180 Days of
Number Sense Routines
Grade 3
Days 41-60

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.

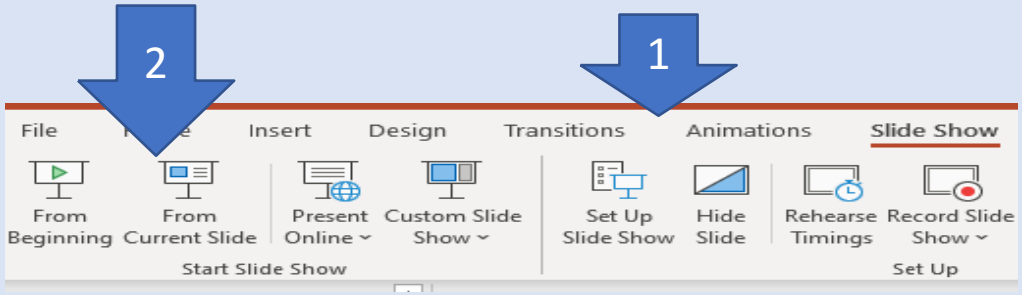
WHAT ARE THE CCPS IMPLEMENTATION EXPECTATIONS? Number sense routines have been developed for all 180 instructional days in grades Prekindergarten through Grade 5. These routines are to be used every day, including early dismissal, late arrival, and field trip days. Because the routines do not require 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, 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

Day 41

ROUTINE: **Count BACK by 5s**

Begin on 715

Chart responses as students SLOWLY count in a choral fashion.

This slide shows a model of what your chart might look like. Writing the numbers with 4 numbers in each row.
After completing several rows of numbers, ask, "WHAT PATTERNS DO YOU NOTICE?" Discuss all of the patterns noted by students. Below are some possible responses:

- The ones place has a pattern of 5,0,5,0,5,0
- The tens place is the same number two times in a row
- When you look down each column, the value decreases by 20
- When you look left to right diagonally downward, the value decreases by 25
- When you look left to right diagonally upward, the value increases by 15 (try to discover WHY with your students!)

SAY: Based on the patterns we discovered, determine **what number would be UNDER the 635 without counting back (615).**

ASK: **How do you think our counting would be different if counted back by 5 but we started with a number that does not end in a 5, like 84?** 84, 79, 74, 69, 64, 59…..
Even more interesting to consider if you ask me!

Count back by 5s

715	**710**	**705**	**700**
695	**690**	**685**	**680**
675	**670**	**665**	**660**
655	**650**	**645**	**640**
635			

CHORAL COUNTING

3.OA.D.9

Day 42

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.

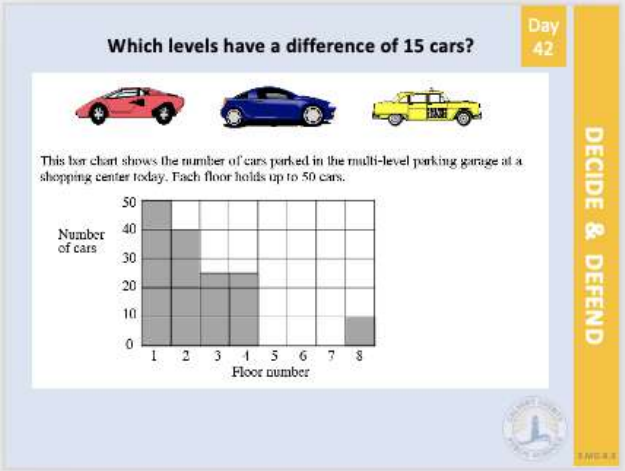
NOTE: This is the CCPS adaptation of the original Decide and Defend protocol

Use the NEXT SLIDE with students.

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

Day 42

DECIDE & DEFEND



The goal of this task is for students to recognize that each box represents 10 cars, so a ½ box on the graph represents 5 cars.

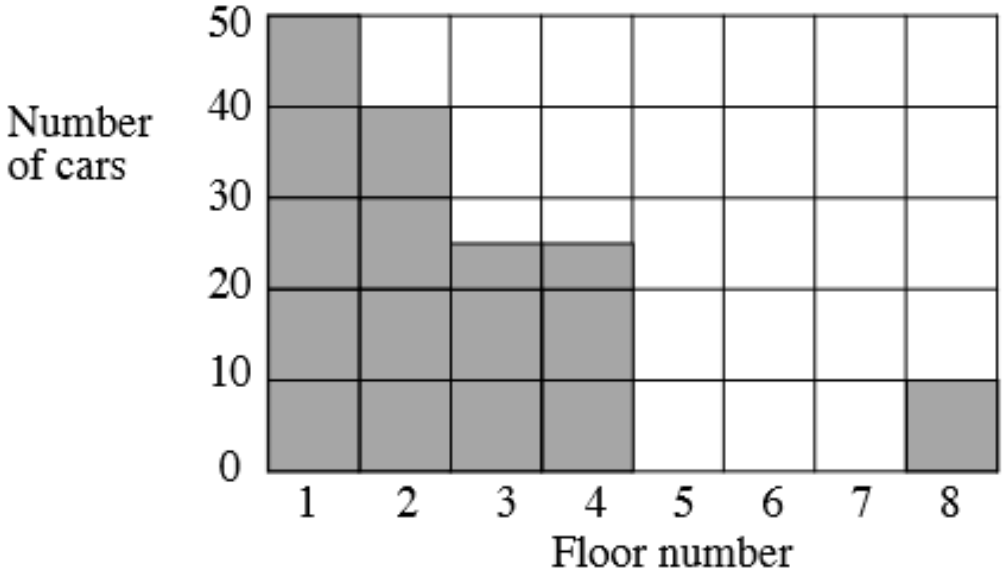
- Levels 2 and 3 (Level 2 has 15 more cars)
- Levels 2 and 4 (Level 2 has 15 more cars)
- Levels 3 and 8 (Level 8 has 15 fewer cars)
- Levels 4 and 8 (Level 8 has 15 fewer cars)

Which levels have a difference of 15 cars?

Day 42



This bar chart shows the number of cars parked in the multi-level parking garage at a shopping center today. Each floor holds up to 50 cars.



DECIDE & DEFEND

3.MD.B.3

Day 42

Reflect on Learning

- A new math idea I learned today is…
- Next time I interpret someone else's work, I will… *(ask myself, pay attention to,…)*
- Next time I plan to….

DECIDE & DEFEND

Day 43

Estimation Activity

Have you already watched the teacher information video?

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

PROMPT: **How many dice are in the glass?**

ESTIMATION

The Reveal

41 marbles

The Reveal

The Reveal

The Reveal

Day 44

8 + 5 + 2
18 + 9 + 1
11 + 4 + 9

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. Remember, students will come with a wide variety of strategies. Allow student sharing of these strategies and work toward determining which of the ways were most efficient and brain-friendly.

DURING

Addends that make quick 10s (friendly numbers)

The Talk is designed to help students build on what they know about adding numbers to create friendly numbers (in this case multiples of 10) and then to use those friendly to quickly and accurately add the third addend.

Students will come with a range of strategies to solve. When a student mentions that s/he saw that 9+1 made ten which made the expression easier to solve, focus the discussion to this effective method of adding 3 addends. Now that you have discussed this strategy, specifically encourage students to use this strategy of making friendly numbers for the next expression in the string.

