180 Days of
Number Sense Routines
Grade 3
Days 81-100

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

PowerPoint or Smart Notebook?

Since some of the slides include animation features, these slides will only work when using PowerPoint. Specifically, (1) **Estimation** when presented as images and (2) **Splat!** will only work correctly when you use the Slide Show feature in PowerPoint. Some teachers prefer the functionality of Smart Notebook and slides without animation can be used on this platform.

Download both the PowerPoint and the Smart Notebook versions from Schoology and place them on your computer's desktop so you can access the slides even without an internet connection.

PowerPoint

Animations for these two routines only work when presented in Slide Show mode

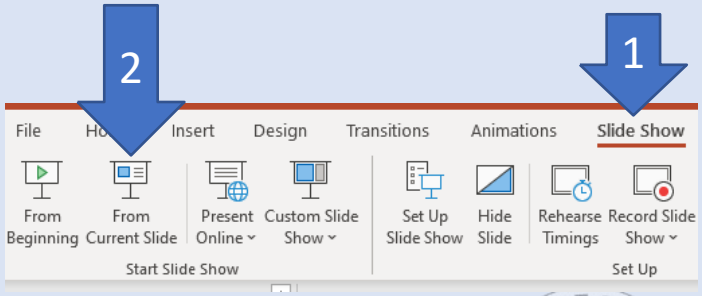
- Estimation
- Splat!

Smart Notebook

Allows for easy annotation

- Decide & Defend
- Number Talk
- Open Number Line
- Quick Count
- Same But Different
- Which One Doesn't Belong?

PRO TIP: You can write directly on any PowerPoint slide when it is in Slide Show mode by right clicking and selecting <Pointer Options>



How to Run PowerPoint in Slide Show mode:

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

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

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

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Adding 19

Day 81

BEGIN WITH NUMBER: 301
COUNTING RULE: add 19

Say: **"Today we will be counting by 19s. That seems pretty tough but let's think of some shortcuts we could use to count up by 19s more easily."**

Give think time. Then discuss student ideas.

Use the chart on the next page to record the choral counting.

Remind students to count slowly and to keep pace with the numbers you are writing. Even if they can count faster, they should stay together as a group counting as you are ready to write the next number.

Once the chart is completed, spend most of the time discussing the patterns noticed on the chart and talking about efficient counting strategies (i.e. count on 20 then subtract 1 for this specific routine).

CHORAL COUNTING

Day 81

Adding 19

301					

*After the first row or two is completed, you may want to pause and have students begin looking for patterns that seem to be emerging from the counting routine.

CHORAL COUNTING

3.OA.D.9

Day 82

Use the NEXT SLIDE with students.

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

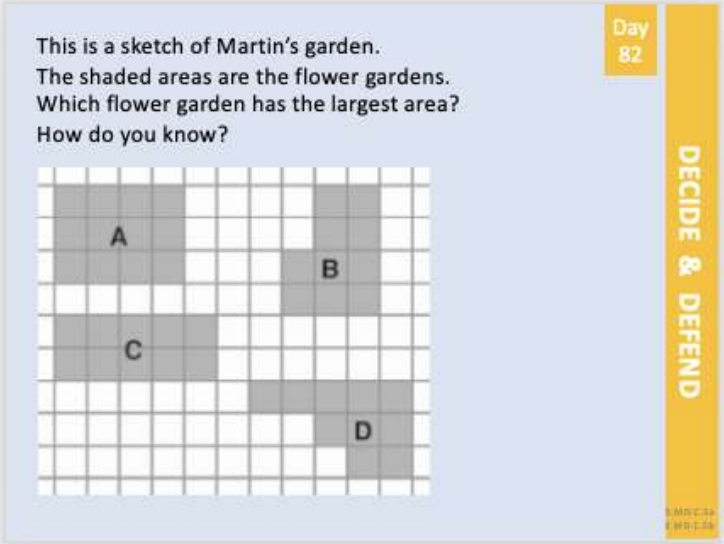
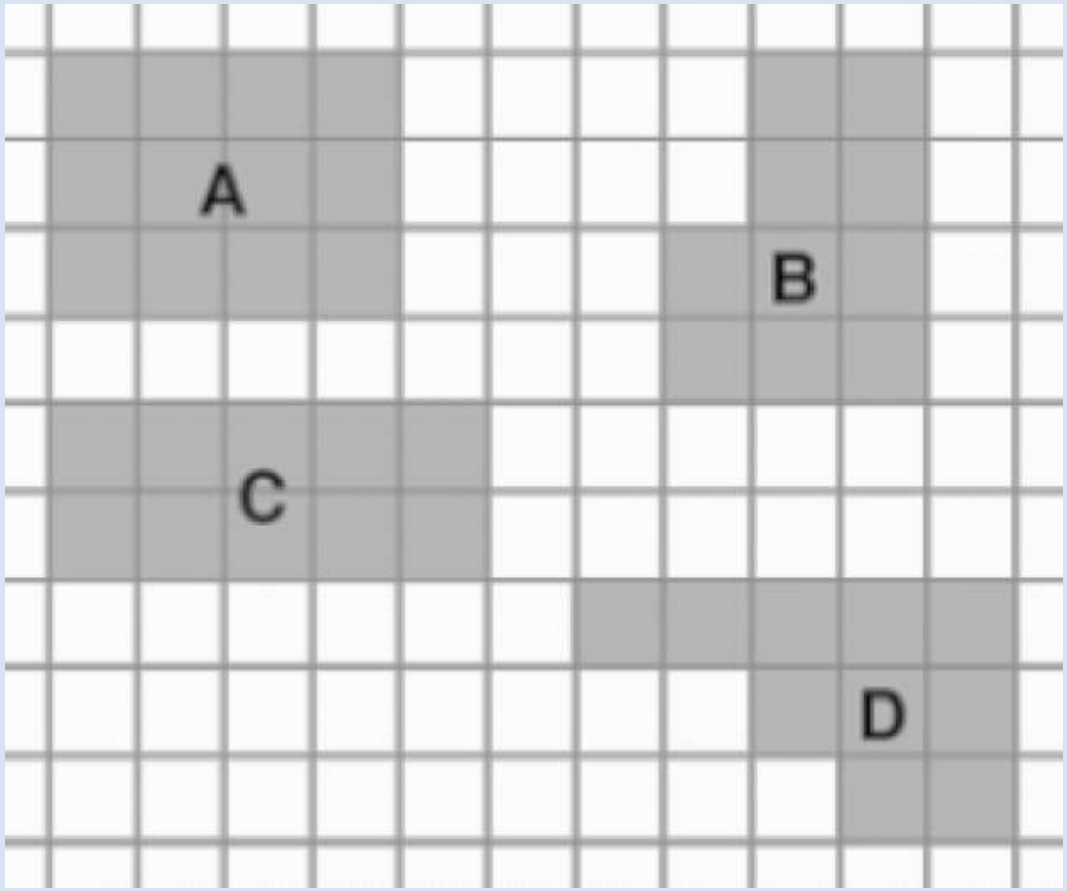


Image A has the greatest area.
At this point in the year, the goal is for students to recognize that area is the amount of space that is covered.
A = 4+4+4 or 4x3 = 12
B = 4 + 6 = 10
C = 5+5 or 5x2 = 10
D = 5+3+2 = 10

DECIDE & DEFEND

Day 82

This is a sketch of Martin's garden.
The shaded areas are the flower gardens.
Which flower garden has the largest area?
How do you know?



DECIDE & DEFEND

3.MD.C.5a
3.MD.C.5b

Day 82

Reflect on Learning

- What was mathematically important in the problem?
- What new math idea did you learn today?
- What suggestions can you offer someone who is trying to convince others of his/her mathematical ideas?

