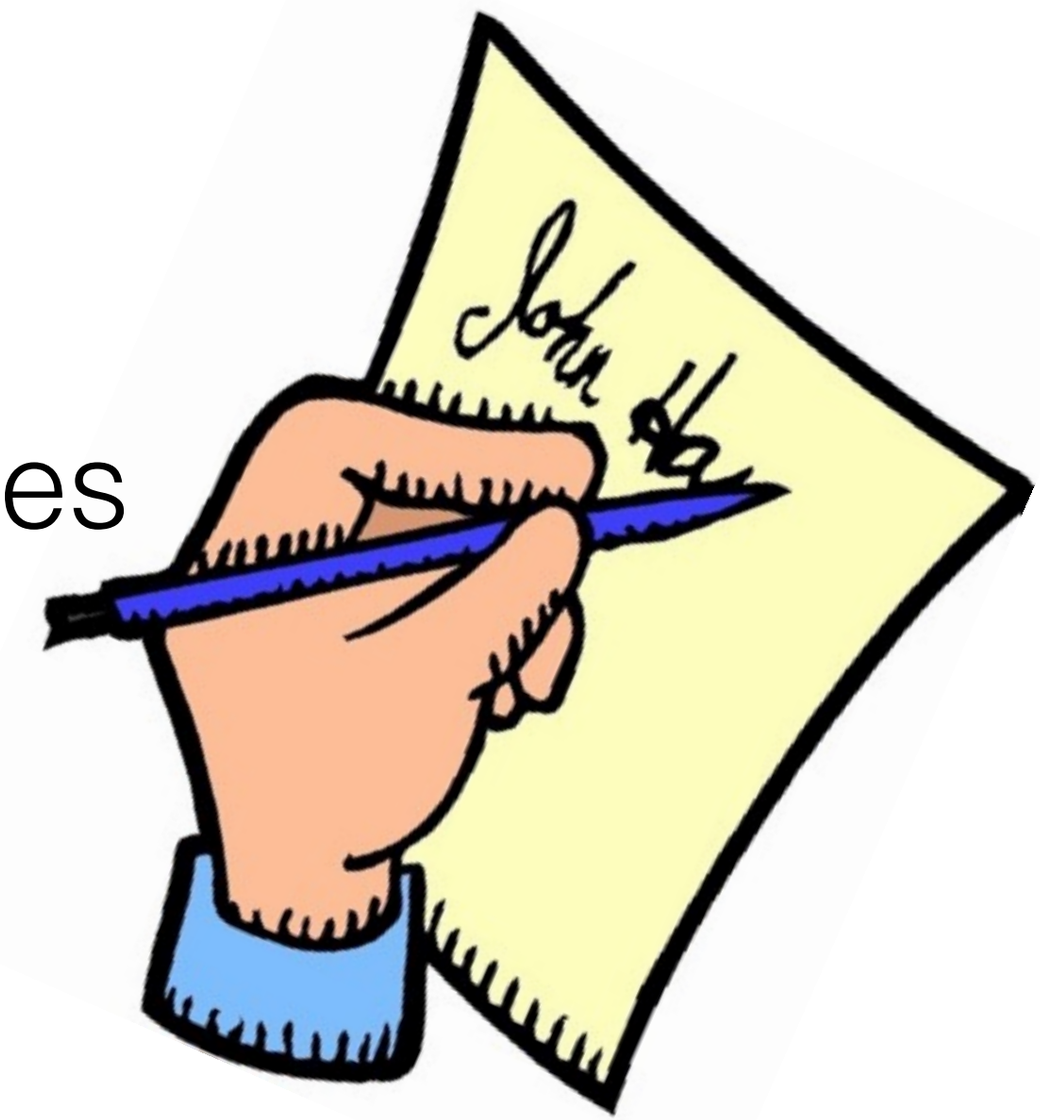
How might you anchor some learning that can be built upon next time?