Example: 18 + 9 + 1
18 + 10
28

11 + 4 + 9
11 + 9 = 20
20 + 4 = 24

AFTER

After doing the Number Talk String, be sure to highlight this strategy and encourage students to "look for" places they can use it throughout the day.

CALVERT COUNTY PUBLIC SCHOOLS

Day 44

8 + 5 + 2

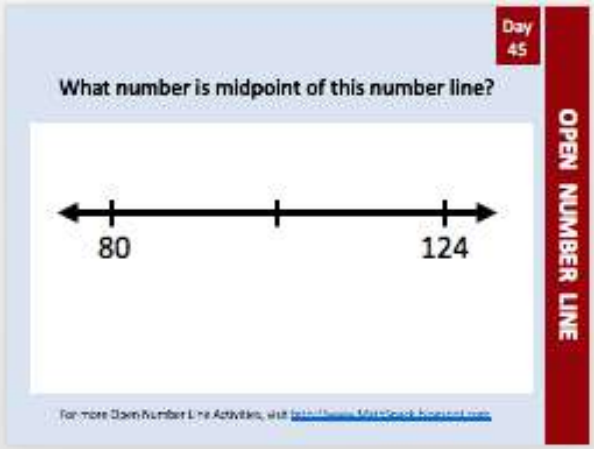
NUMBER TALK

3.NBT.A.2

Day 45

Use the NEXT SLIDE with students.

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



Possible reasoning:
The spread between 80 and 124 is 44. Half of 44 is 22, so the midpoint of this number line is 102 (80+22 or 124-22).

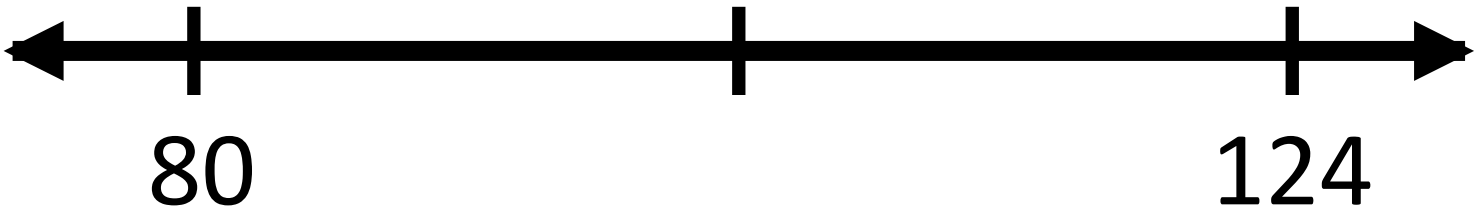
For more Open Number Line Activities, visit http://www.MathSnack.blogspot.com

OPEN NUMBER LINE

Day 45

What is the midpoint of this number line?

How do you know?



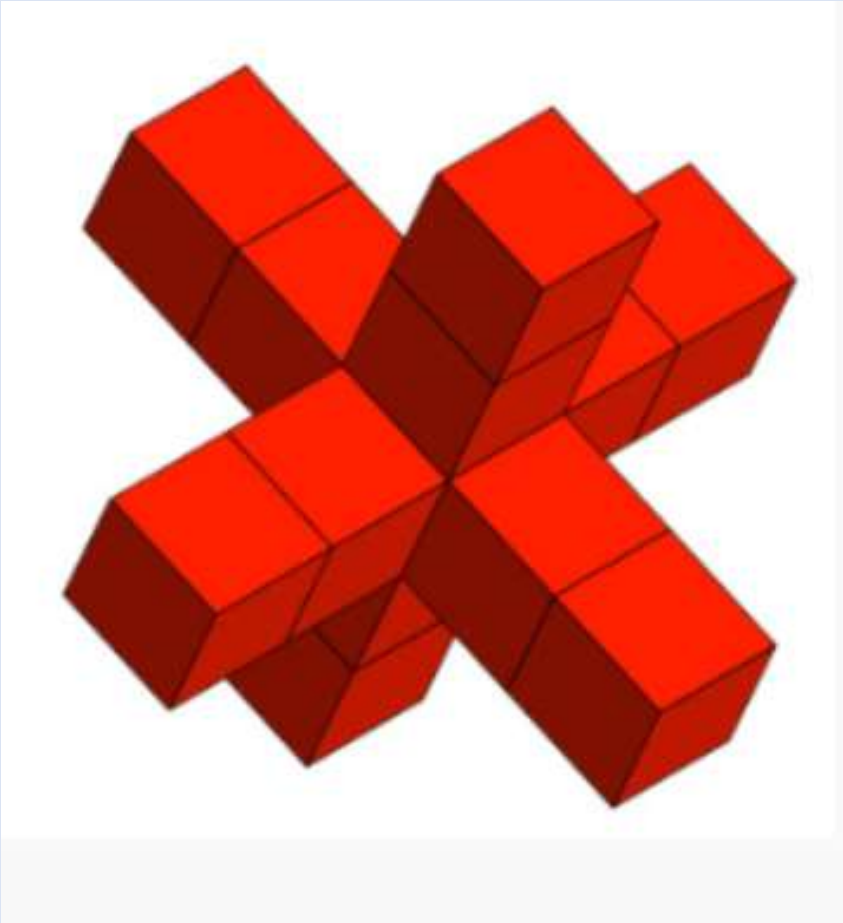
OPEN NUMBER LINE

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 3 different student-generated shortcut strategies.
10. End by asking students to explain what was "mathematically important"

Day 46



What do you NOTICE?

QUICK COUNT

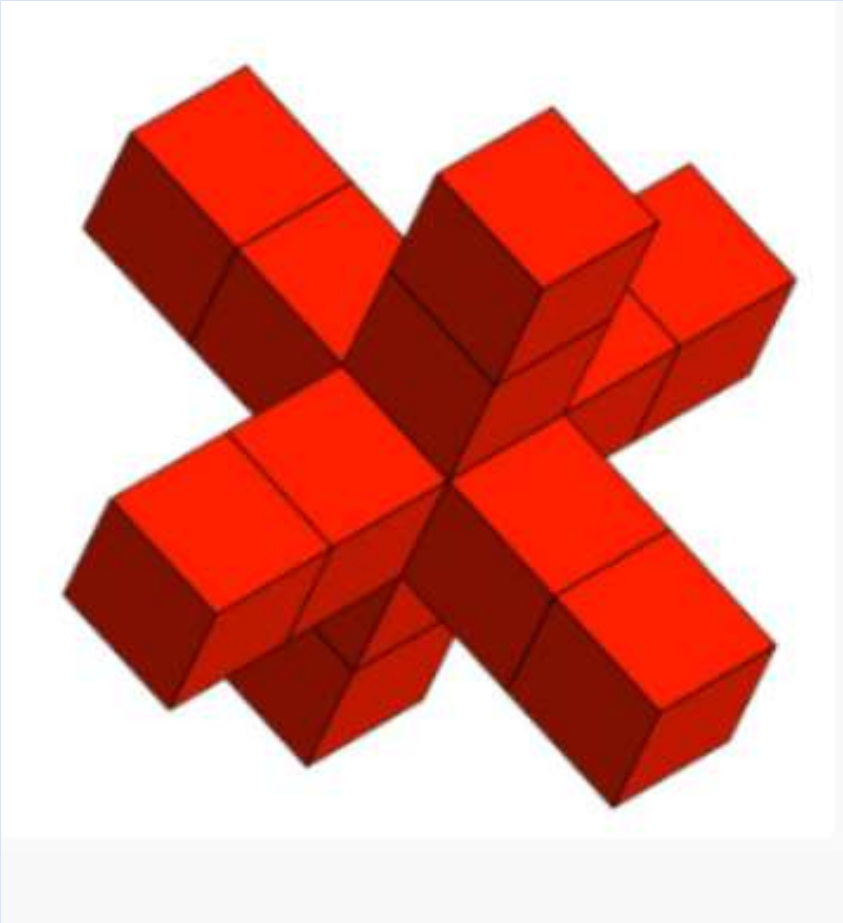
Day 46

QUICK COUNT

What did you NOTICE?