DECIDE & DEFEND

Day 83

Estimation Activity

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

PROMPT: **How many dice are being held by the cup?**

ESTIMATION

How many dice are being held by the cup?
Steve Wyborney
The Reveal
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28 dice

The Reveal

The Reveal

The Reveal
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Day 84

40 + 24
37+ 24
437 + 18
292 + 169

TEACHER NOTES

BEFORE
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
Make A Ten: Decomposing
1) 40 + 24 – Notice how easy it was to find the sum of these two values using just a mental calculation. Why was it easy? (because 40 is a decade number and is easy to add to)
2) 37+24 Hopefully, a student will suggest decomposing 24 into 3+21 so the 3 can be added quickly to the 37 to make 40. Continue to accept a wide range of ideas for solving, of course, but give special focus to the strategy of decomposing to make a quick ten for today's Number Talk as you work through the other problems.
3) 437+18 = 437 + 3 + 15 = 440 + 15 = 455 (a focusing question could be to ask students how many are needed to make 437 a decade number that is easier to work with)
4) 292+169 = 292 + 8 + 161 = 300 + 161 = 461 (again focus students to look for the amount needed to make 292 a decade number of 300)

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.

AFTER
After solving the expressions with various strategies, help students to understand how these expressions were all related.

NUMBER TALK

40 + 24

Day 84

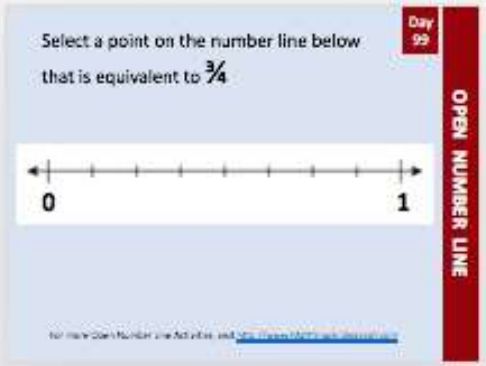
NUMBER TALK

3.NBT.A.2

Day 85

Use the NEXT SLIDE with students.

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



By counting the SPACES between the 0 and 1 on the number line, we can see that the number line is portioned into eighths. Students must recognize that each hash is 1/8. We would need to convert ¾ to 6/8 and then count over 6 hash marks to find ¾.

A common error would be to simply count over 3 hash marks.
Help students recognize that this is not reasonable since ¾ is GREATER than ½ and if we go over just 3 hash marks, we have moved LESS THAN ½ way to the 1.

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

OPEN NUMBER LINE

Day 85

Select a point on the number line below that is equivalent to $\frac{3}{4}$

OPEN NUMBER LINE

3.NF.A.2a
3.NF.A.2b

Directions for QUICK COUNT routines

Intro

QUICK COUNT

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

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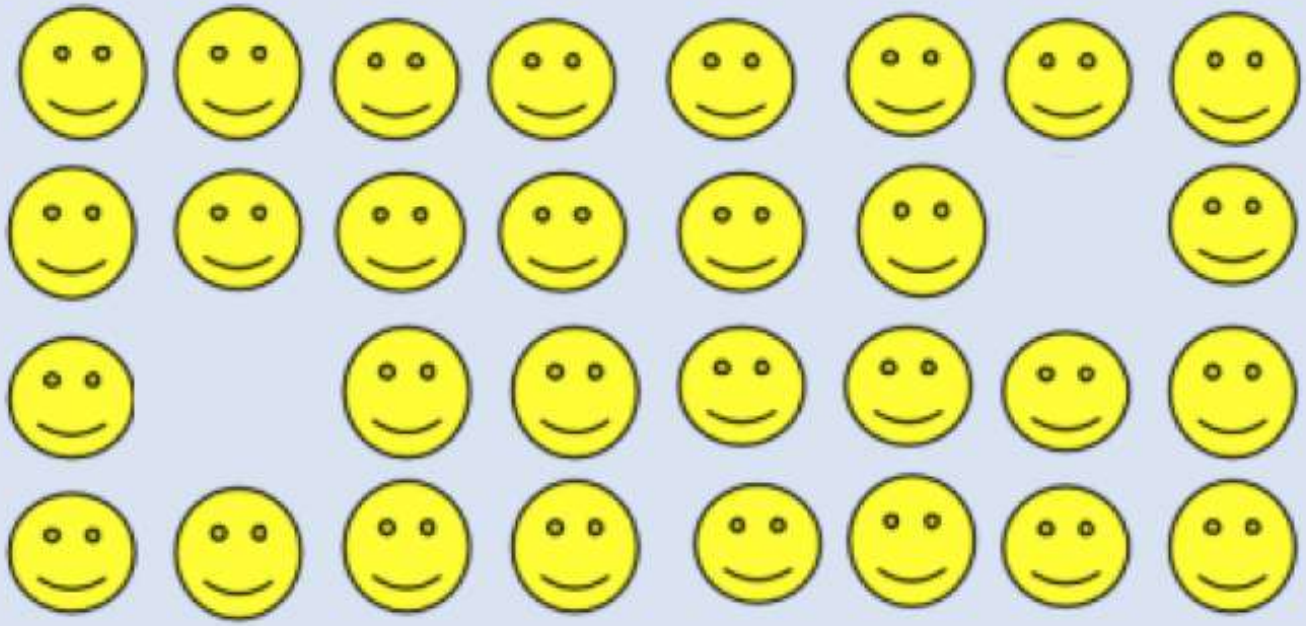
Day 86

QUICK COUNT



What do you NOTICE?

3.OA.A.1

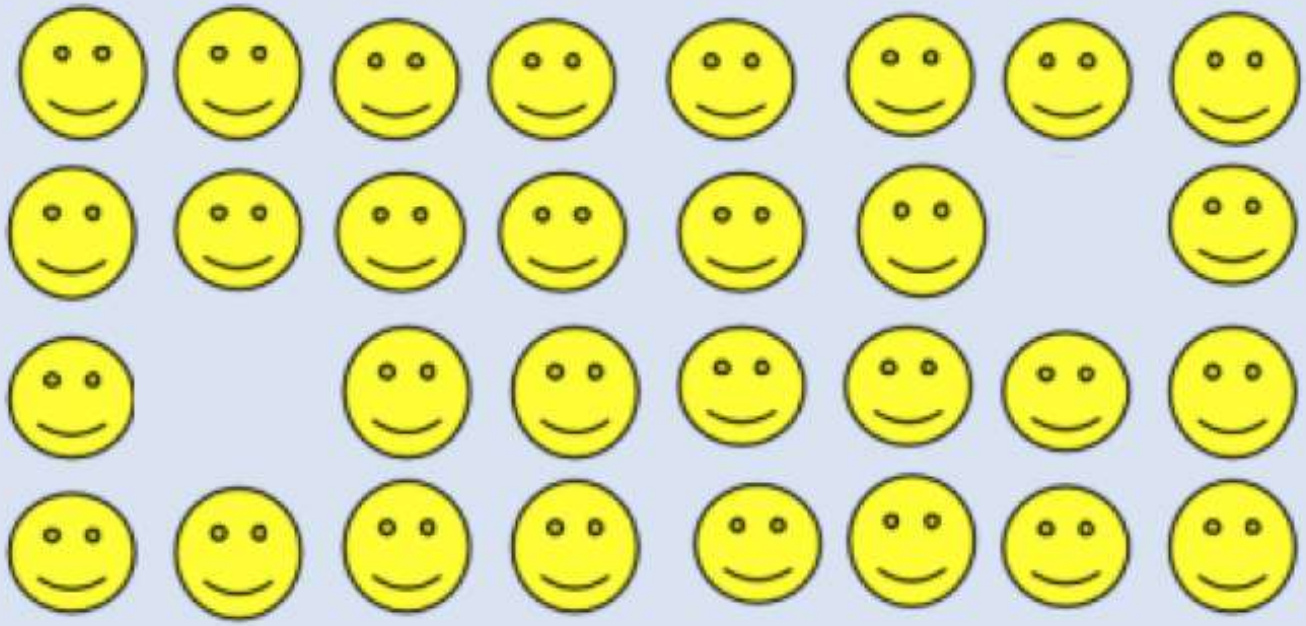
Day 86

QUICK COUNT

What did you NOTICE?

