180 Days of
Number Sense Routines
Grade 2
Days 141-160

180 Days of
Number Sense Routines

WHY IS DEVELOPING NUMBER SENSE IMPORTANT? Number Sense is the foundational building block for all strands of mathematics. Students who struggle in mathematics do not lack mathematical ability, but rather, they simply do not have a strong number sense on which to build their knowledge. Just as we are not born knowing how to read, we are not born with Number Sense. It must be developed and nurtured over time through a progression of understandings about numbers and their relationships to one another. With time and focused practice, students come to understand that numbers are meaningful, and outcomes are sensible and expected. Number Sense development encourages students to think flexibly and promotes confidence with numbers.

WHAT IS A NUMBER SENSE ROUTINE? A routine is an activity or event that occurs on a regular basis over time. Routines provide a framework for our day to support both the teacher and students. Routines help to build community and create a safe learning environment for students. Routines build a sense of belonging, ownership, and predictability which make the classroom a place to take risks. We learn through risk-taking; we take risks when we feel safe; we feel safe in a supportive learning environment; we create supportive learning environments through routines. Just as we have established routines for bus dismissal and fire drills, we must also establish routines that build mathematical thinking and discourse.

180 Days of
Number Sense Routines

HOW WILL THESE NUMBER SENSE ROUTINES BENEFIT ME AND MY STUDENTS? What teachers do and how they do it is critically important and has a profound impact on the quality of the educational experience of our students. Effective pedagogy, the art and science of teaching, is a key element in the learning process. The Number Sense are models of effective pedagogy and ensure that the critical Number Sense instruction we provide is equitable to all our students regardless of geography, teacher experience, or student circumstance. As we prepare our students to be mathematically proficient in their lives beyond the classroom walls, these Number Sense routines will help to lay the critical foundation for all future mathematical endeavors.

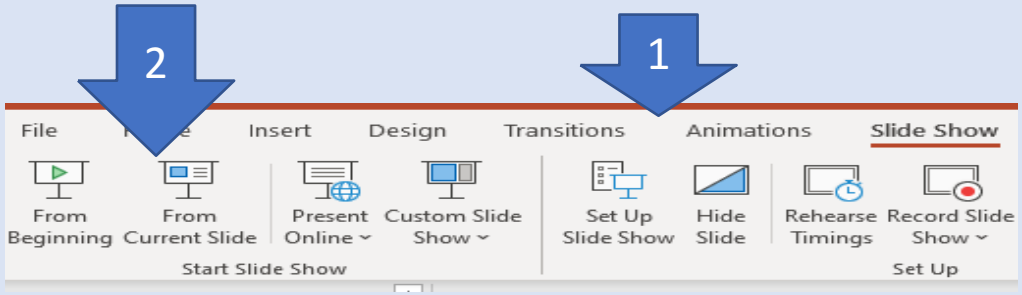
WHAT ARE THE CCPS IMPLEMENTATION EXPECTATIONS? Number sense routines have been developed for all 180 instructional days in grades 1-5. These routines are to be used every day, including early dismissal, late arrival, and field trip days. Because the routines do not require a specific order, it is permissible to trade routines among days within the week to best match the time available. Number Sense must be built over time. With consistency, we can build students' number sense creating a strong mathematical foundation. If students or the teacher is struggling with a routine, it is expected that the teacher collaborate with colleagues to build capacity in that routine – do not just choose to skip the routine. If additional help is needed, the teacher should seek the assistance of their content specialist or mathematics supervisor.

180 Days of
Number Sense Routines

HOW TO RUN POWERPOINT IN SLIDE SHOW MODE:

Slides with animation features, must run in Slide Show mode of PowerPoint for the animations to work correctly.

1. Select <Slide Show> from the menu at the top
2. Select <From Current Slide>



HOW TO ANNOTATE STUDENT THINKING ON THE SLIDE:

- With the slide in Slide Show mode, right click on the slide
- Select <Pointer Options> then choose <Pen>

180 Days of
Number Sense Routines

Acknowledgements

We are grateful to those who have inspired this project – and there have been many. These slide decks were designed for Grades 1–5 with custom-built daily routines for each grade level. The nine routines blend original creations, adaptations, and OER materials. We have made our work available in Open Educational Resources so that others may benefit as we have from the collaboration of other educators. Our deepest gratitude and respect to all those who helped move our work forward, and a special thank you goes to the following whose own work had such a tremendous impact on our 180 Days of Number Sense Routines:

- *Decide & Defend* and *Quick Count* routines were adapted from templates created by Grace Kelemanik and Amy Lucenta at http://FosteringMathPractices.com
- *Estimation Clipboard, Esti-Mysteries,* and *Splat!* templates created by www.SteveWyborney.com
- *Same But Different* discussion from Developing Grayscale Thinking by Looney Math Consulting at https://www.samebutdifferentmath.com
- *Which One Doesn't Belong* tasks adapted from http://wodb.ca by Mary Bourassa
- *As Close As It Gets* https://www.mathisfigureoutable.com/ascloseasitgets by Pam Harris

What is the t

Let's look under the splat to see what coins were hiding.

ld

culate the

What other coin combinations could it be?

How do you know?

$0.54

Day 141

SPLAT!

Day 142

DECIDE & DEFEND

Using the DECIDE & DEFEND routine

- **READ to Understand:** Begin by having students discuss the question being asked. At this time, do NOT focus on the math calculations required or the answer. This step is designed for students to understand the context of the question (What is the gist of the question?)

- **DECIDE**: Pair or group students. Using a consistent pairing will make this routine more fluid so you do not have to take time to pair students every time you want them to discuss. Have students discuss the question and discuss the question and decide which solution is correct (note: partners may not agree and that is fine provided they can justify their own thinking).

- **DRAFT**: Students draft a statement about their ideas (either as a group or individually and it can be written or oral – teacher's choice)

- **DEFEND**: Students share their ideas and defend their reasoning with the whole group. Encourage active listening and accountable talk.

- **RELECT**: To further develop comprehension, have students use ONE of the sentence starters on the "Reflect on Learning" slide after they have discussed and listened to new ideas with classmates.

NOTE: This is the CCPS adaptation of the original Decide and Defend protocol

Use the NEXT SLIDE with students.

Here is are some possible responses. This list is not all-inclusive.
Additional ideas encouraged!

Day 142

DECIDE & DEFEND

Allow students time to work TOGETHER and discuss the possibilities. The goal is not specifically to get the best solution; but rather, to explore how changing the place value of the digits affects the overall sum of the numbers. Hopefully, students will recognize that the larger values need to be in the larger place values.

Winning Sum will equal 951.

- The 5 and 4 must be in the hundreds places.
- The 3 and 2 will be in the tens places.
- The 1 and 0 will go in the ones places.

There is more than one winning sum [520 + 431 or 530 + 421, etc.…]

Help students to recognize the PATTERN of what must be true in order for Kate to win the game.
Explore several possible winning combinations and explore the PATTERN of why they are winning solutions.

Day 142

BIG DEAL GAMESHOW!

Kate is a contestant on a game show.
She must add **two 3-digit numbers** using the digits **0, 1, 2, 3, 4, 5** *(she can only use each digit once, so* 555 + 555 *is not allowed!)*

If she makes the **greatest possible sum**, she WINS!
What two 3-digit numbers should Kate make?

Example:
$$\begin{array}{r} 123 \\ +450 \\ \hline 573 \end{array}$$

DECIDE & DEFEND

2.NBT.A.4
2.NBT.B.7

Day 142

Reflect on Learning

- A new math idea I learned today is…
- Place value is important because…

DECIDE & DEFEND

56 – 10
456 – 10
456 – 100

Day 143

NUMBER TALK

TEACHER NOTES

BEFORE

This slide has the String of expressions that you will use for today's Number Talk. You can use Smart Ink, right click for PowerPoint Pen, or convert this slide to Smart Notebook so you can easily annotate on the slide. The annotation is an important part of the routine. The expressions should be presented one-at-a-time with skills building on one another.

DURING

Mentally subtract 10 or 100 from a given number

Key Ideas:

- 56 – 10 = 46
- 456 – 10 = 446
- 456 – 100 = 356

Remember, students will come with a variety of strategies. During a Number Talk, the students explain their way of thinking. When students find ways that are especially efficient, highlight those strategies in the reflection that should follow the Talk. Help students to understand a wide variety and guide them into understanding that some strategies work better in some situations, so knowing more than one way to solve an equation like this one is important so they can later choose the method that is most efficient.

AFTER

Help students to recognize the patterns of subtracting 10 or 100 from a number. Notice that the ones place value does not change since we are subtracting zero ones. When we subtract 100, both the tens place and the ones place will remain unchanged since we are not subtracting any tens or ones.