Day 46

QUICK COUNT

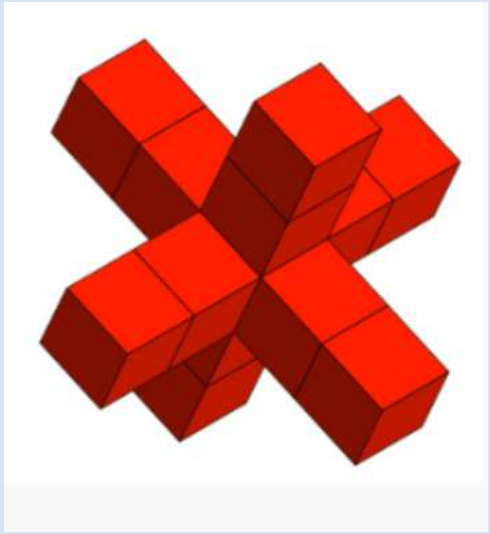


How many do you see?

What counting shortcut did you use?

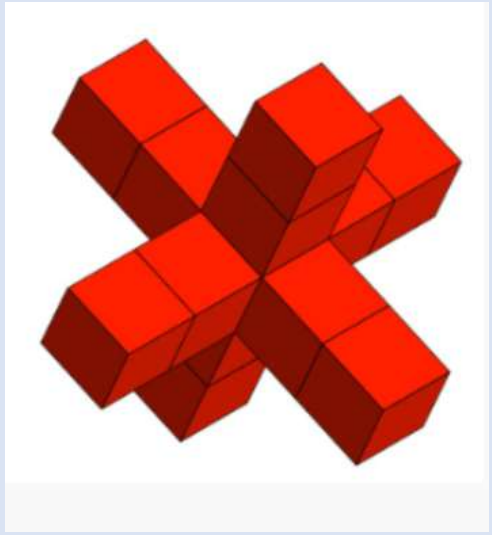
Day 46

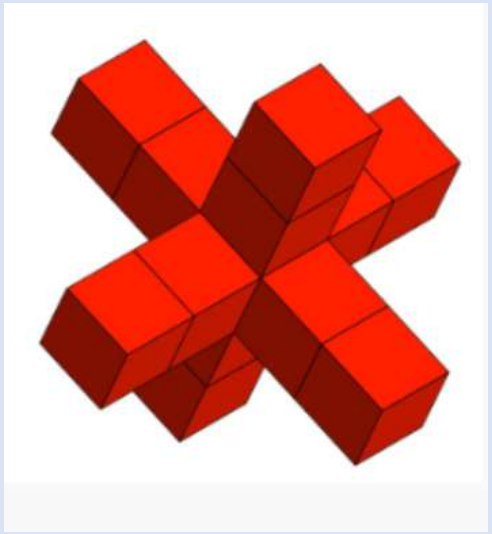
QUICK COUNT



I noticed ____ so I _____

(They) noticed ____ so they _____





Day 46

Reflect

What was mathematically important?

QUICK COUNT

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.

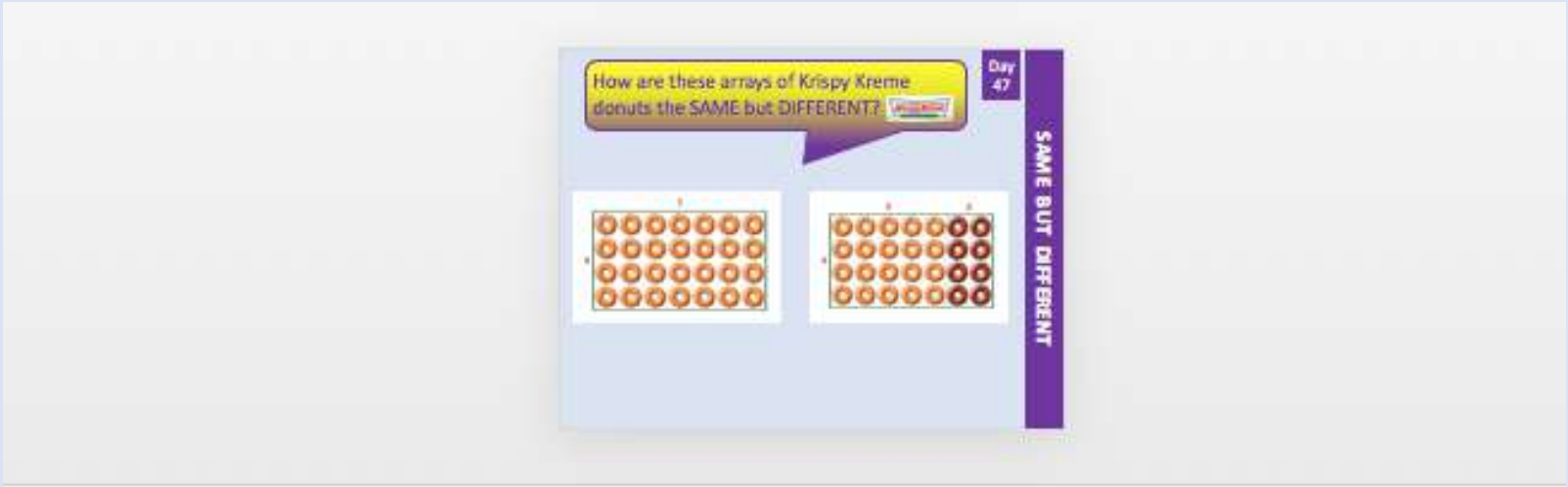
CALVERT COUNTY PUBLIC SCHOOLS

Day 47

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….”