Day 86

QUICK COUNT



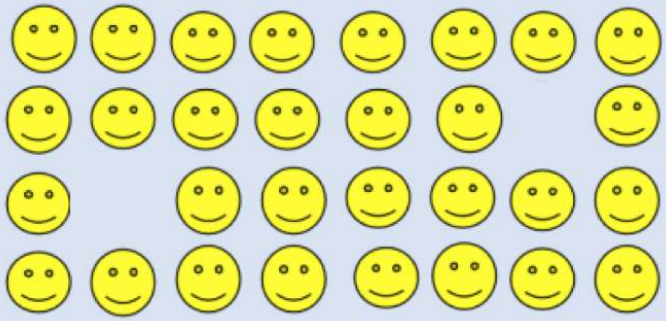
How many do you see?

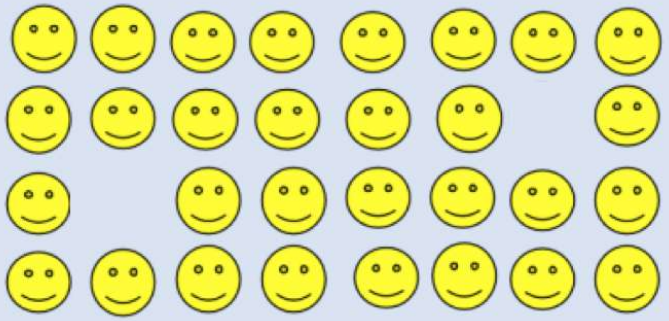
What counting shortcut did you use?

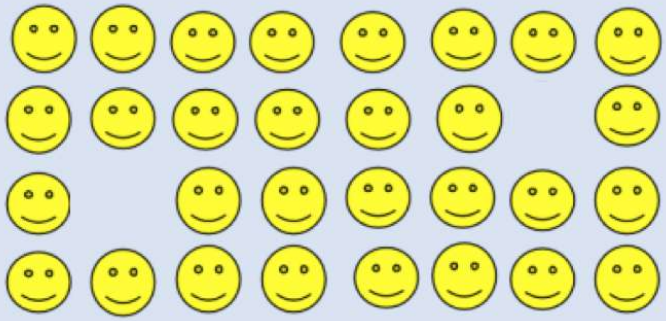
I noticed ____ so I _____

(They) noticed ____ so they___

Day 86







QUICK COUNT

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Day 86

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.

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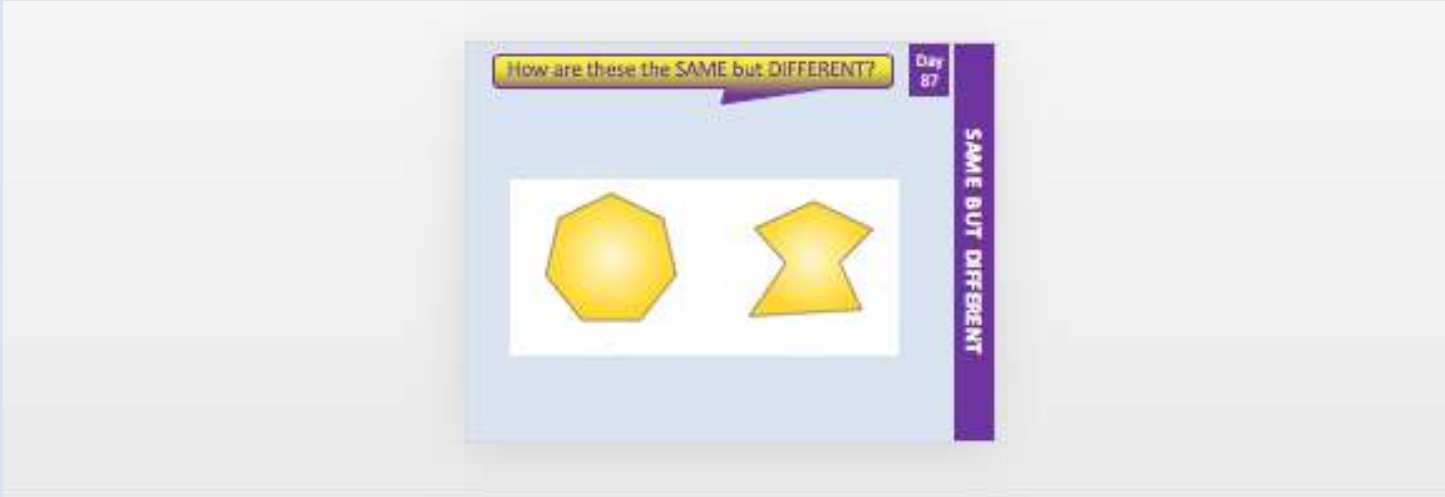
Day 87

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

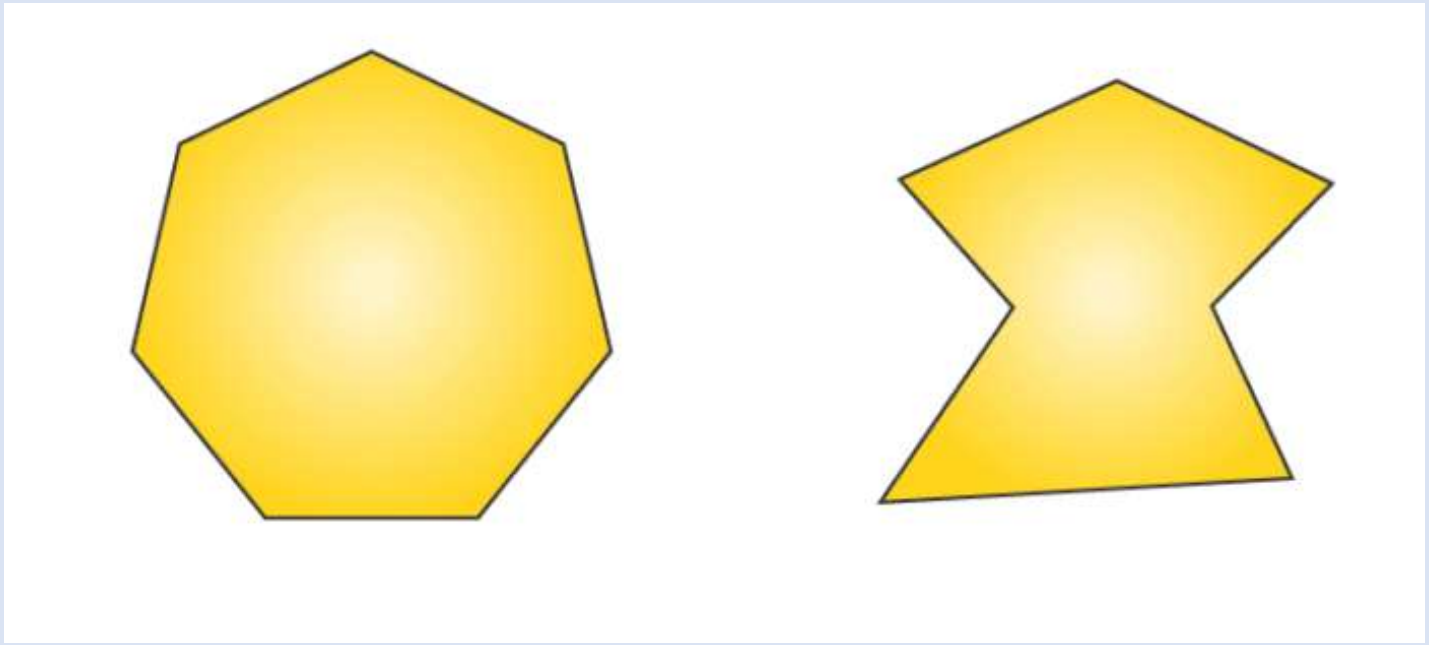
- Both are polygons (closed shapes made from straight lines that connect at the endpoints)
- Both are the same color
- Both have 7 sides (a seven-sided polygon is called a heptagon)

- The one on the left has equal sized sides. The one on the right does not.
- The one on the left has equal sized interior angles. The one on the right does not.
- The one on the left is called a “REGULAR heptagon. The one on the right is not, it is irregular.