56 – 10

Day 143

NUMBER TALK

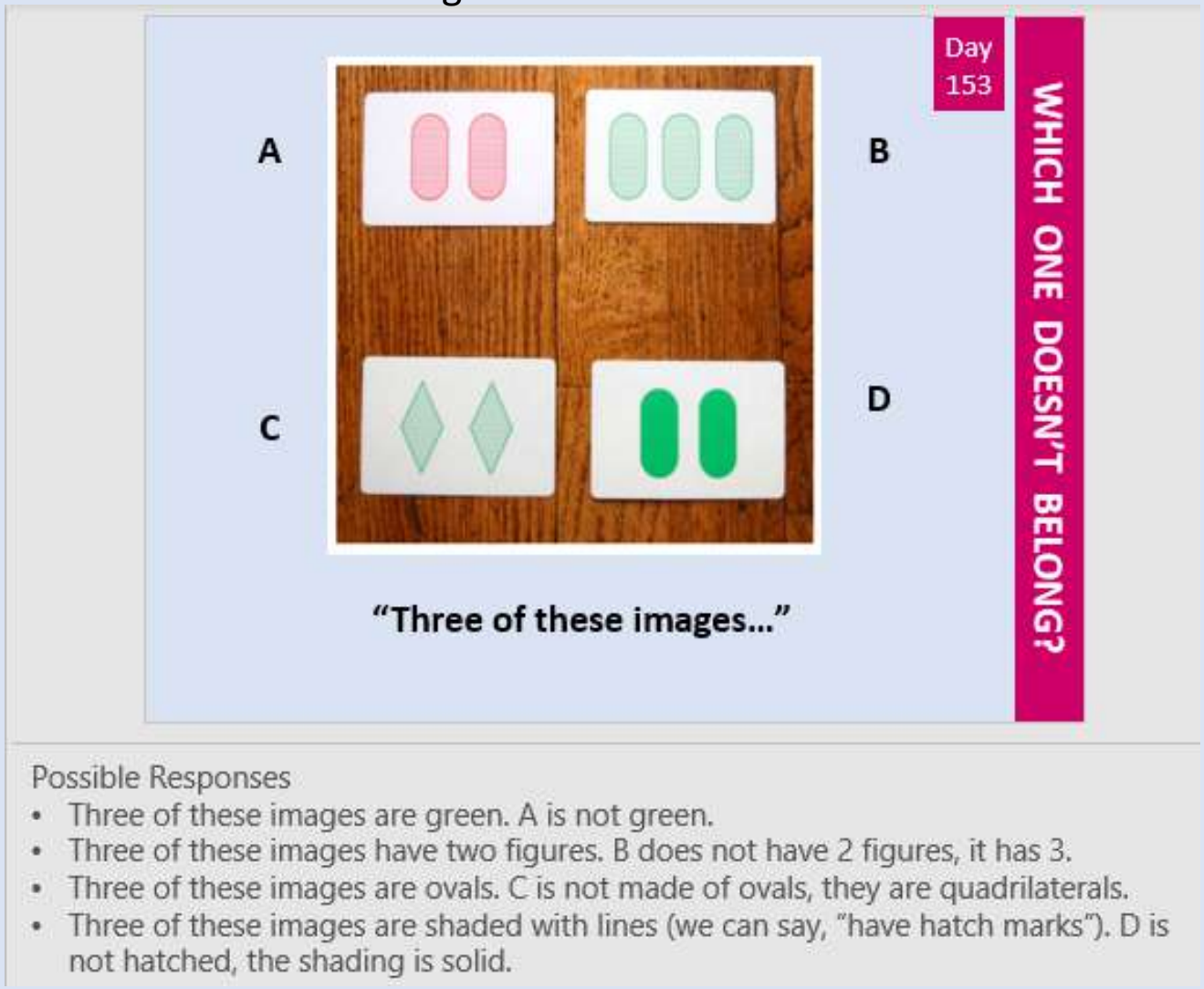
2.NBT.B.8
2.NBT.B.9

Day 144

WHICH ONE DOESN'T BELONG?

Use the NEXT SLIDE with students.

Here is are some possible responses. This list is not all-inclusive. Additional ideas encouraged!



Possible Responses

- Three of these images are green. A is not green.
- Three of these images have two figures. B does not have 2 figures, it has 3.
- Three of these images are ovals. C is not made of ovals, they are quadrilaterals.
- Three of these images are shaded with lines (we can say, "have hatch marks"). D is not hatched, the shading is solid.

Day 144

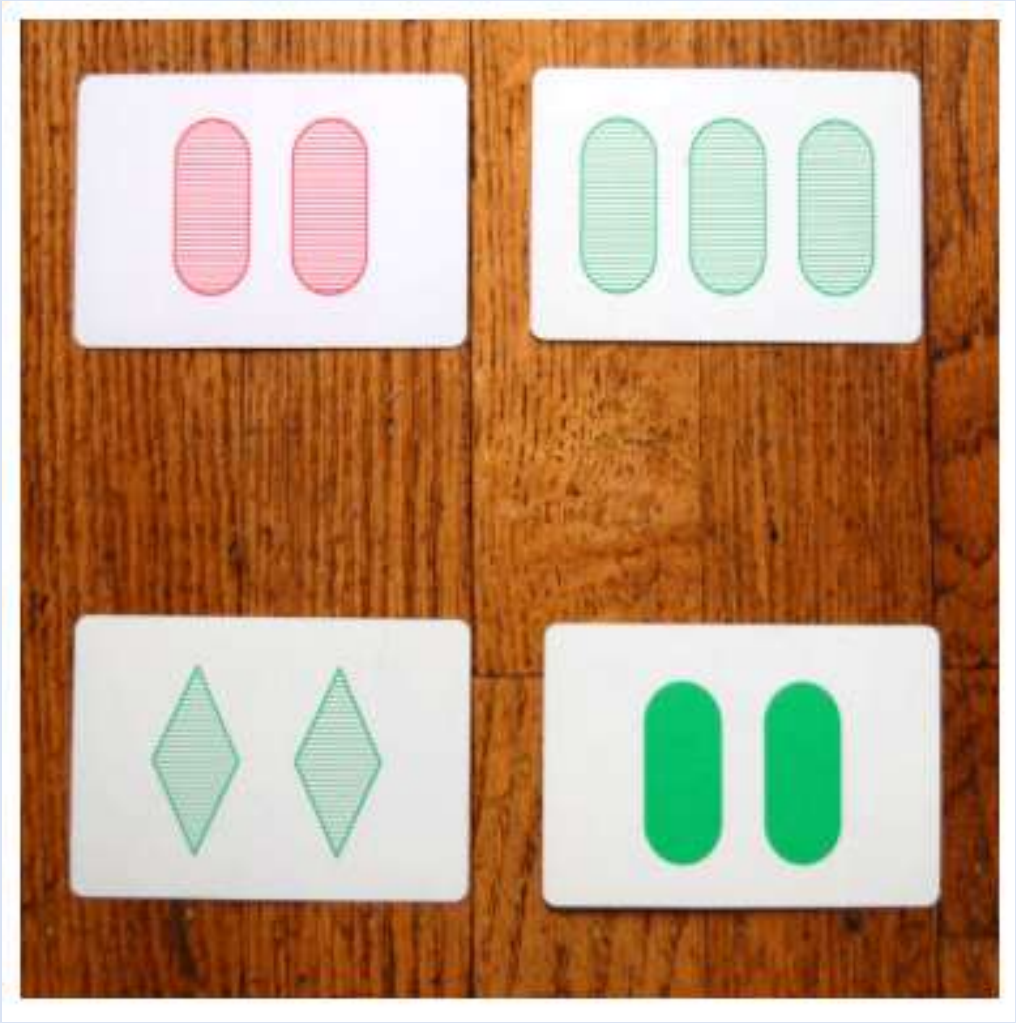
WHICH ONE DOESN'T BELONG?

A

B

C

D



"Three of these images…"

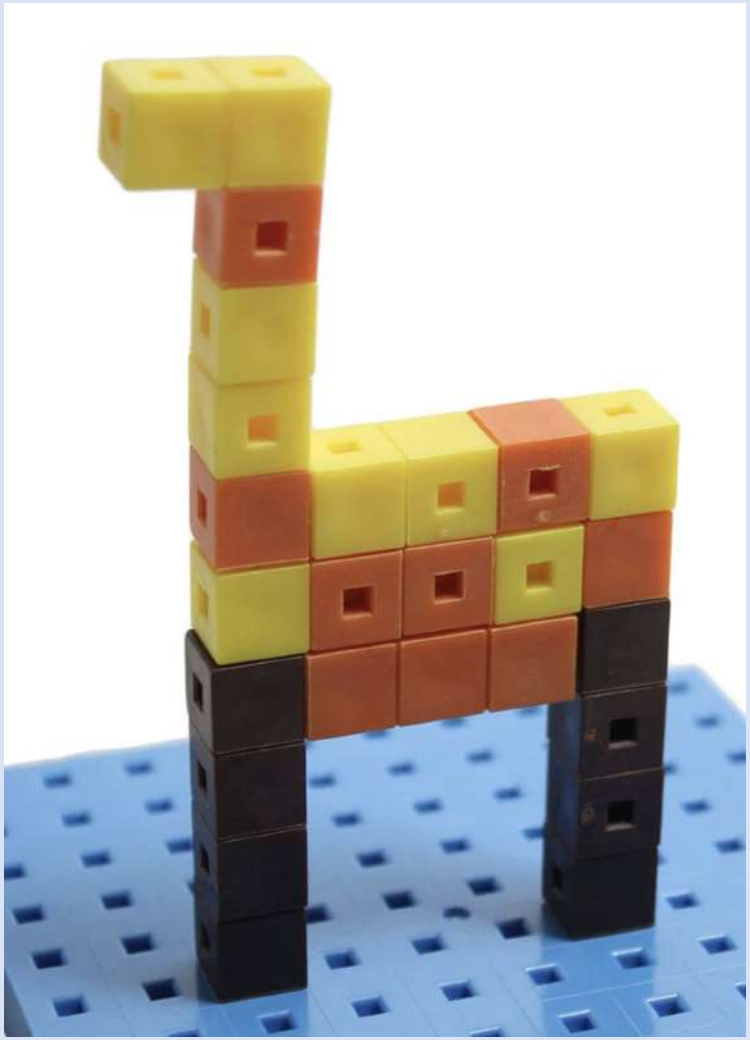
1.G.A.1
2.R.1

Directions for QUICK COUNT routines

Quick Count is an instructional routine designed to shift attention away from mindless calculations and toward necessary structural interpretations of mathematics. This routine fosters structural thinking, Math Practice 7, and promotes student discourse.