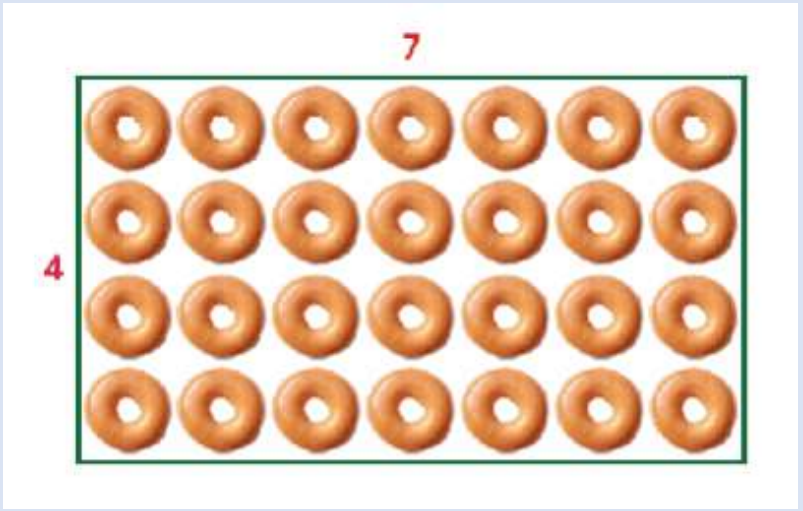
POSSIBLE RESPONSES

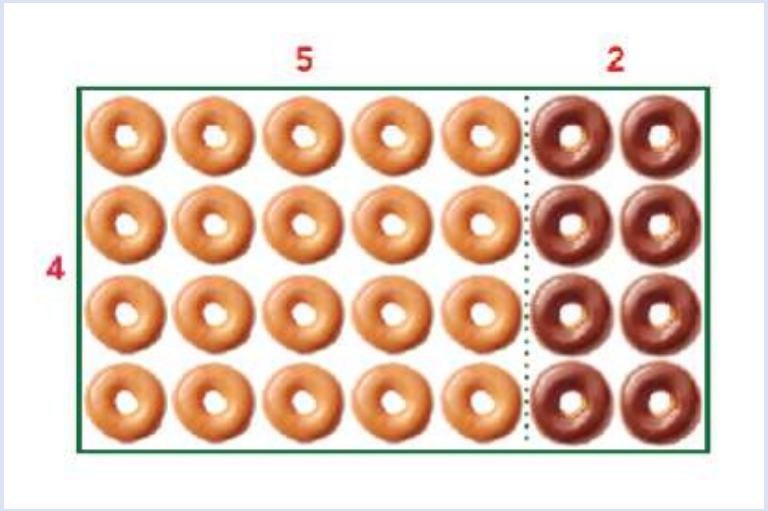
- Both have a total of 28 donuts.
- Both have 4 rows.
- Both have 7 columns (or vertical rows)
- The first is represented as 4x7. The second array is represented as 4x5 + 4x2
- The first has only original glazed donuts. The second has original glazed and chocolate glazed donuts.
- The second is partitioned into two groups.

SAME BUT DIFFERENT

Day 47

How are these arrays of donuts the SAME but DIFFERENT?





SAME BUT DIFFERENT

3.OA.A.1

16

Day 48

How many blue

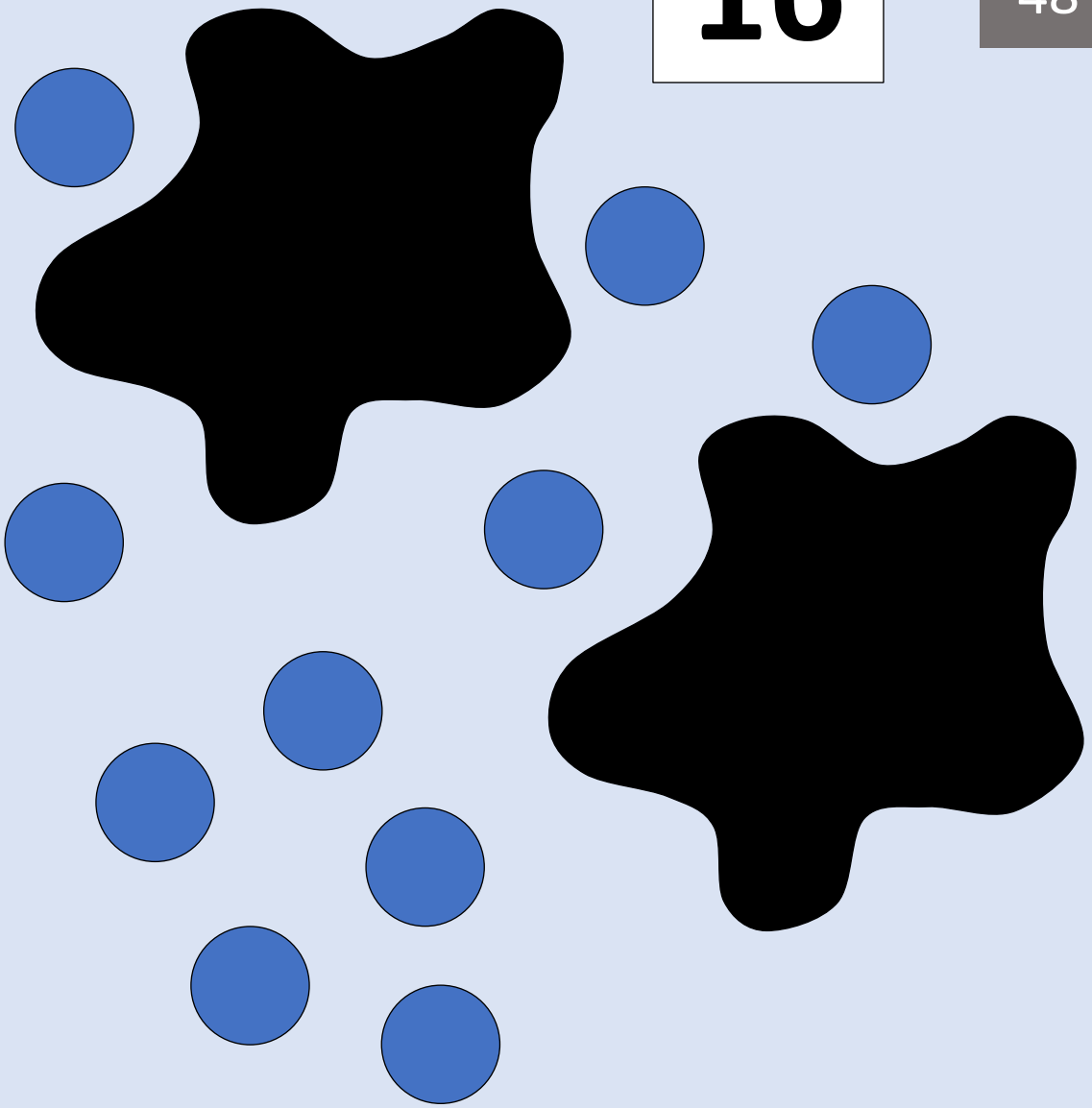
How did you count them?

H many shapes are under each splat?

How else could you know?

Let's look under the splat to see how many shapes

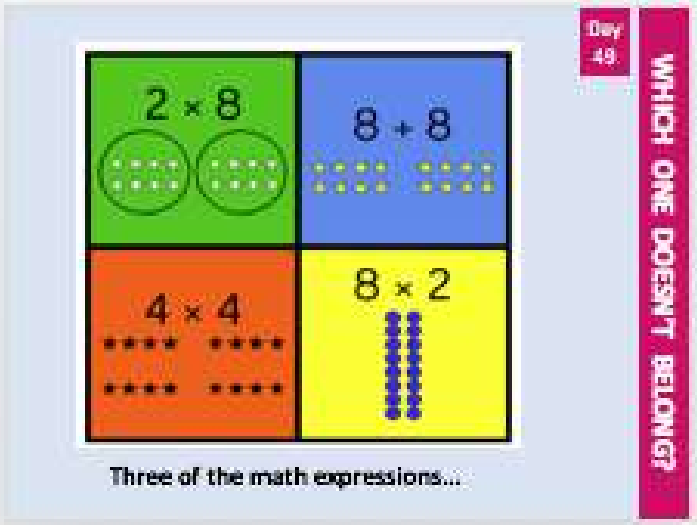
What can we learn from this picture?



SPLAT!

Use the NEXT SLIDE with students.