SAME BUT DIFFERENT

How are these the SAME but DIFFERENT?

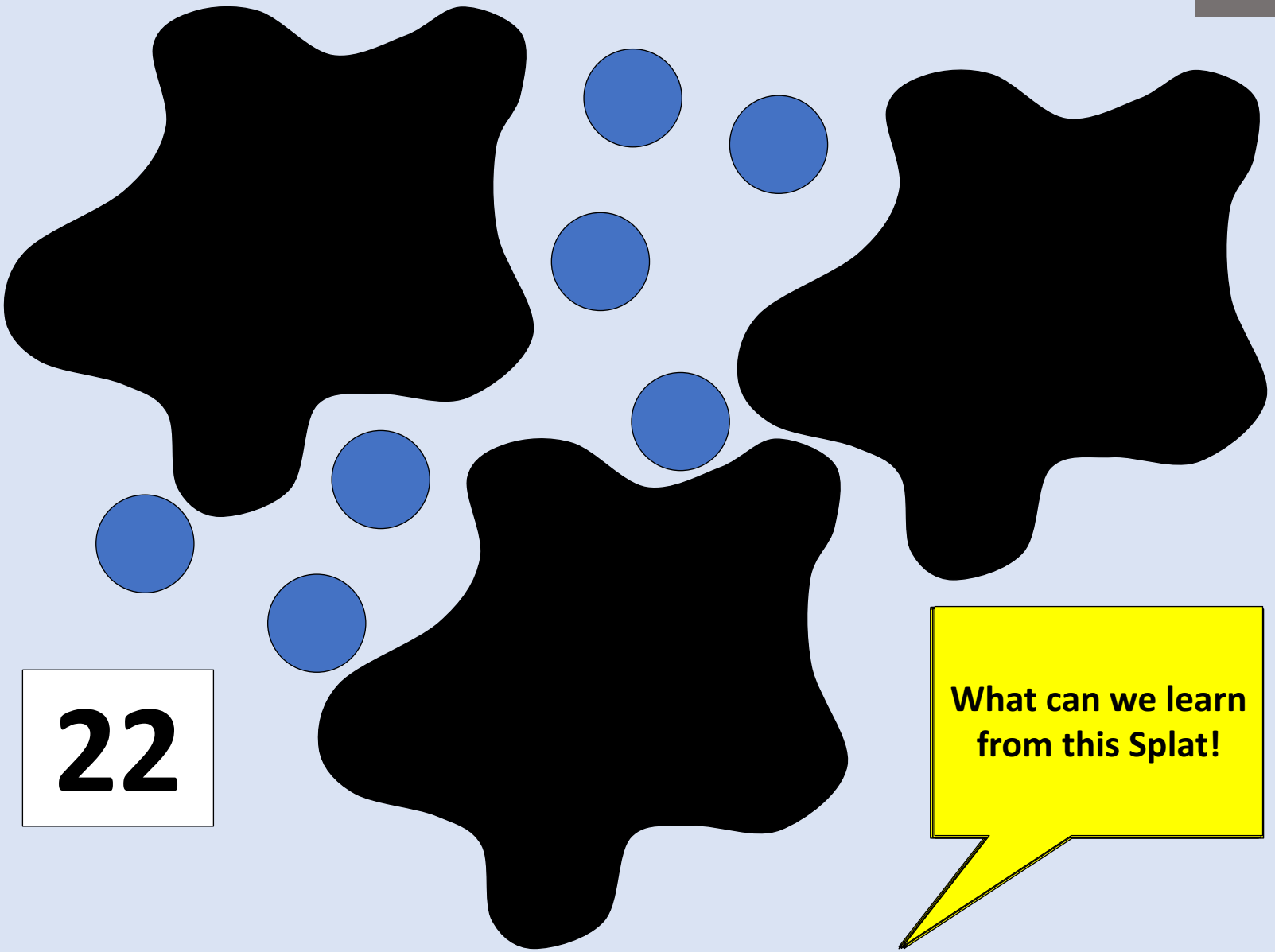
Day 87



SAME BUT DIFFERENT

**Splats! that are the same color have the same number of dots hiding beneath*

Day 88



22

What can we learn from this Splat!

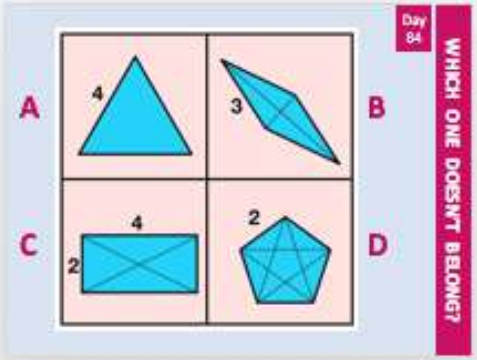
SPLAT!

Use the NEXT SLIDE with students.

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

Day 89

WHICH ONE DOESN'T BELONG?



- A – Triangle - Three of the shapes have a dotted line that connects two of the corners (these are called "diagonals", a term that students will learn in middle/high school). Shape A does not have any diagonals since diagonals only attach non-adjacent vertices and all vertices in a triangle are adjacent to each other
- B – Rhombus - Three of the shapes were made with all equal-sized angles. Shape B does not have all equal angles, it has two different sized angles.
- C – Rectangle - Three of the shapes have all equal-sized edges. The side on Shape C are not all equal-sized. (NOTE: If students say that the rectangle is the only one with two different numbers, probe further and ask WHY it is the only one that has two different numbers to get to the idea that the sides on the other 3 figures are equal lengths: 4,4,4 or 3,3,3,3 or 2,2,2,2,2 instead of 2,2,4,4)
- D – Pentagon – Three of the shapes have interior shapes of triangles. Shape D is the only one that was portioned into shapes that were not all triangles (the center shape is a pentagon surrounded by ten triangles)

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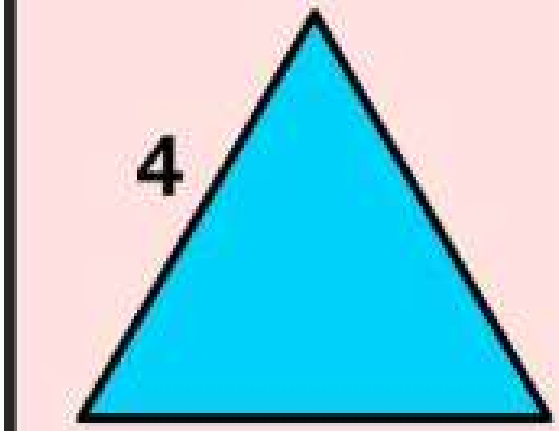
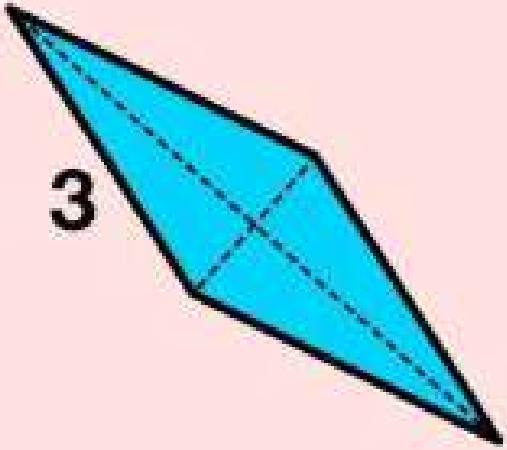
Day 89

WHICH ONE DOESN'T BELONG?