1. Pair students into Numbered Heads (or Peanut Butter Jelly partners, etc.)
2. Show students the first image slide for about 3-5 seconds depending on the complexity of the image and level/experience of the students.
3. With their partner, students discuss everything they can remember about the image.
4. After a minute of partner discussions, have students share ideas to the group.
5. Create a list of student ideas that students can refer to when the image is shown again.
6. Tell students that you are going to put the slide back up. Ask students to COUNT the images using some type of shortcut strategy (chunking, symmetry, arrays…)
7. Show the image again and leave it displayed as students look for counting shortcuts.
8. With their partner again, students discuss how many objects are in the image and how describe the shortcut counting strategy they used. Give time for partner discussions. Walk around and take notes about discussions to determine which students will share.
9. Use the slide with identical images as a comparative visual as students take turns explaining how they counted the objects in the image.
    - Use your notes to select different students with different approaches.
    - The student explains his/her shortcut as the teacher **gestures** over the image.
    - A **different student** is asked to **REPEAT the original student's shortcut** as the teacher **annotates** (circles, underlines) on the image to show the shortcut used.
    - Repeat the process using a different student-generated shortcut strategies.
10. End by asking students to explain what was "mathematically important"

Day
145



What do you NOTICE?

QUICK COUNT

1.OA.A.1
1.OA.C.4
2.R.1

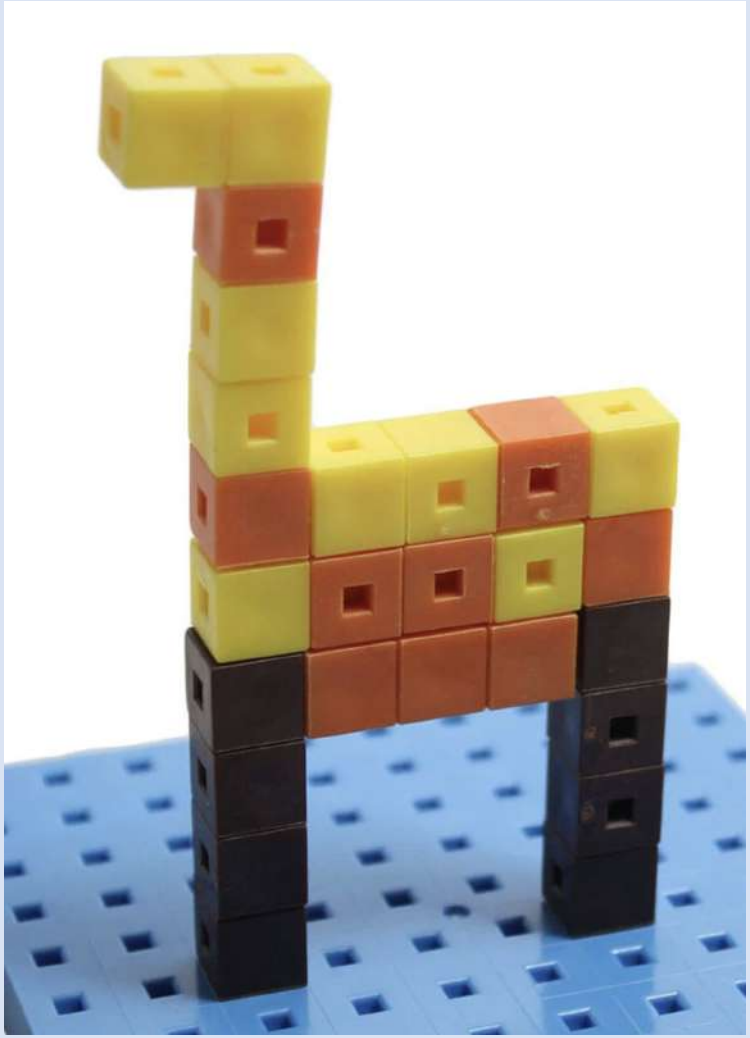
Day 145

QUICK COUNT

What did you NOTICE?

Day
145

QUICK COUNT



How many snap cubes?

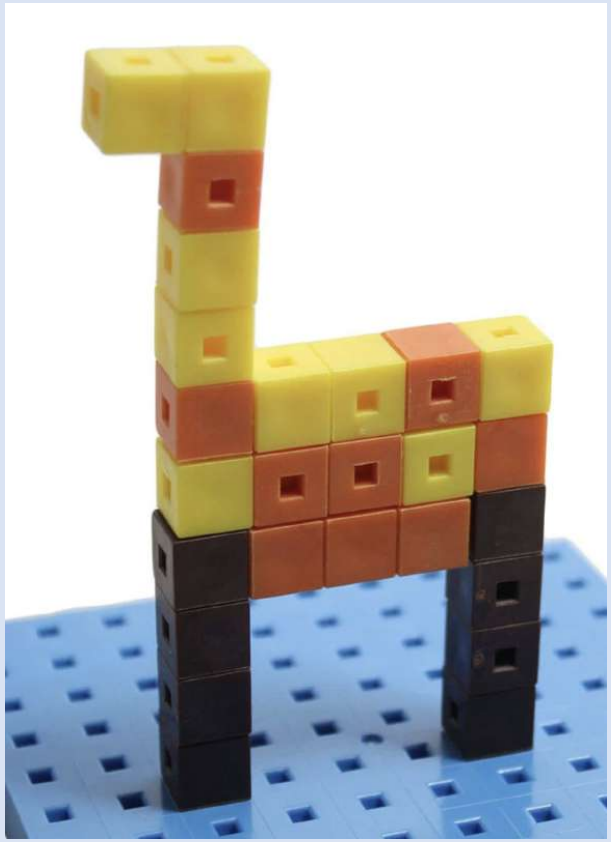
What **counting shortcut** did you use?

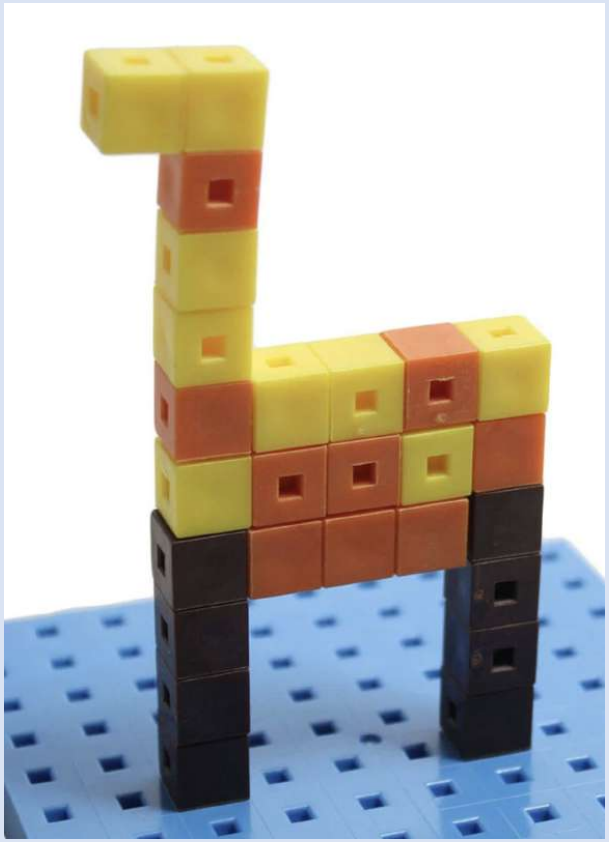
I noticed ____ so I _____

(They) noticed ____ so they___

Day 145

QUICK COUNT





Day 145

Reflect

What was mathematically important?

QUICK COUNT

Day 146

Counting Quarters

- Say: Today we are going to count ALL TOGETHER .
- We will start with 25 cents and will skip-counting by adding a quarter each time.
- We will count SLOWLY so I can chart the number that we count.
- Ready? Let's count together: 25 cents, 50 cents, 75 cents, 1 dollar, 1 dollar 25 cents, 1 dollar 50 cents….
- As you slowly count together, chart responses on the next slide.
- **When you have finished charting, <u>discuss patterns</u> that are noticed.**

CHORAL COUNTING

Start at 25 cents and count up by 25 cents.

Day 146

25¢ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

CHORAL COUNTING

2.MD.C.8
2.NBT.B.7

50 + 24 + 6 + 50
80 + 17 + 20 + 2
13 + 75 + 25 + 10

Day 147

NUMBER TALK

TEACHER NOTES

BEFORE

This slide has the String of expressions that you will use for today's Number Talk. You can use Smart Ink, right click for PowerPoint Pen, or convert this slide to Smart Notebook so you can easily annotate on the slide. The annotation is an important part of the routine. The expressions should be presented one-at-a-time with skills building on one another.