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



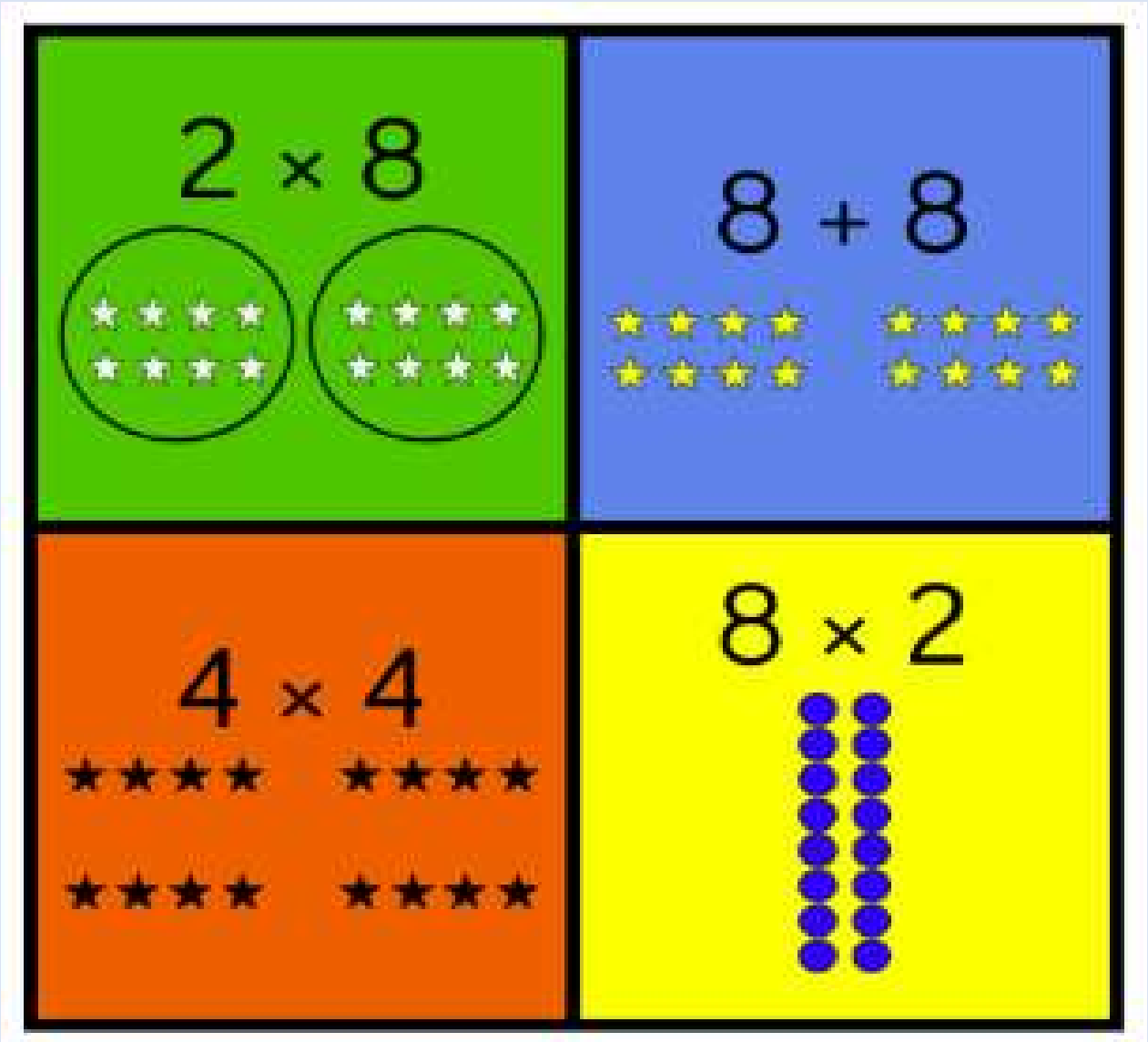
- Green: Three of the math expressions do not use a grouping image (circling the groups). The green one uses circles to show the groups.
- Blue: Three of the math expressions use multiplication to represent a total of 16. The blue one does not use multiplication, it uses addition.
- Red/Orange: Three of the math expressions show TWO groups of the same value. The red one does not show 2 groups, it shows 4 groups.
- Yellow: Three of the math expressions use stars to represent the numbers. The yellow one does not use stars, it uses dots.

Day 49

WHICH ONE DOESN'T BELONG?

Day 49

WHICH ONE DOESN'T BELONG?



Three of the math expressions…

3.OA.A.1

Count back by 10s – starting on 548

Day 50

BEGIN WITH NUMBER: 548
COUNTING RULE: Subtract 10
QUESTIONS & LOOK FORS:

- What number patterns to you see when you look at the charted numbers?
- Using the patterns you found, what number would be directly ABOVE 548? (don't count back!)

548	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

CHORAL COUNTING

3.OA.D.9

Day 51

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 closest quotient is 6.*
Since 8 x 6 = 48 and 48 is only 1 away from 49, 49 ÷ 8 = 6 with leftovers

ESTIMATION

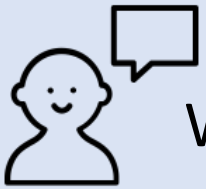
Day 51

Which answer is

As Close as it Gets?

49 ÷ 8

6	7	8



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

ESTIMATION

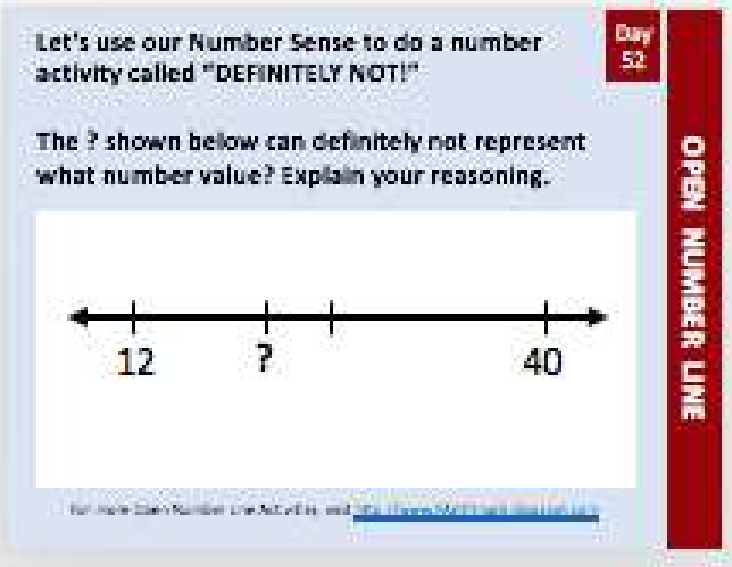
3.OA.A.2

Use the NEXT SLIDE with students.

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

Day 52

OPEN NUMBER LINE



Hopefully students will state these "obvious" truths about the unknown value.

The ? is definitely not greater than 40

The ? is definitely not less than 12

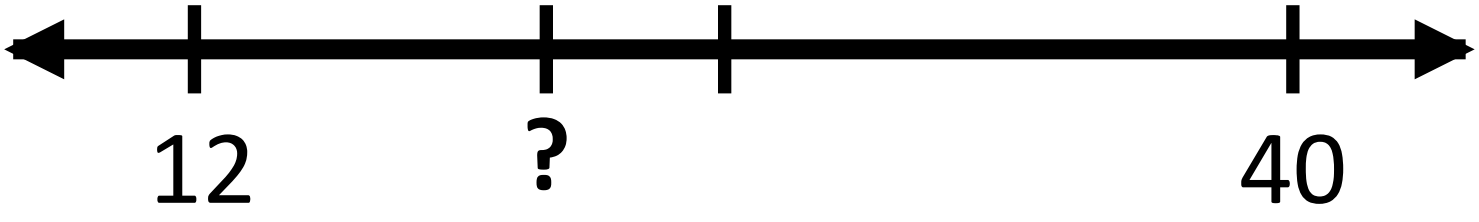
The ? Is definitely not less than 19 because 19 is the midpoint between 12 and 26 and the ? appears to the right of that midpoint.