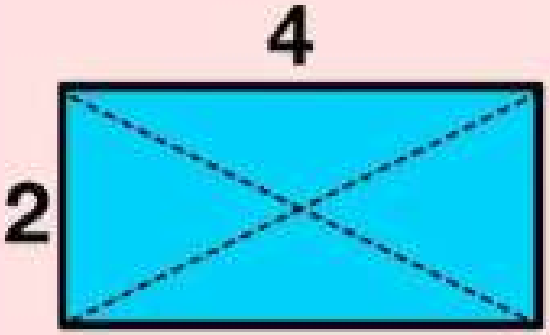
A



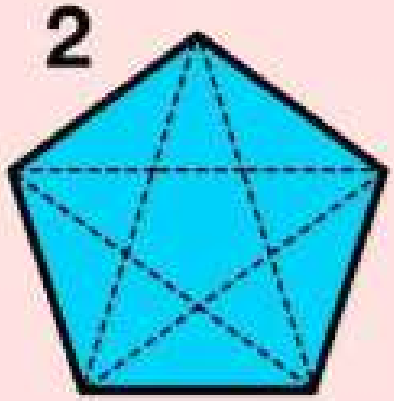
B



C



D



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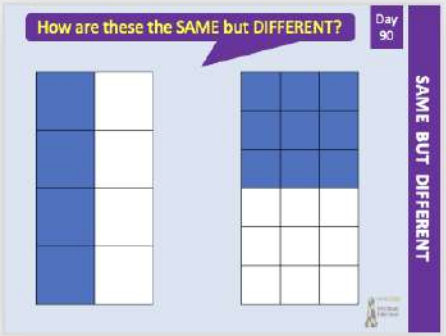
Use the NEXT SLIDE with students.

Day 90

TODAY'S GOAL: Since Day 90 marks the halfway point of the schoolyear, we will use our Number Sense Routine today to explore the concept of halves on the number line.

**Before beginning today's Number Sense Routine, set the stage by explaining why today is a special day:

Today is Day 90 of school. We go to school 180 days each year.
*The number **90 is HALF of 180**, so today marks the HALFWAY point of our school year.*
To celebrate the HALFWAY point of school, we will focus our Number Talk today on HALF.



Possible Responses:

- BOTH REPRESENT HALF (remember the theme of the day)!
- Both have half shaded but one is represented by 4/8 and the other is represented by 9/18
- Both have half shaded but one shows the left side shaded and the other shows the top half shaded
- Both have the same amount of AREA shaded but one is a long, shaded rectangle and the other is a shaded square

SAME BUT DIFFERENT

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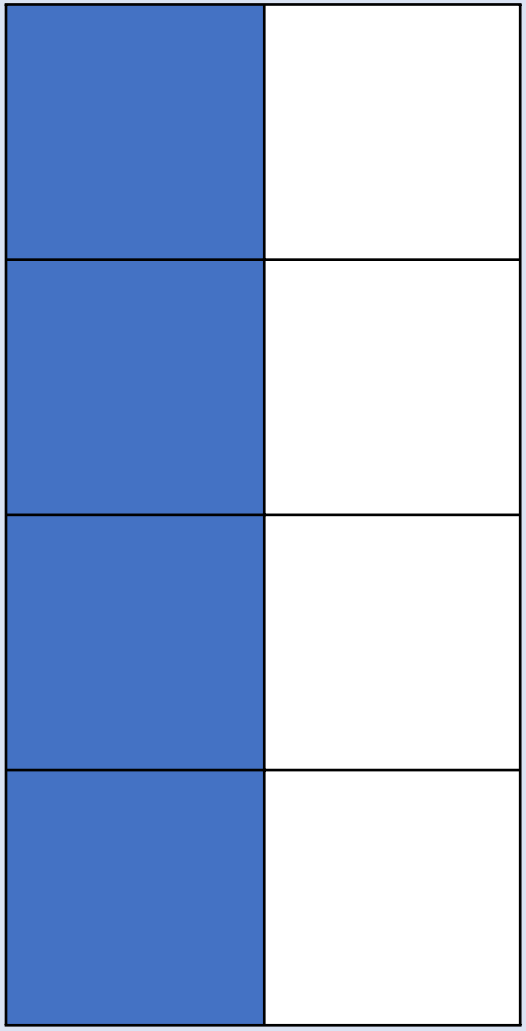
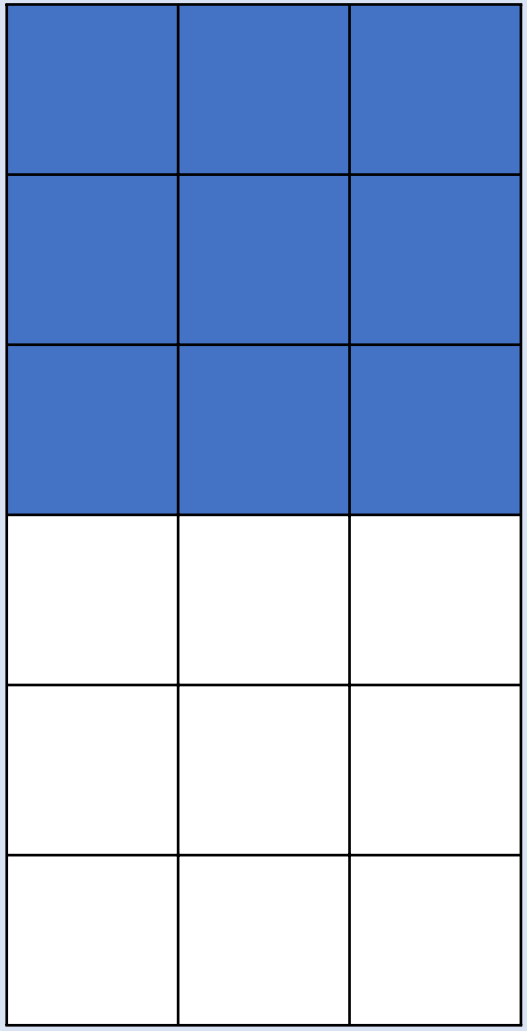
How are these the SAME but DIFFERENT?

Day 90





SAME BUT DIFFERENT

3.MD.C.5a
3.MD.C.5b

Day 91

Estimation Activity

A new type of Estimation FUN!

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

ESTIMATION

Before seeing the clues, estimate how many erasers are in the cup.

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

*Esti-Mysteries will only work correctly in Slide Show mode of PowerPoint – select “Play from Current Slide”

www.stevewyborney.com

Clue #1

Count by 2's from 2 to 30. The answer is one of those numbers.

Clue #2

The answer is greater than 10.

Clue #3

The answer is less than 30.

Clue #4

One of the digits is a 4.

Clue #5

There are now two possibilities. Which one do you think it is?

By combining the clues and estimation, you now have enough information to determine the answer.

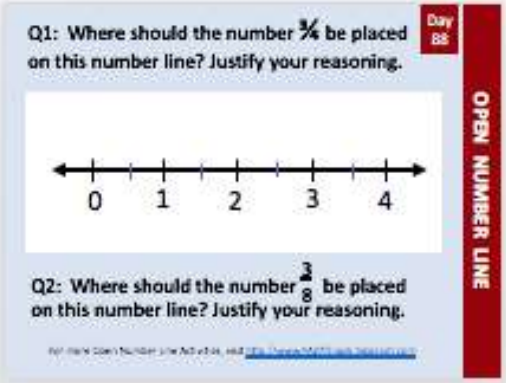
The Reveal
Click to see the answer.

Use the NEXT SLIDE with students.

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

Day 92

OPEN NUMBER LINE



Q1: ¾ would fall between 0 and 1 since it is a value that is greater than 0 but less than 1 whole. More specifically, it should fall halfway between the ½ hash mark and 1.
Two common misconceptions to look out for and to help build students conceptual understanding:

- Fractions have a value that is less than one
- The fraction ¾ will fall between the 3 and 4 on the number line

Q2: The number 3/8 would again fall between 0 and 1 because it is a fraction that has a value of less than 1. Imagine that the section between 0 and 1 is partitioned into 8 equal parts. 3/8 would use 3 of those 8 parts. Students should reason that 3/8 is LESS than half (4/8 is half), so it should fall just slightly left of the halfway mark between 0 and 1.