DURING

Adding Up to Four 2-Digit Numbers Using Place Value Strategies

Below are POSSIBLE responses. Students may add differently than shown. The goal is (1) for students to have a logical way to more than two numbers using place value strategies and (2) to be able to articulate those strategies. Be careful NOT to write "run-on equations" as you annotate (for example, do not write 50+50=100+24=124+6=130 since 50+50 does not equal 130 as indicated by this run-on equation. Instead, write 50+50=100 then on the next line below write 100+24=124). Each example below makes use of the Commutative Property which means that we are permitted to move the addends in an addition expression without it affecting the sum.

- 50 + 24 + 6 + 50 ---- Students may see the 50+50 to make an easy 100
- 80 + 17 + 20 + 2 ---- Students may see the 80+20 to make an easy 100
- 13 + 75 + 25 + 10 ---- Students may see the 75+25 to make an easy 100

Remember, students will come with a variety of strategies. During a Number Talk, the students explain their way of thinking. When students find ways that are especially efficient, highlight those strategies in the reflection that should follow the Talk. Help students to understand a wide variety and guide them into understanding that some strategies work better in some situations, so knowing more than one way to solve an equation like this one is important so they can later choose the method that is most efficient.

AFTER

Discuss the various approaches. Highlight those that were efficient and accurate. Remember, the goal is
(1) for students to have a logical way to more than two numbers using place value strategies and
(2) to be able to articulate those strategies.

CALVERT COUNTY PUBLIC SCHOOLS

Day
147

50 + 24 + 6 + 50

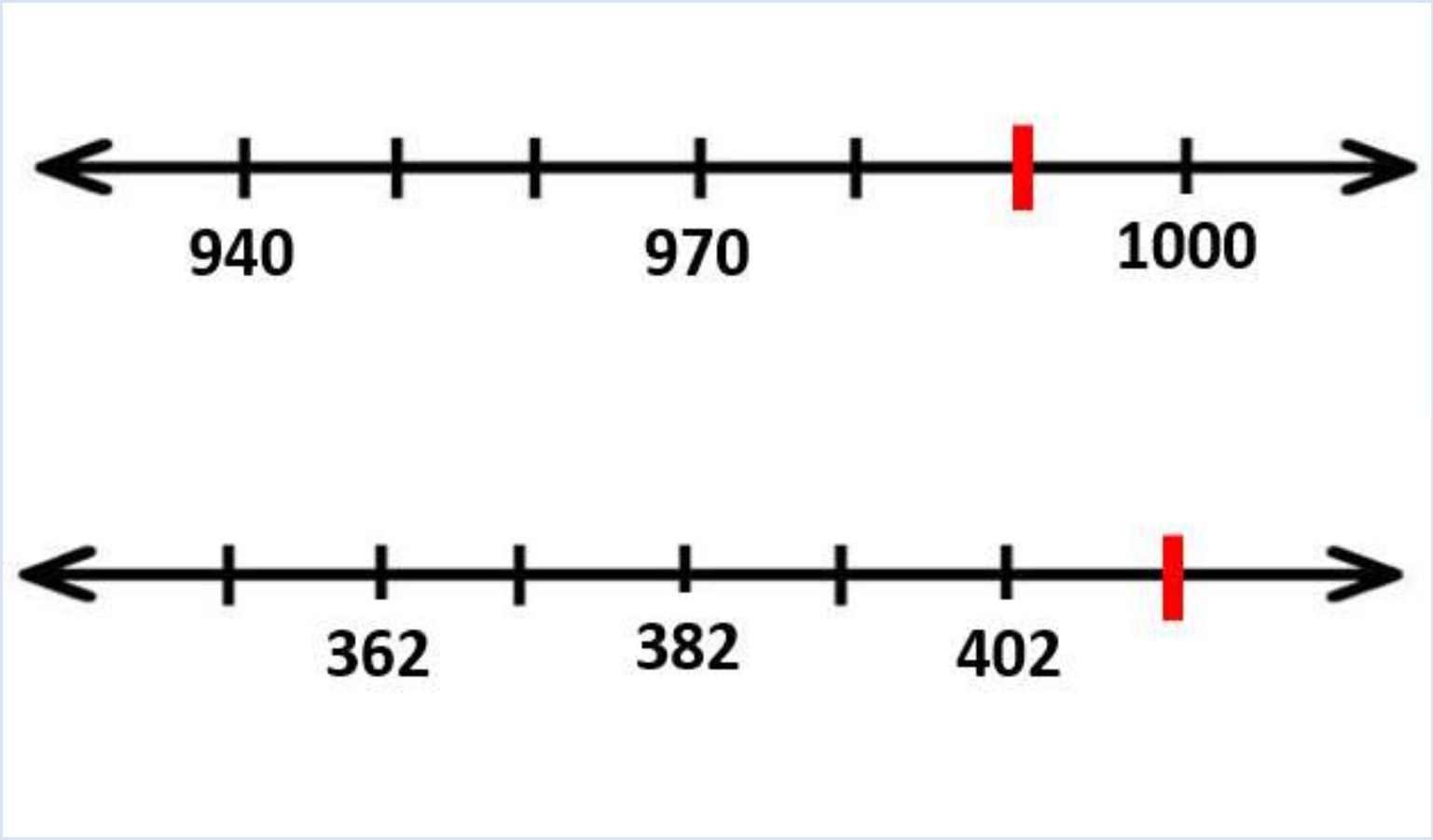
NUMBER TALK

2.NBT.B.6
2.NBT.B.9

Day 148

What number would go on the RED hash mark?

How do you know?



OPEN NUMBER LINE

For more Open Number Line Activities, visit http://www.MathSnack.blogspot.com

2.NBT.A.2
2.NBT.B.7

Day 149

ESTIMATION

Which answer is

As Close as it Gets?

Explain that NONE of the answers shown are the exact solution.

- Students should use **mathematical reasoning** to select the answer that is **closest** to the actual answer. **Discourage complex calculations, encourage estimation and reasoning.**
- Students are expected to **explain the reasoning they used** to select the answer that they think is closest to the actual answer.

Possible Reasoning: *The shorter hand on a clock tells the hours, so it is between 11 and 12 o'clock. Because the minute hand is past the halfway mark on a clock (11:30), it is closer to 12:00 than 11:00. It is only 20 minutes away from 12:00 but is 40 minutes away from 11:00.*

Day 149

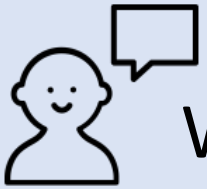
Which answer is

As Close as it Gets?

8:00

11:00

12:00



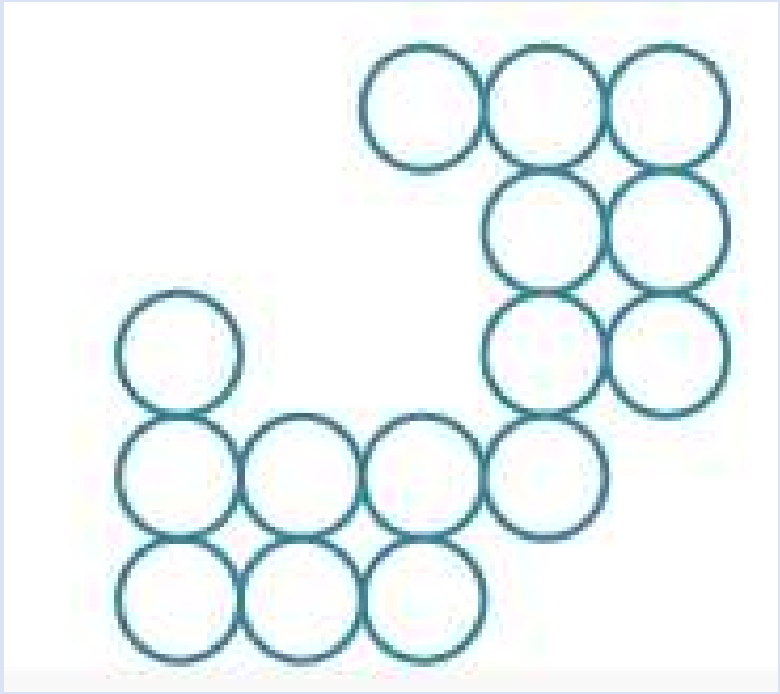
What mathematical reasoning did you use to decide on the closest answer?

ESTIMATION

2.MD.C.7

Day 150

QUICK COUNT



What do you NOTICE?

Image Source: http://www.visualpatterns.org

2.OA.B.2
2.OA.C.3

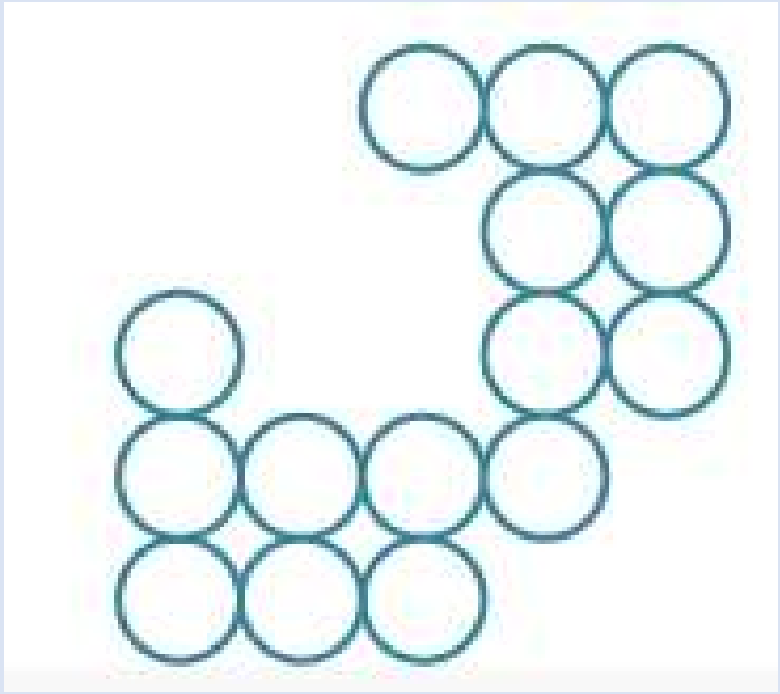
Day 150

QUICK COUNT

What did you NOTICE?