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

Day 52

Let's use our Number Sense to do a number activity called "DEFINITELY NOT!"

The ? shown below can definitely not represent what number value? Explain your reasoning.



OPEN NUMBER LINE

Day 53

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

DECIDE & DEFEND

Use the NEXT SLIDE with students.

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

Day 53

DECIDE & DEFEND

Either chose is correct depending on the justification:

- 364 – 98 = 364 – 100 + 2 = 264 + 2 = 266

Students may select this one because it leaves you with the most jellybeans at the end.
Students may select this one because you shared the most with friends.

- 291 – 47 = 291 – 50 + 3 = 241 + 3 = 244

If the student does not like jellybeans, s/he may select this one because it leaves you with the least jellybeans at the end.

Day 53

Would you rather

Have **364** **jellybeans** and give **98** to **friends** OR have **291** **jellybeans** and give **47** to **friends**?

DECIDE & DEFEND

3.NBT.A.2

Day 53

Reflect on Learning

- What was mathematically important in the problem?
- What new math idea did you learn today?
- Next time I plan to…

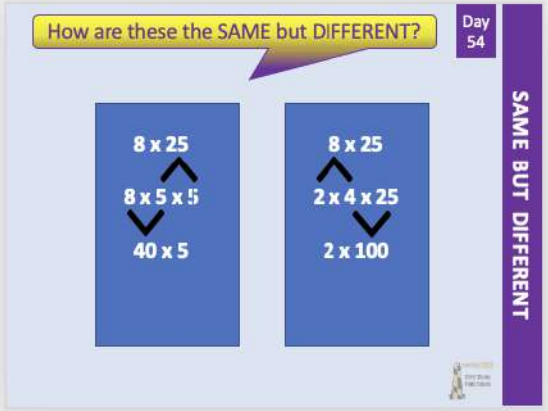
DECIDE & DEFEND

Day 54

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….”

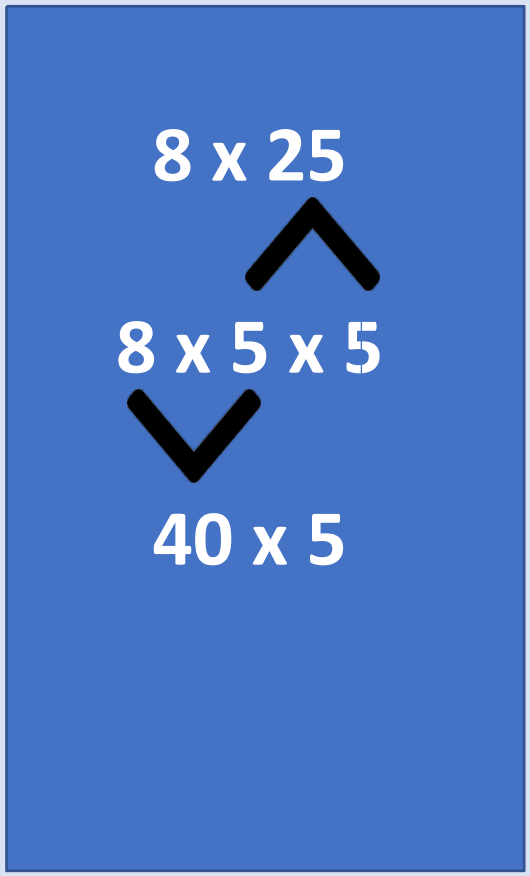


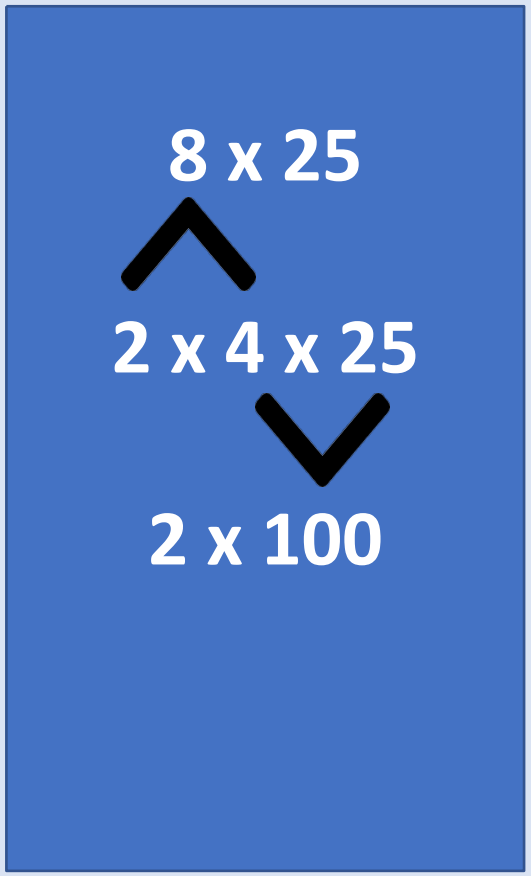
- Both begin with 8 x 25
- Both were decomposed to make the calculation easier, but they were decomposed differently
- Both were decomposed but one decomposed the 25 and the other decomposed the 8
- Both have a final product of 200 but the process to find the product was not the same
- Both are multiplication problems

SAME BUT DIFFERENT

How are these the SAME but DIFFERENT?

Day 54



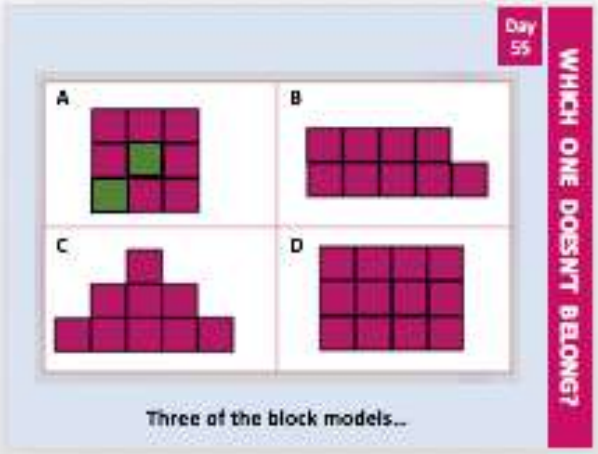


SAME BUT DIFFERENT

3.OA.B.5

Use the NEXT SLIDE with students.

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

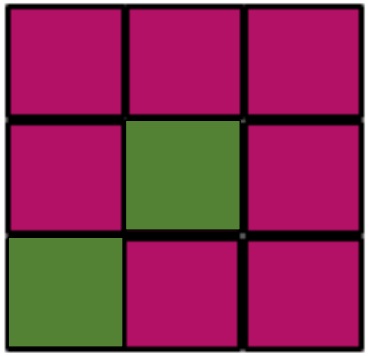


- Three of the block models use blocks that are all the same color. Model A does not belong because all of the blocks are not the same color.
- Three of the block models look like they are complete because they have symmetry. Model B does not look symmetrical; it looks like one block is missing.
- Three of the block models have more than one block on the top layer. Model C does not belong because it does not have more than one block on the top.
- Three of the block models use 9 blocks. Model D does not belong because it does not use 9 blocks.