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

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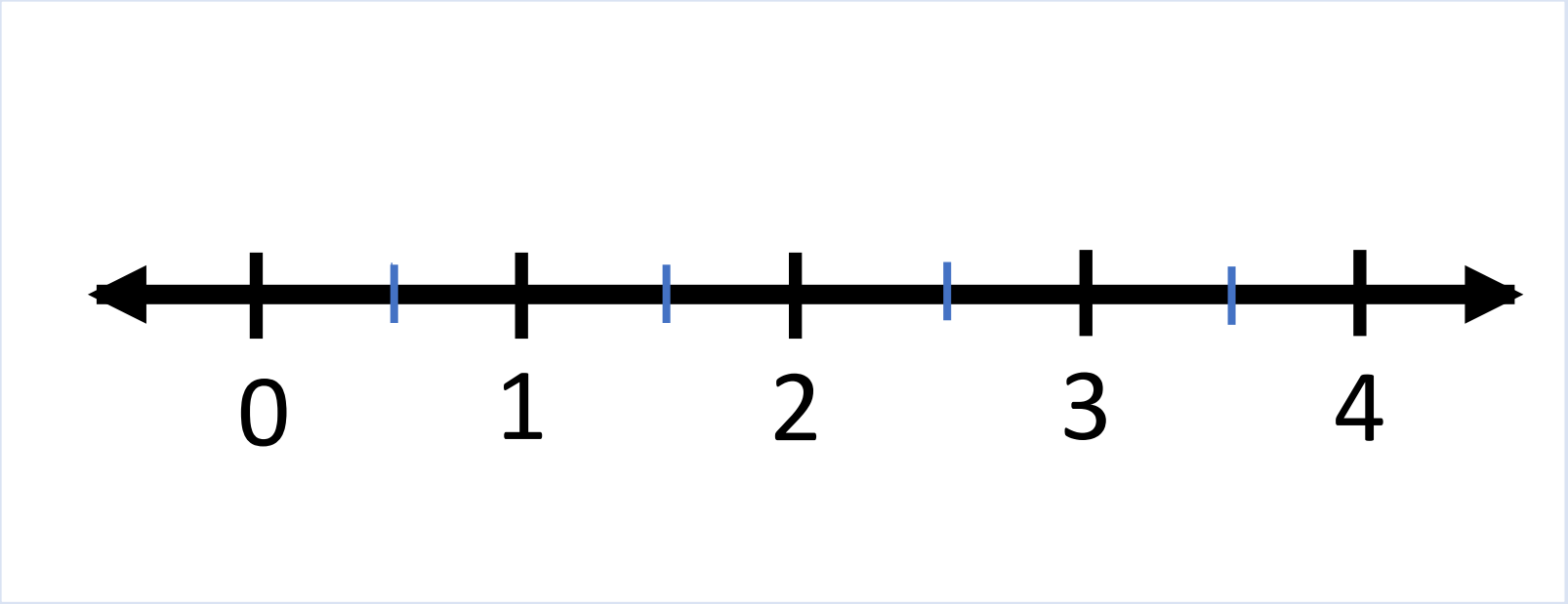
Day 92

Q1: Where should the number ¾ be placed on this number line? Justify your reasoning.



Q2: Where should the number $\frac{3}{8}$ be placed on this number line? Justify your reasoning.

OPEN NUMBER LINE

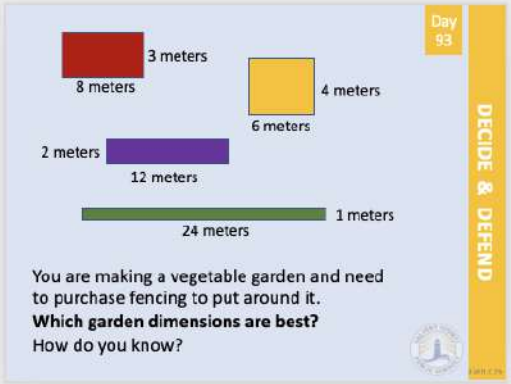
3.NF.A.2a
3.NF.A.2b

Use the NEXT SLIDE with students.

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

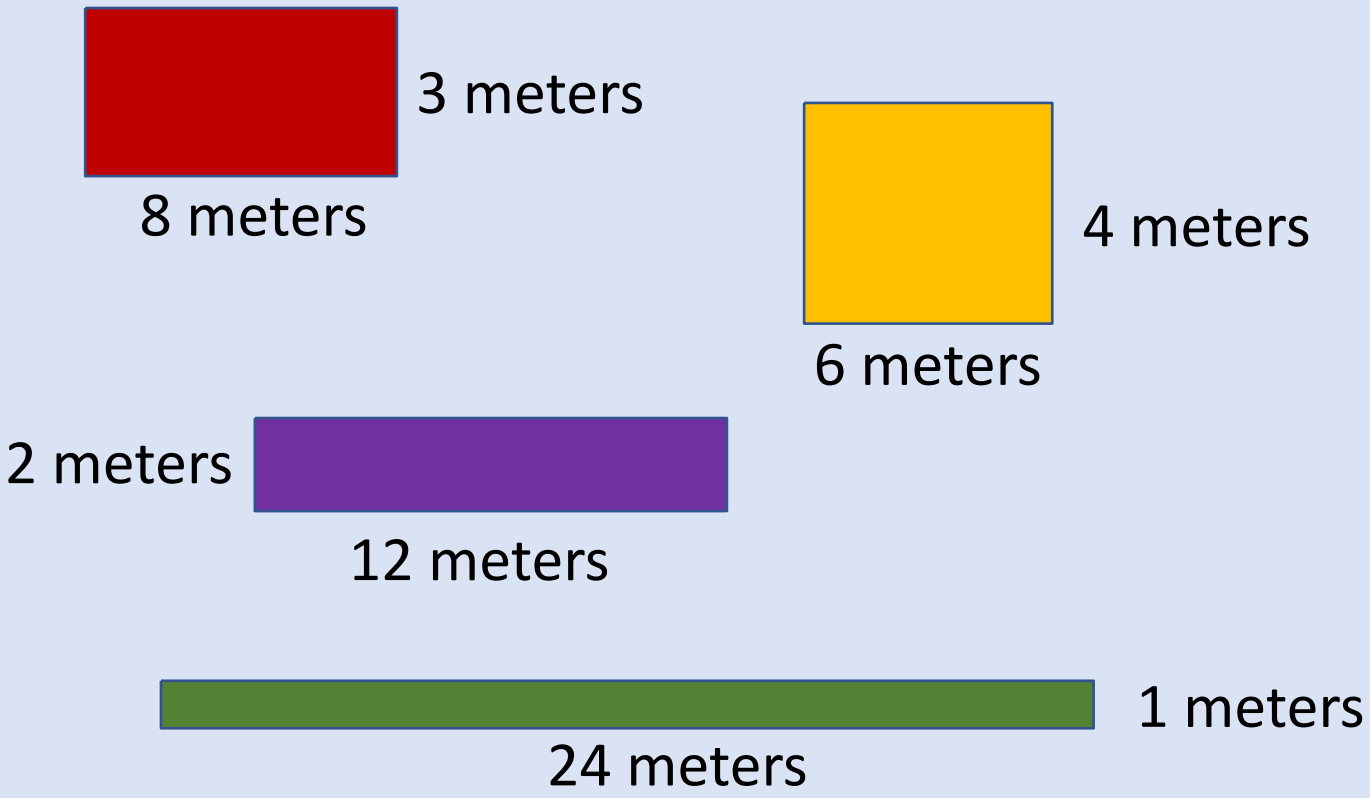
Day 93

DECIDE & DEFEND



All of the gardens have an area of 24 square meters, so the amount of space to plant vegetables is equal.
The difference is in the amount of fencing (and subsequent cost) you are required to purchase to go around the fence.
Red = 22 meters (8+3=11 then 11+11=22)
Yellow = 20 meters
Purple = 28 meters
Green = 50 meters

Day 93



You are making a vegetable garden and need to purchase fencing to put around it.