Day 150

QUICK COUNT



How many circles do you see?

What **counting shortcut** did you use?

I noticed ____ so I _____

(They) noticed ____ so they___

Day 150

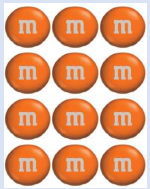
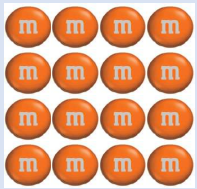
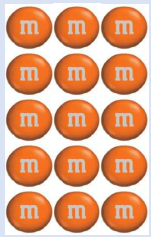
QUICK COUNT

Day 150

Reflect

What was mathematically important?

QUICK COUNT

Day 151

NUMBER TALK

TEACHER NOTES

BEFORE

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DURING

Use Addition to find the total number of objects arranged in an array

The goal of this number talk is for students to recognize ShortCut patterns for counting the total in each array. Some students may skip count while others add. For the first image, it is fine for students to skip count by 4s: 4, 8, 12 while others see the groups of 3 that go across and skip count by 3s: 3, 6, 9, 12. Both end with 12 total!

Remember, students will come with a variety of strategies. During a Number Talk, the students explain their way of thinking. When students find ways that are especially efficient, highlight those strategies in the reflection that should follow the Talk. Help students to understand a wide variety and guide them into understanding that some strategies work better in some situations, so knowing more than one way to solve an equation like this one is important so they can later choose the method that is most efficient.

AFTER

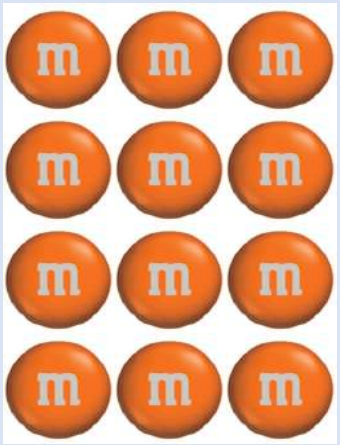
Discuss the various approaches. Highlight those that were efficient and accurate. Remember, the goal is (1) for students to have a logical strategy to add to find the total count in an array and (2) to be able to articulate those strategies

CALVERT COUNTY PUBLIC SCHOOLS

Day 151

How many M&M candies in each array?

What strategy did you use?



NUMBER TALK

2.OA.C.4

Day 152

Estimation Activity

When you are ready to use this activity,
use the PowerPoint platform so the slides work properly.

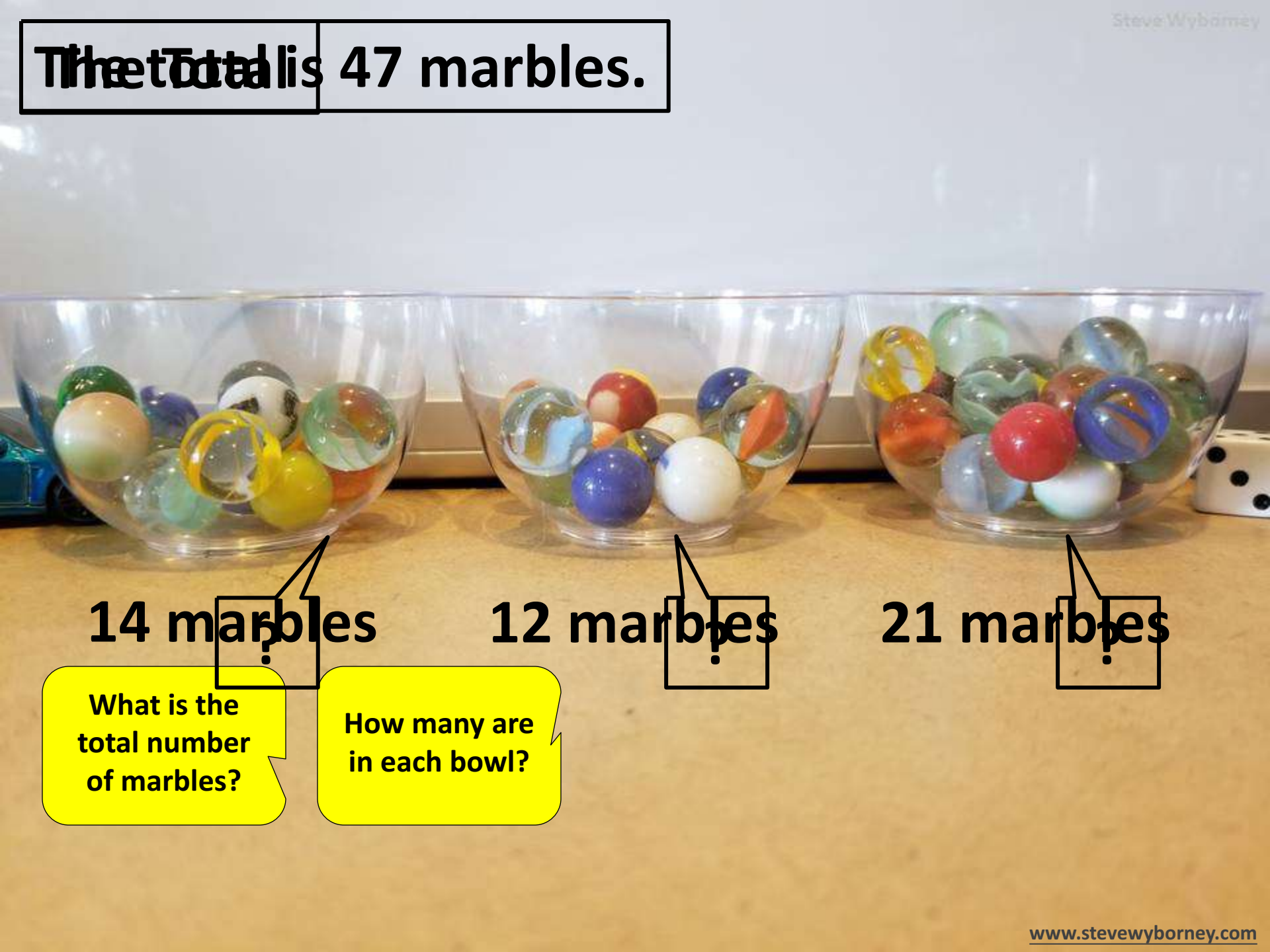
PROMPT 1: **What is the total number of marbles in all the bowls?**
Reveal answer BEFORE asking Prompt 2

PROMPT 2: **How many marbles are in each bowl?**
Reveal answers and discuss one at a time allowing students to refine their estimates between each "reveal" – help students keep the total number of gems in mind as they formulate estimates – allow paper/pencil or dry erase if students want to do calculations

ESTIMATION

2.NBT.B.9

The total is 47 marbles.



Day 153

Skip Counting Time by 5 Minutes

- Today we will be skip counting by 5 minutes intervals.
- If we begin on 1:40, what number should we say next? Remember, we are skip-counting by 5-minute intervals. (1:45)
- Let's count all together. Let's count slowly so I can record the times on our chart.
- After we finish counting, we will **look for patterns** in the time count we did together.
- Chart on the next page.

CHORAL COUNTING

TIME: 5-Minute Intervals

Day 153

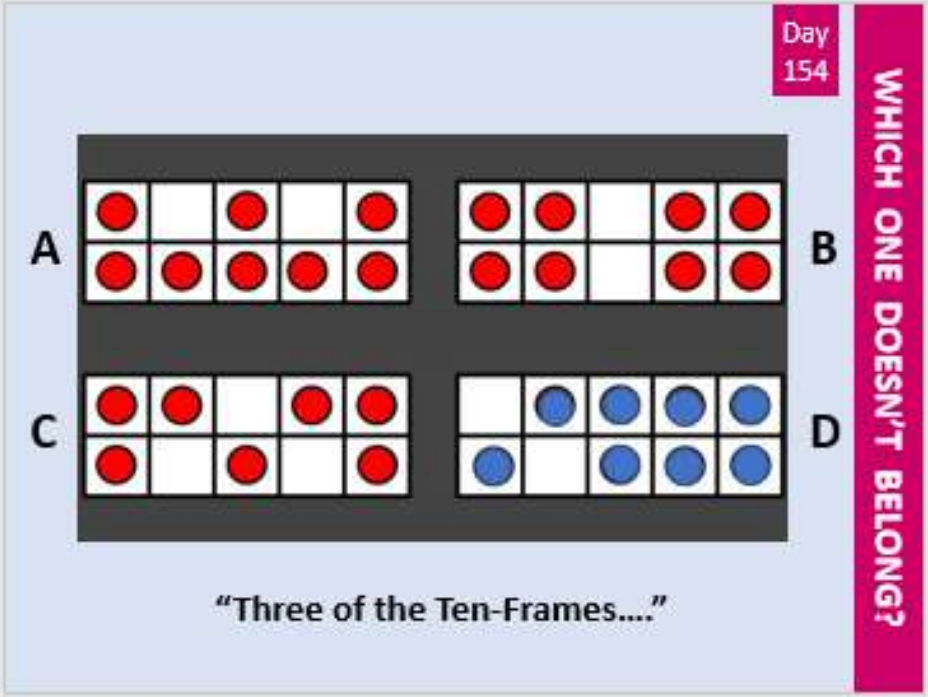
1:40	1:45	1:50	

CHORAL COUNTING

2.NBT.B.9

Use the NEXT SLIDE with students.