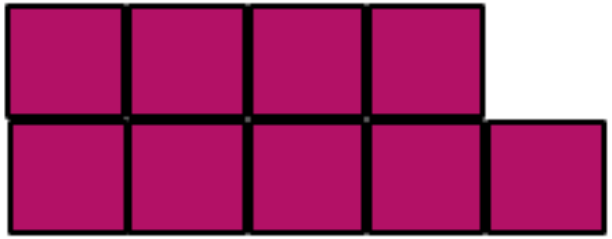
Day 55

WHICH ONE DOESN'T BELONG?

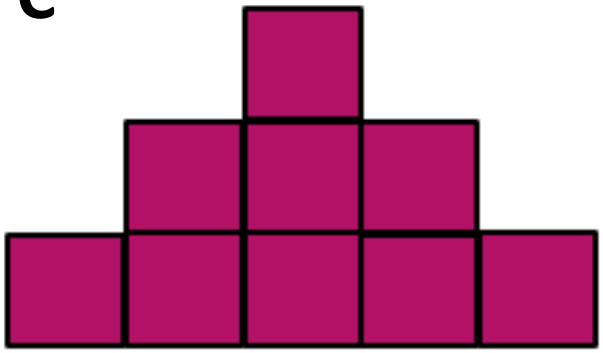
A



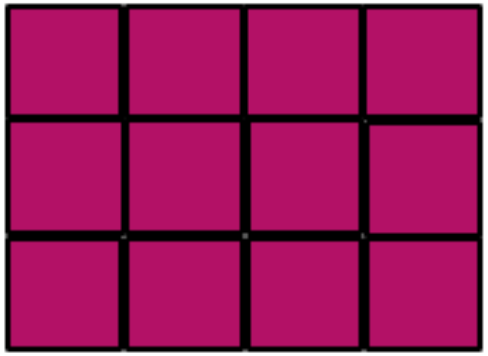
B



C



D



Three of the block models…

Day 56

4 + 94 + 6
26 + 9 + 1
34 + 18 + 6

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. Remember, students will come with a wide variety of strategies. Allow student sharing of these strategies and work toward determining which of the ways were most efficient and brain-friendly.

DURING

Addends that make quick 10s (friendly numbers)

The Talk is designed to help students build on what they know about adding numbers to create friendly numbers (in this case multiples of 10) and then to use those friendly to quickly and accurately add the third addend.

Students will come with a range of strategies to solve. When a student mentions that s/he saw that 4+6 made a multiple of ten which made the expression easier to solve, focus the discussion to this effective method of adding 3 addends. Now that you have discussed this strategy, specifically encourage students to use this strategy of making friendly numbers for the next expression in the string.

Example: 4 + 94 + 6
4 + 100
104

34 + 18 + 6
40 + 18
58

AFTER

After doing the Number Talk String, be sure to highlight this strategy and encourage students to "look for" places they can use it throughout the day.

NUMBER TALK

4 + 94 + 6

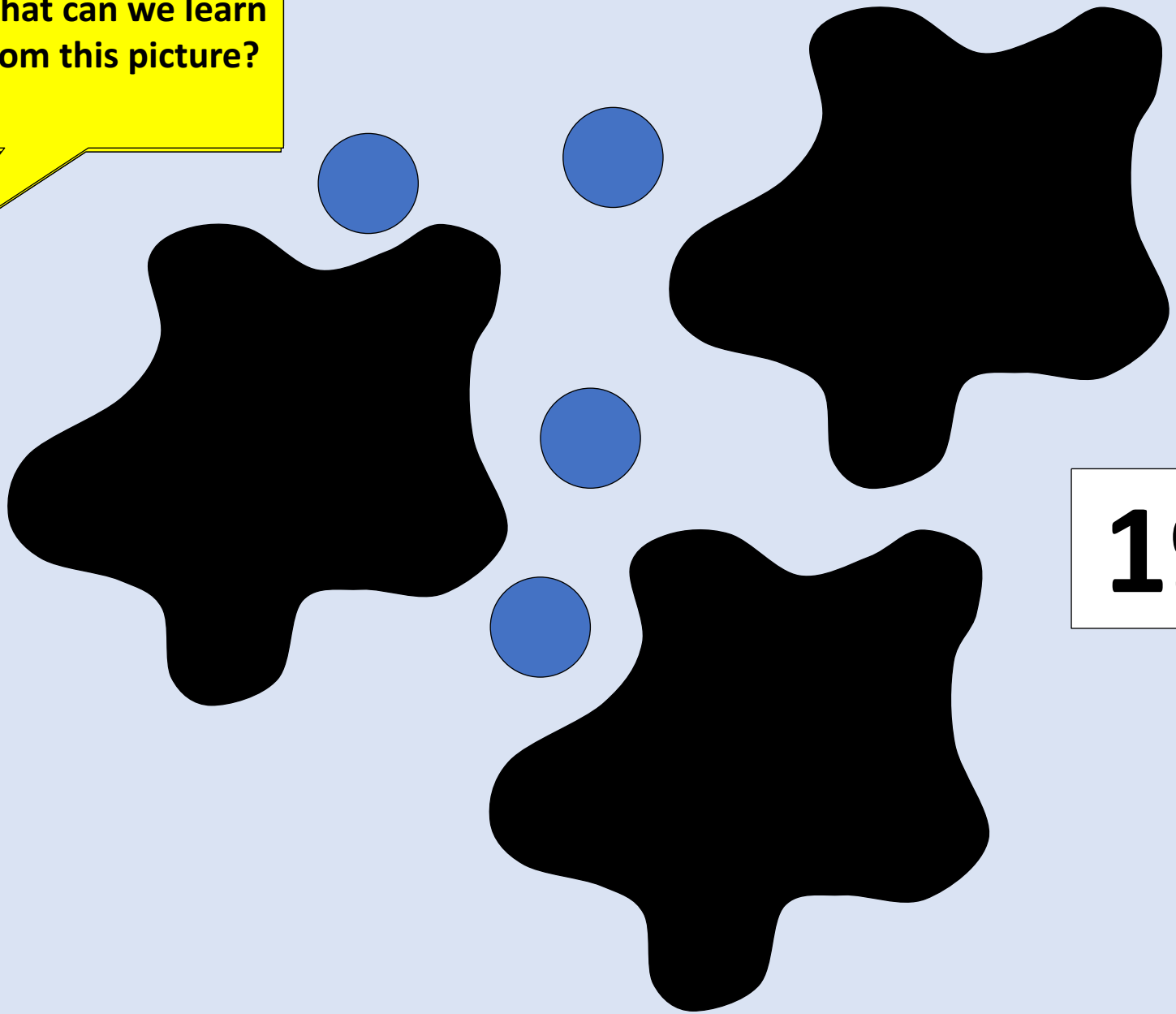
Day 56

NUMBER TALK

3.NBT.A.2

Day 57

What can we learn from this picture?