Which garden dimensions are best?

How do you know?

DECIDE & DEFEND

3.MD.C.7b

Day 93

Reflect on Learning

- What was mathematically important in the problem?
- What new math idea did you learn today?

DECIDE & DEFEND

Day 94

Multiplying by Multiples of 10

(3.NBT.A.3)

This activity will only run in PowerPoint use Slide Show mode

Across the top of the game board are multipliers; each is a multiple of ten (10, 20, 40, 80). When the teacher clicks the mouse or presses the RETURN key on the keyboard , a single-digit number will appear on the game board. As the number appears, students multiply the single digit number with the multiple of ten at the top of the column (2 x 10). The teacher says “2x10” and the students respond in chorus “20”.

When all of the slides have been revealed, the actual math fun begins! The power of Choral Counting is not in the counting part, but rather, in the discussion of patterns and number relationships. Ask students to look for patterns that they notice. Discuss with a partner. Then share with the class. Be sure to discuss WHY that pattern is occurring – what MATH led to that pattern/relationship of numbers? Below are some of the patterns they may notice:

- All products end in zero
- Each column is double of the previous column (because the multiplier x10, x20, x40 is double of the previous column)
- Each row is multiplied by the same number. Follow up with the question, “so what patterns of sums do we see?” (the tens place is a multiple of the multiplier – on the 3 row, for example, there are 3 tens, 6 tens, 12 tens, 24 tens)
- 3x40 and 6x20 have the same product (explore why! This is the rule of *halves and doubles*: If we half one number and double the other in multiplication, the product is the same).

CHORAL COUNTING

Multiplying by Multiples of 10

Day 94

x 10	x 20	x 40	x 80
2 x 10 20	2 x 20 40	2 x 40 80	2 x 80 160
3 x 10 30	3 x 20 60	3 x 40 120	3 x 80 240
4 x 10 40	4 x 20 80	4 x 40 160	4 x 80 320
5 x 10 50	5 x 20 100	5 x 40 200	5 x 80 400
6 x 10 60	6 x 20 120	6 x 40 240	6 x 80 480
7 x 10 70	7 x 20 140	7 x 40 280	7 x 80 560

CHORAL COUNTING

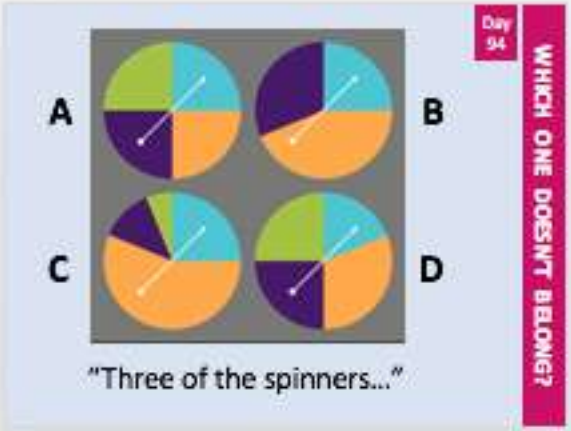
*Remember: This slide only runs in PowerPoint Slide Show (select *Play from Current Slide*)

3.OA.D.9

Day 95

Use the NEXT SLIDE with students.

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



Possible Responses:

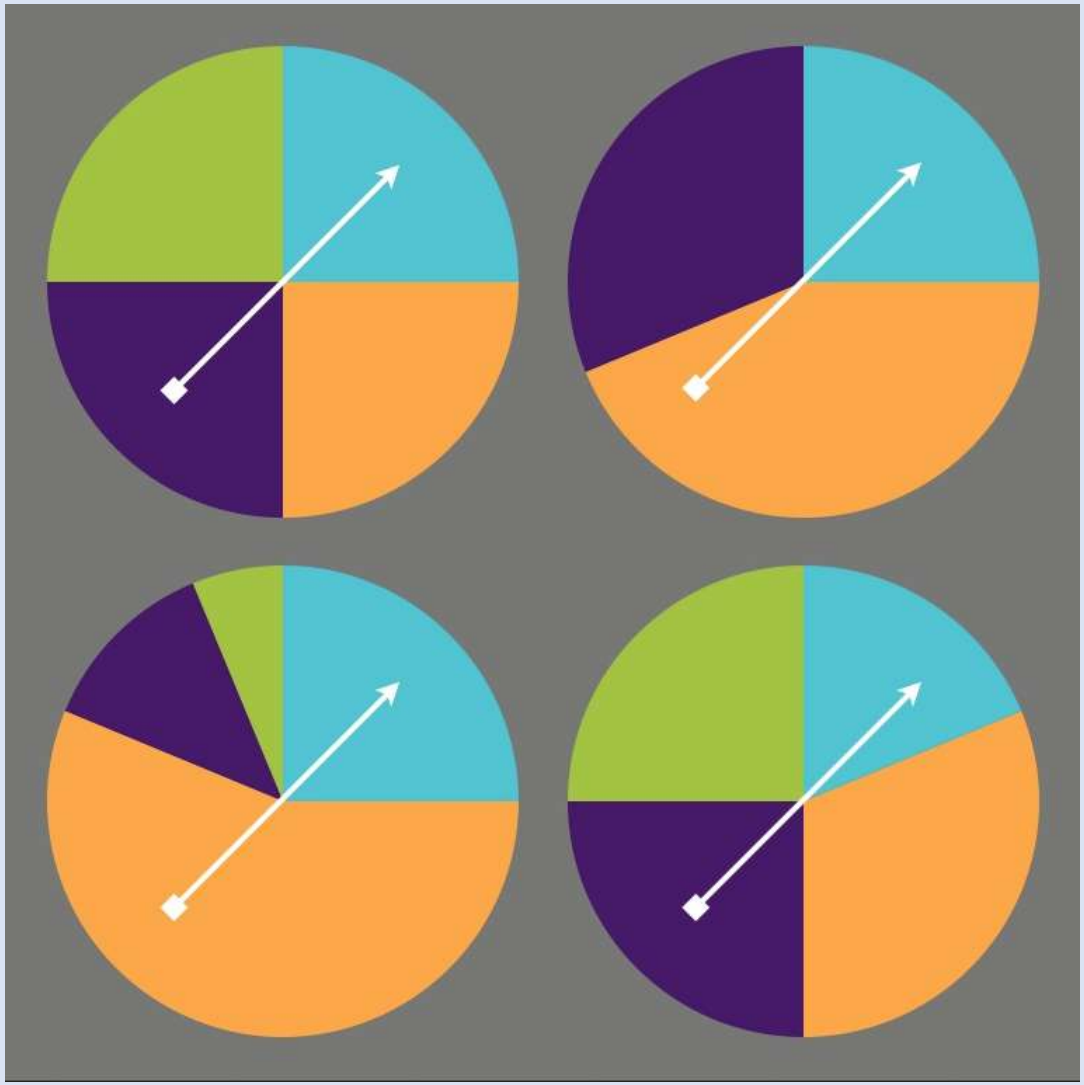
- A – Three of the spinners are partitioned into Unequal parts. Spinner A is not partitioned into unequal parts, they are equal parts.
- B – Three of the spinners have 4 colors. Spinner B does not have 4 colors, it only has 3 colors
- C – Three of the spinners have the orange color covering less than half of the spinner. Spinner C has the orange covering more than half.
- D – Three of the spinners have the blue color covering exactly ¼ of the circle. On Spinner D, the blue is less than ¼ of the circle.

WHICH ONE DOESN'T BELONG?

Day 95

WHICH ONE DOESN'T BELONG?

A



B

C

D

"Three of the spinners…"

Day 96

39 + 16
28 + 39
59 + 13
23 + 49

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
Making Landmark or Friendly Numbers – use numbers that are one away from a landmark or friendly number.

This string of expressions all contain values that are just one or two numbers away from a landmark number. Help student to recognize that decomposing numbers to make landmark numbers is an easy way to find the sum using mental calculations.