Here is are some possible responses. This list is not all-inclusive.
Additional ideas encouraged!



Possible Responses:

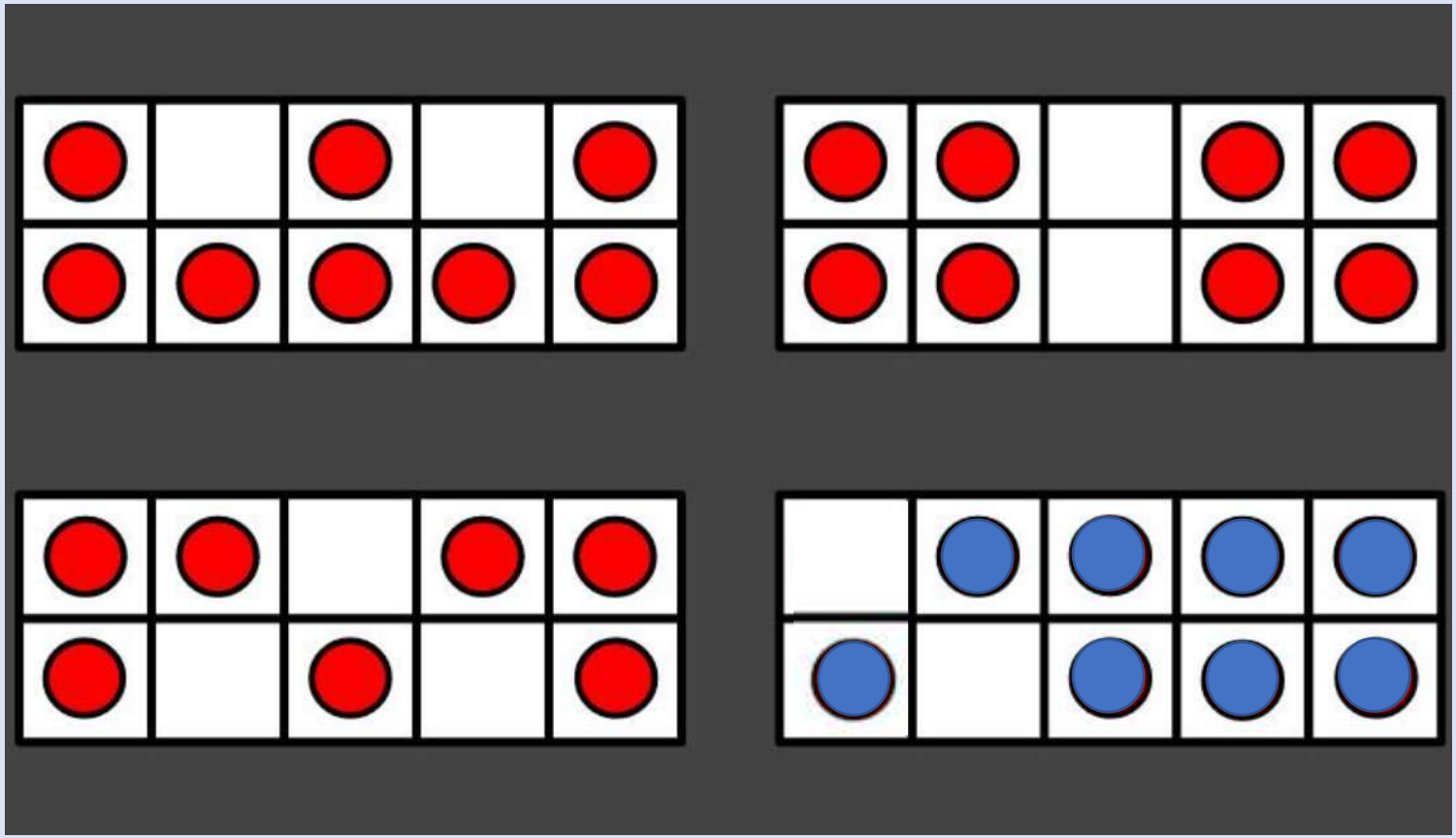
- Three of the 10-Frames have 4 dots on the top row. Frame A does not have 4 dots on the top row.
- Three of the 10-Frames do not show a doubles fact. Frame B shows 4+4 which is a doubles fact.
- Three of the 10-Frames have 8 dots. Frame C does not have 8 dots, it only has 7.
- Three of the 10-Frames have red dots. Frame D does not have red dots.

Day
154

WHICH ONE DOESN'T BELONG?

Day
154

WHICH ONE DOESN'T BELONG?



"Three of the Ten-Frames…."

2.R.1
1.OA.A.1

4 dimes + 3 pennies
1 quarter + 2 dimes
3 quarters + 3 nickels
3 nickels + 12 pennies

Day 155

NUMBER TALK

TEACHER NOTES

BEFORE

This slide has the String of expressions that you will use for today's Number Talk. You can use Smart Ink, right click for PowerPoint Pen, or convert this slide to Smart Notebook so you can easily annotate on the slide. The annotation is an important part of the routine. The expressions should be presented one-at-a-time with skills building on one another.

DURING

Adding coins

Below are POSSIBLE responses. Students may add differently than shown. The goal is (1) for students to have a logical way to add combinations of coins (2) to be able to articulate those strategies

- 4 dimes + 3 pennies ---- 40 cents + 3 cents = 43 cents
- 1 quarter + 2 dimes ---- 25, 35, 45 cents
- 3 quarters + 3 nickels ---- 75 + 15 = 80 + 10 = 90 cents
- 3 nickels + 12 pennies ---- 15 cents + 12 cents = 15 cents + 10 cents + 2 cents = 25 cents + 2 cents = 27 cents

Remember, students will come with a variety of strategies. During a Number Talk, the students explain their way of thinking. When students find ways that are especially efficient, highlight those strategies in the reflection that should follow the Talk. Help students to understand a wide variety and guide them into understanding that some strategies work better in some situations, so knowing more than one way to solve an equation like this one is important so they can later choose the method that is most efficient.

AFTER

Discuss the various approaches. Highlight those that were efficient and accurate.
Remember, the goal is (1) for students to have a logical way mixed coin values and (2) to be able to articulate those strategies

4 dimes + 3 pennies

Day 155

NUMBER TALK

2.MD.C.8

Intro

SAME BUT DIFFERENT

About the SAME BUT DIFFERENT Routine

Same But Different is a powerful routine for use in math classrooms. The *Same but Different* routine compares two things **calling attention to both how they are the same and how they are different**. This apparent paradox is the beauty of the activity. In this analysis, *instead of making a choice and trying to prove that these are the same or prove that they are different, **students consider how two items can be both**.* This is a critically important distinction from many other tasks.

One of the reasons students struggle in math is that they struggle to make connections. Someone who has poorly developed number sense might see each number as its own thing, and not part of the larger network of mathematical ideas. A mathematical conversation using the language *same but different* that calls attention to how a new concept in math is the same as another familiar and comfortable concept but different in a specific way is a useful conversation in growing a student's network of connections. Building these connections could also reduce anxiety as children become the sense-makers in the conversation.

Source: www.samebutdifferent.net.com/about

Facilitating the SAME BUT DIFFERENT Routine

1. Present the slide
2. Ask students to THINK about how the two items are both the SAME AND DIFFERENT.
3. Do not allow conversation at this time -- give ample think time for students to consider the possibilities
4. After some time has been given (a minute or so), ask students to talk with their Number Head partner or small group about their ideas -- allow this conversation to dominate the time dedicated to this routine
5. As students talk with partners/groups, walk around and listen to the conversations. Resist jumping in; let them grapple with the ideas with their peers.
6. As you walk around listening, take notes. You will use these notes to help direct the whole group conversation.
7. Refocus student attention to the front of the room for a whole group debriefing session. Ask students to share some of their ideas about how the two were both the SAME and DIFFERENT – use the notes you took to bring out important ideas that will benefit the entire room.

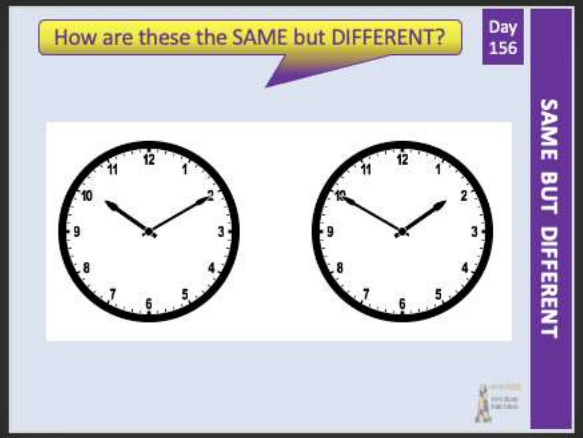
CALVERT COUNTY PUBLIC SCHOOLS

Day 156

Use the NEXT SLIDE with students.