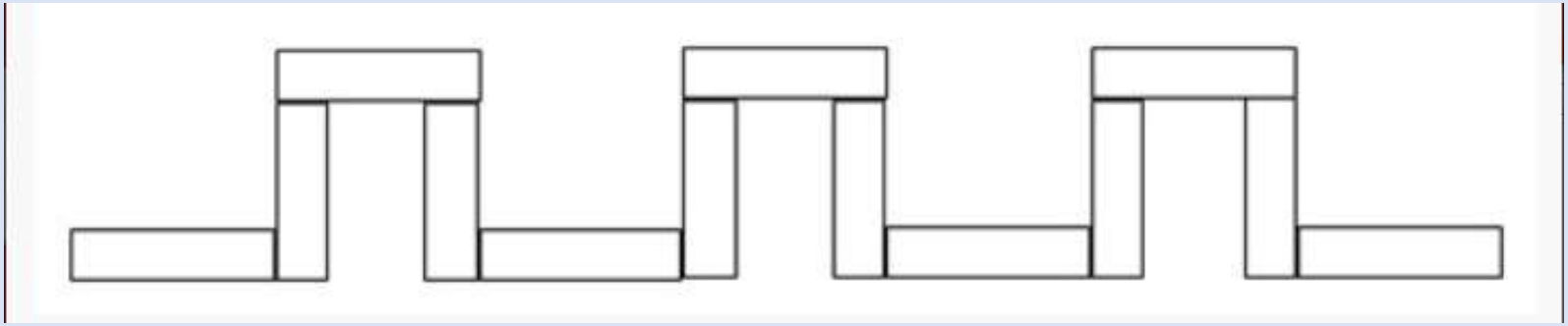


19

SPLAT!

Day
58

QUICK COUNT



What do you NOTICE?

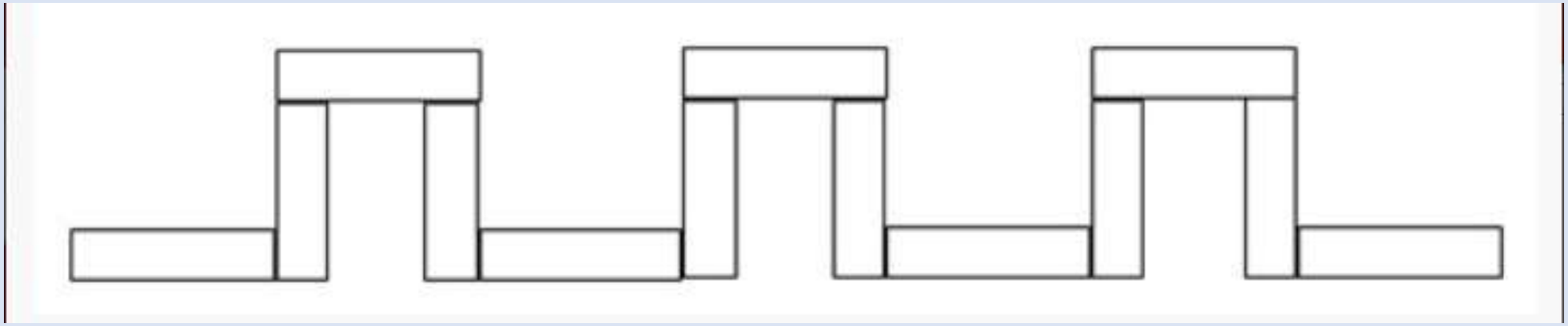
Day 58

QUICK COUNT

What did you NOTICE?

Day 58

QUICK COUNT

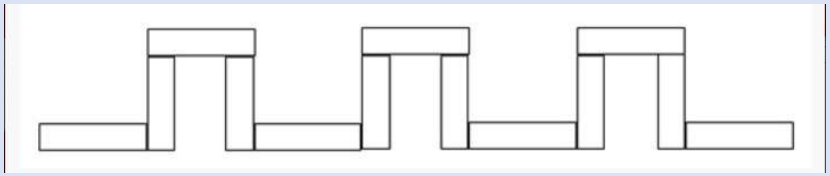


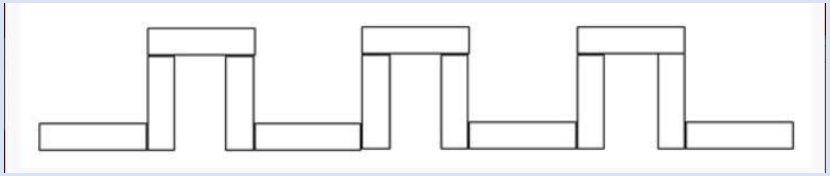
How many blocks do you see?
What counting shortcut did you use?

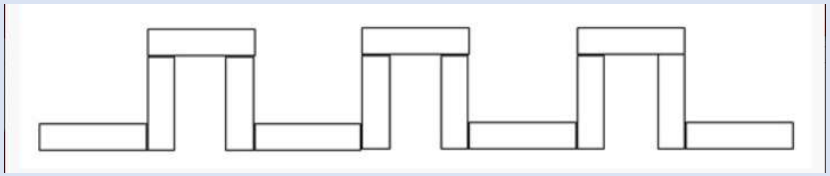
I noticed ____ so I _____

(They) noticed ____ so they___

Day 58







QUICK COUNT

Day 58

Reflect

What was mathematically important?

QUICK COUNT

Day 59

5 + 3 + 5 + 4 + 7
9 + 5 + 8 + 2 + 1
4 + 5 + 6 + 3 + 7

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. Remember, students will come with a wide variety of strategies. Allow student sharing of these strategies and work toward determining which of the ways were most efficient and brain-friendly.

DURING

Two Pairs of Addends that make quick 10s (friendly numbers)

The Talk is designed to help students build on what they know about adding numbers to create friendly numbers (in this case multiples of 10) and then to use those friendly to quickly and accurately add the numbers together.

Students will come with a range of strategies to solve. When a student mentions that s/he saw that 5+5=10 AND 3+7=10 which made the expression easier to solve, focus the discussion to this effective method of adding pairs of numbers to make friendly numbers. Now that you have discussed this strategy, specifically encourage students to use this strategy of looking for pairs of friendly numbers for the next expression in the string.

Example: 5+3+5+4+7
(5+5) + (3+7) + 4
10 + 10 + 4
24

AFTER

After doing the Number Talk String, be sure to highlight this strategy and encourage students to "look for" places they can use it throughout the day.

NUMBER TALK

Day 59

$5 + 3 + 5 + 4 + 7$

NUMBER TALK

3.NBT.A.2

Day 60

Esti-Mystery

Estimation Activity with clues!

Students use clues to solve the estimation mystery. After all clues are revealed, students will have enough information to determine if their initial estimate was correct.

Clues are revealed one at a time with time to discuss and refine original estimates after EACH clue is revealed. No one should be stuck with their original estimate – encourage mindful refinements.

Students may benefit from using paper and pencil to work through possibilities or consider creating a class chart where possibilities are added and crossed off as each clue is revealed.

PRO TIP: Allow students to use scratch paper or dry erase as they reason through this one.

BE PATIENT. Give TIME & SPACE for thinking and calculations ☺

ESTIMATION

How many pizza boxes are stacked?

As the clues appear, use the information to narrow the possibilities to a smaller set. After each clue, use estimation again to determine which of the remaining answers is the most reasonable.

Write down your first estimate. After each clue, you'll see if your estimate is still a possibility. After each clue, if it is no longer possible write down a new estimate – and be prepared to explain why you chose it.

Clue #1

The shortest stack has 13 boxes

Clue #2

The middle stack is a multiple of 10

Clue #3

The tallest stack has 10 more pizza boxes than the middle stack

Explain the math you used to know how many boxes are on the stack.

The Reveal
Click to see the answer.