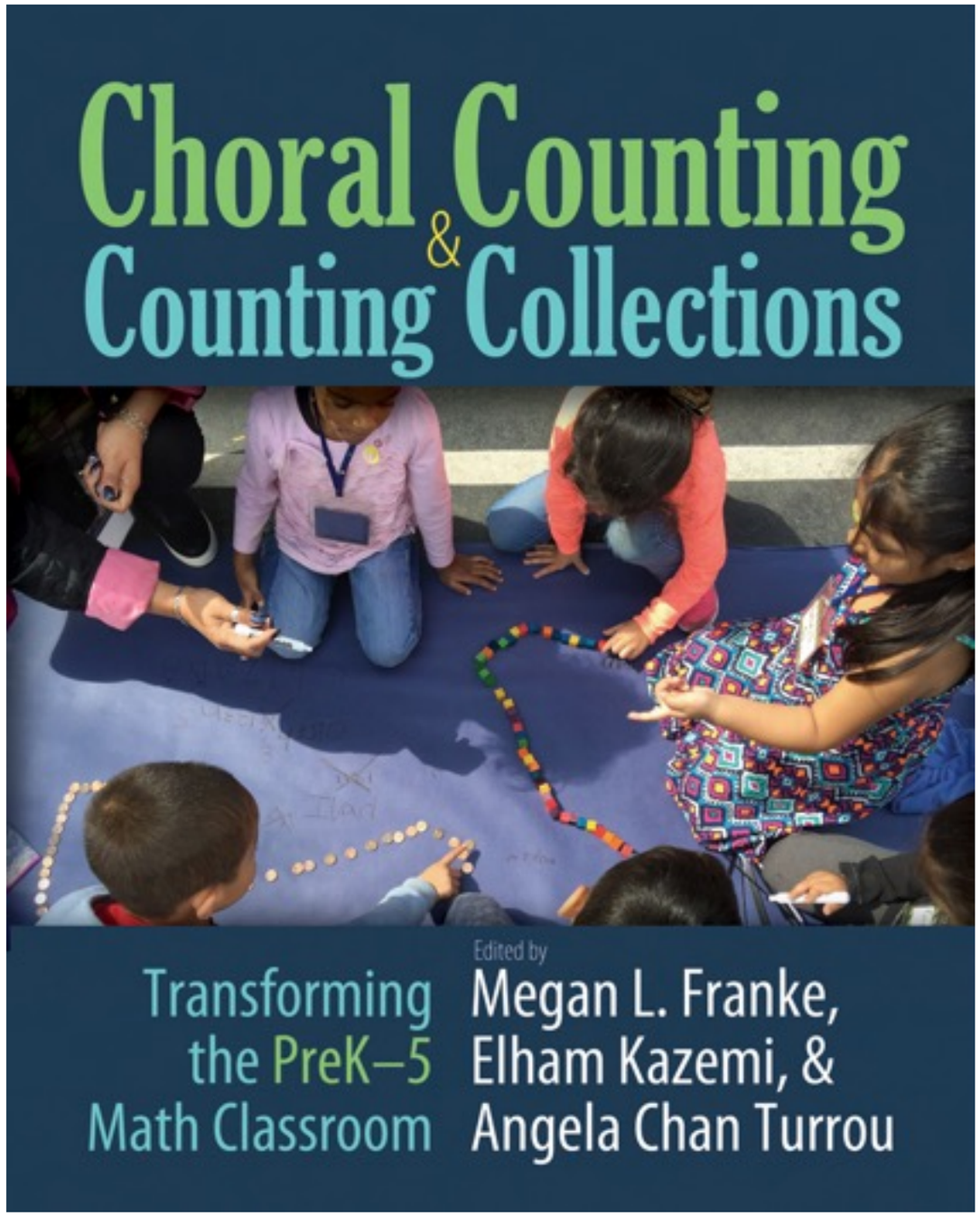
Possibilities include:

- Sharing of photos of students collections and students speak to how they counted.
- Sharing of students recordings of how they counted.
- Posing a reflective question

How can we document the learning and understanding?

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





LRS # 179991

#countingcollections

tedd.org for support

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Teacher Education by Design

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Mathematics Instructional Activities

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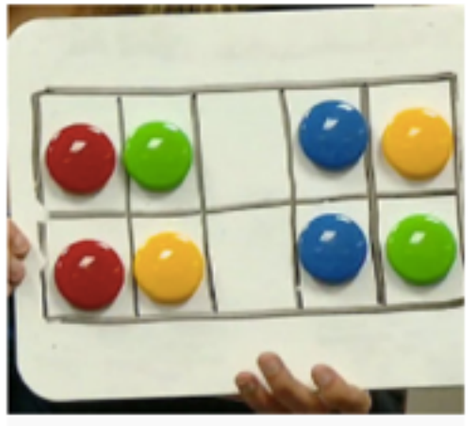
Search for ...



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

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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

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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

Brainstorm with your students how you can build your collecitons.

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