Here is are some possible responses. This list is not all-inclusive.
Additional ideas encouraged!

- Students may simply recognize a component that makes them the “same” OR “different”
- Some students may state a same/different relationship and say that they are the “same because…. But different because….”

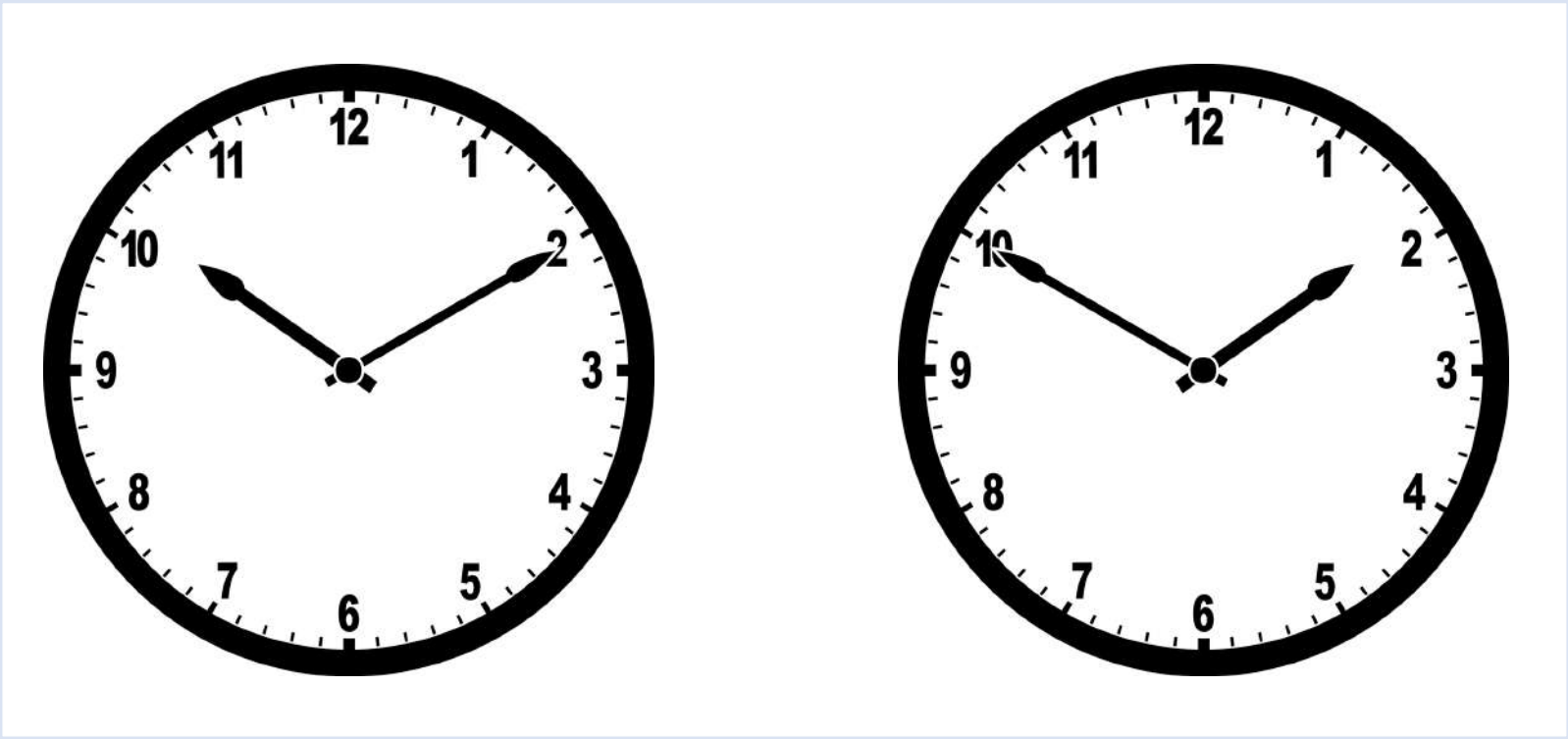


Both are clocks but they tell different times.
One clock says 10:10 and the other clock says 1:50
They both have a long hand and a short hand but the hands are in different places
The shorter hand is slightly past the 10 on the left; the longer hand is directly on the 10 on the right
The numbers are in the same places

SAME BUT DIFFERENT

How are these the SAME but DIFFERENT?

Day 156



SAME BUT DIFFERENT

Day 157

320

What value

What if a value of 100 is hiding – what will th

Let's see the

What value must be hiding?

Let's look under the splat to see the hidden value.

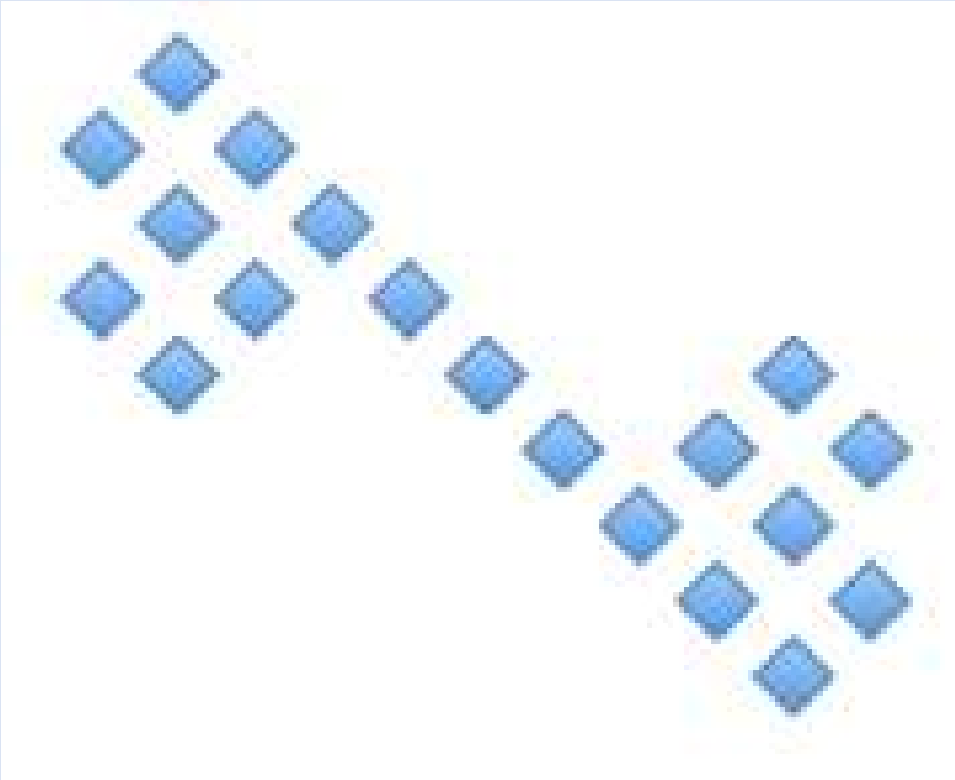
What can we learn from this picture?

SPLAT!

2.NBT.B.7
2.NBT.B.8
2.NBT.B.9

Day
158

QUICK COUNT



What do you NOTICE?

Image Source: http://www.visualpatterns.org

2.OA.B.2
2.OA.C.4

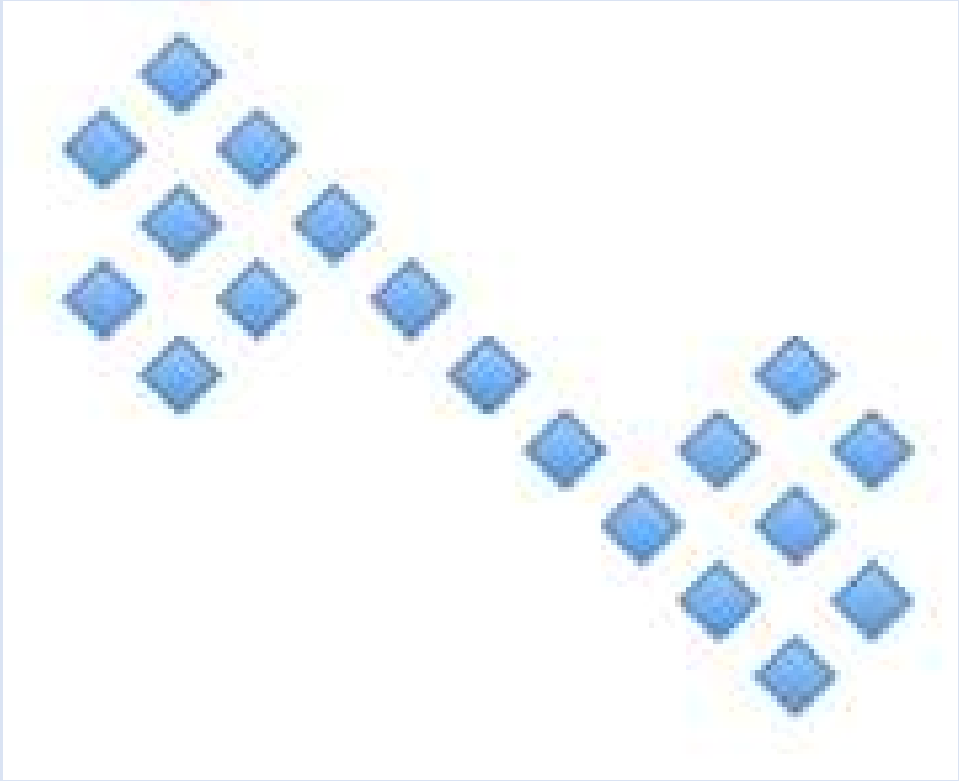
Day 158

QUICK COUNT

What did you NOTICE?

Day
158

QUICK COUNT



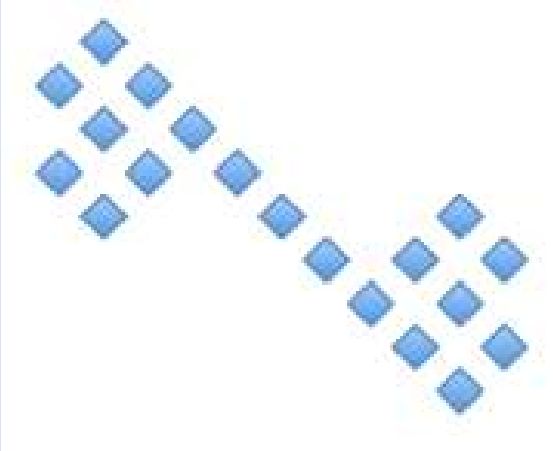
How many blue squares do you see?

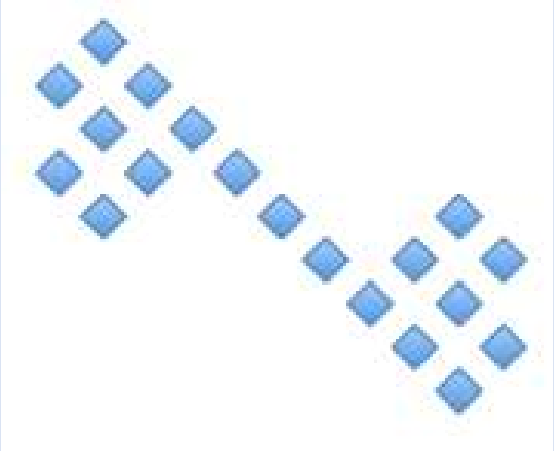
What counting shortcut did you use?

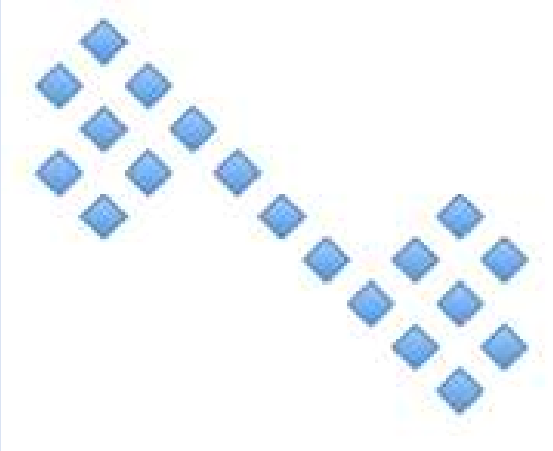
I noticed ____ so I _____

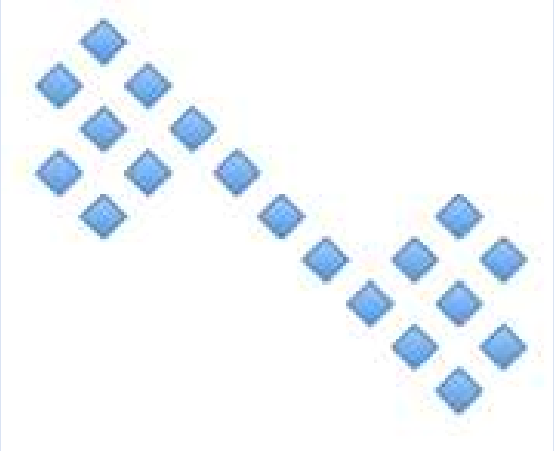
(They) noticed ____ so they___

Day 158









QUICK COUNT

Day 158

Reflect

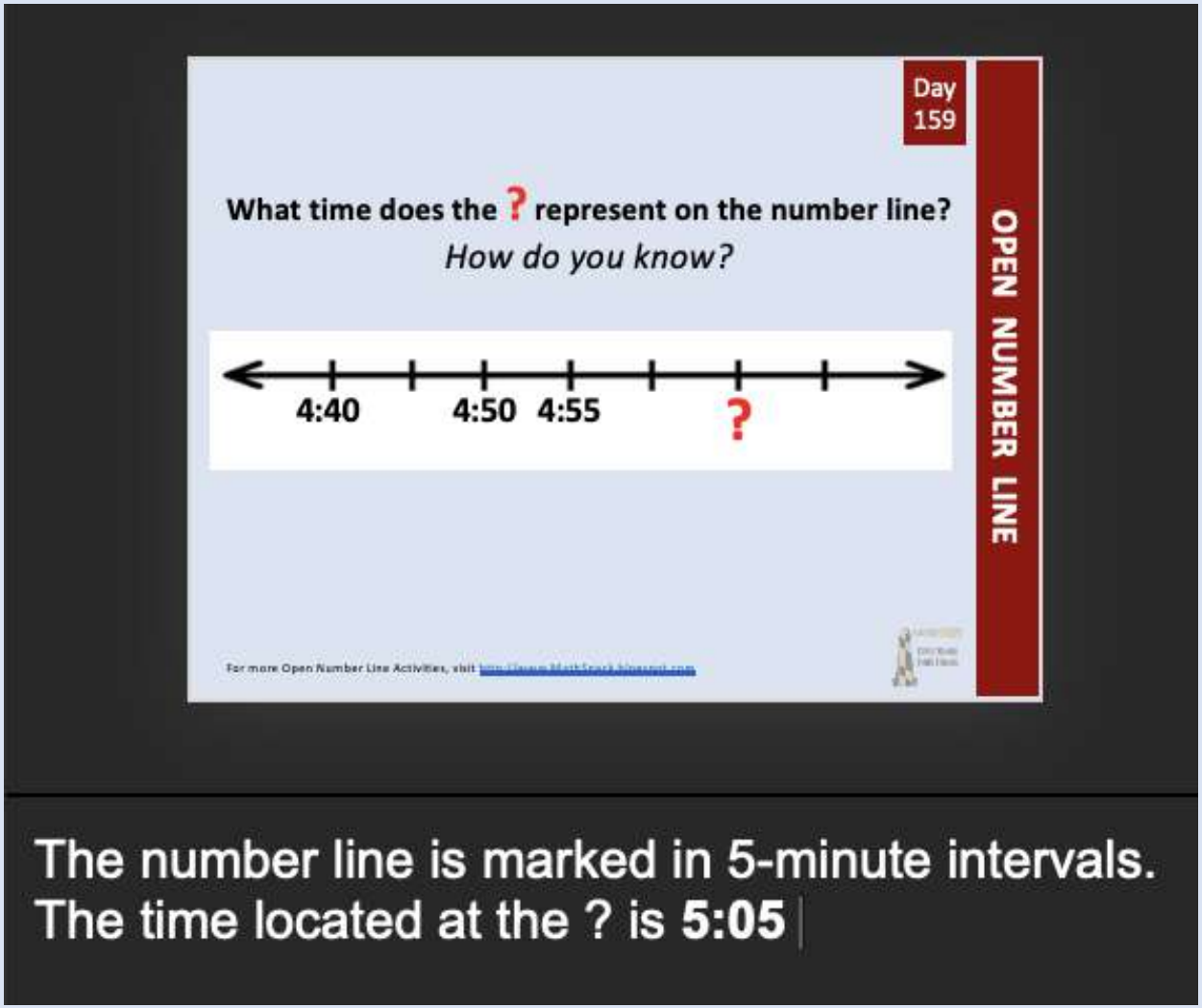
What was mathematically important?

QUICK COUNT

Day 159

Use the NEXT SLIDE with students.

Here is are some possible responses. This list is not all-inclusive. Additional ideas encouraged!



OPEN NUMBER LINE

Day
159

OPEN NUMBER LINE

What time does the ? represent on the number line?

How do you know?

For more Open Number Line Activities, visit http://www.MathSnack.blogspot.com

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2.MD.B.6
2.MD.C.7

Day 160

103 > 99
451 > 419
257 < 280

NUMBER TALK

TEACHER NOTES

BEFORE

This slide has the String of expressions that you will use for today's Number Talk. You can use Smart Ink, right click for PowerPoint Pen, or convert this slide to Smart Notebook so you can easily annotate on the slide. The annotation is an important part of the routine. The expressions should be presented one-at-a-time with skills building on one another.

DURING

Comparing numbers based on place value understandings

Remember, students will come with a variety of strategies. During a Number Talk, the students explain their way of thinking. When students find ways that are especially efficient, highlight those strategies in the reflection that should follow the Talk.

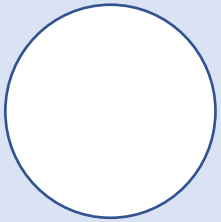
AFTER

Help students to recognize how to use their understanding of place value to determine which value is greater/less.
The "small" closed side of the inequality sign should be next to the number with the smaller value.
The "large" open side of the inequality sign should be next to the number with the larger value.

Greater than, less than, equal?

How do you know?

Day 160

103  **99**

NUMBER TALK

2.NBT.A.4