- 39 + 16 = 39 + 1 + 15 = 40 + 15 = 55
- 28 + 39 = 27 + 1 + 39 = 27 + 40 = 67 (notice that it may be easier to adjust 39 to an easier tens value in this one)
- 59 + 13 = 59 + 1 + 12 = 60 + 12 = 72
- 23 + 49 = 22 + 1 + 49 = 22 + 50 = 72 (again notice that it was easier to adjust the second value)

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.

AFTER
After solving the expressions with various strategies, help students to understand how these expressions were all related. Explicitly discuss the strategy of making landmark/friendly numbers.

NUMBER TALK

CALVERT COUNTY PUBLIC SCHOOLS

Day 96

39 + 16

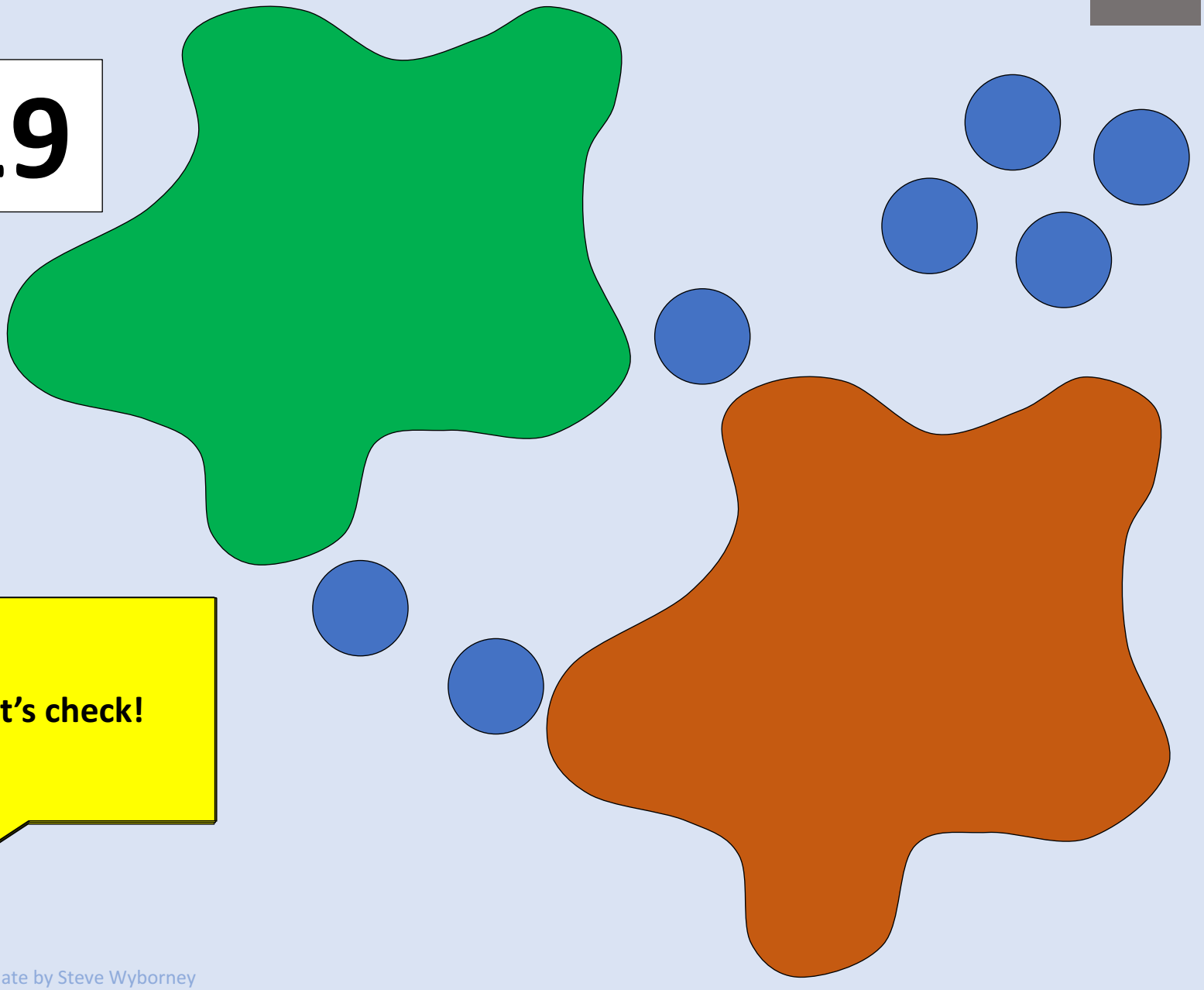
NUMBER TALK

3.NBT.A.2

*Splats! that are different colors have different quantities of dots hiding.

Day 97

19



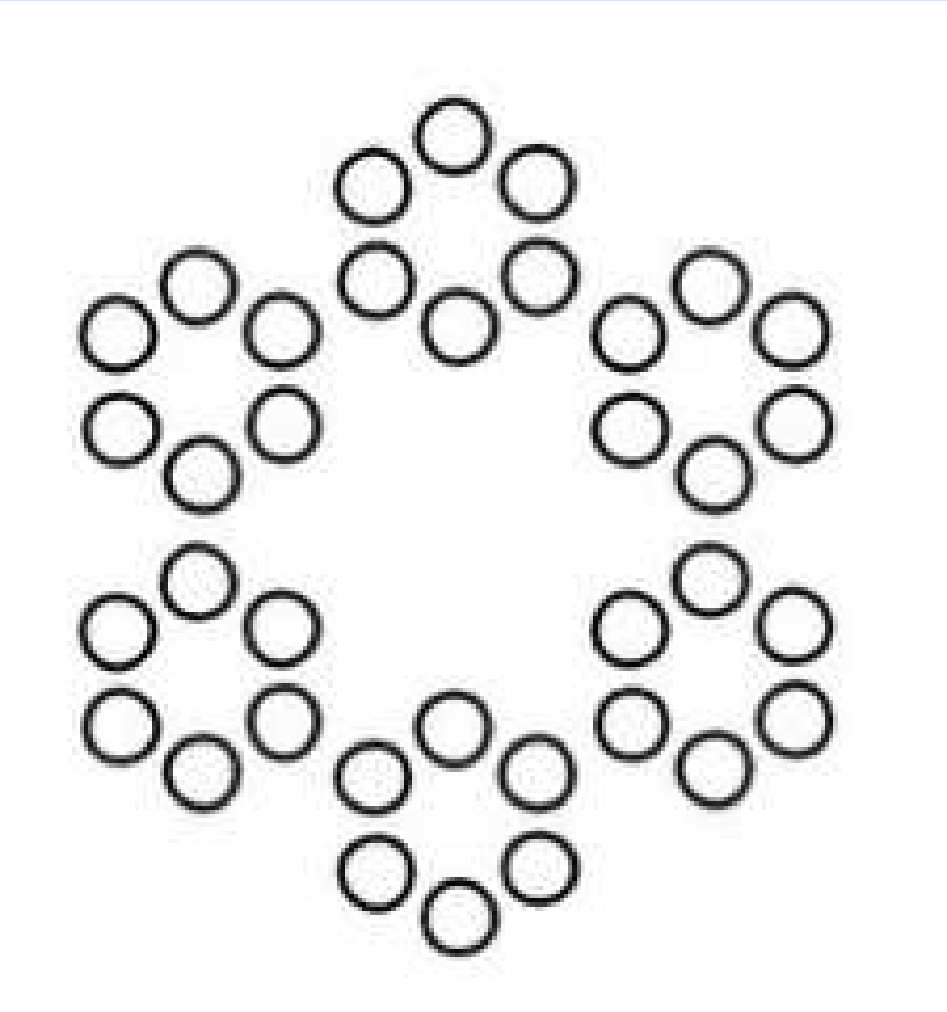
Let's check!

SPLAT!

3.NBT.A.2

Based on a template by Steve Wyborney

Day 98



What do you NOTICE?

QUICK COUNT

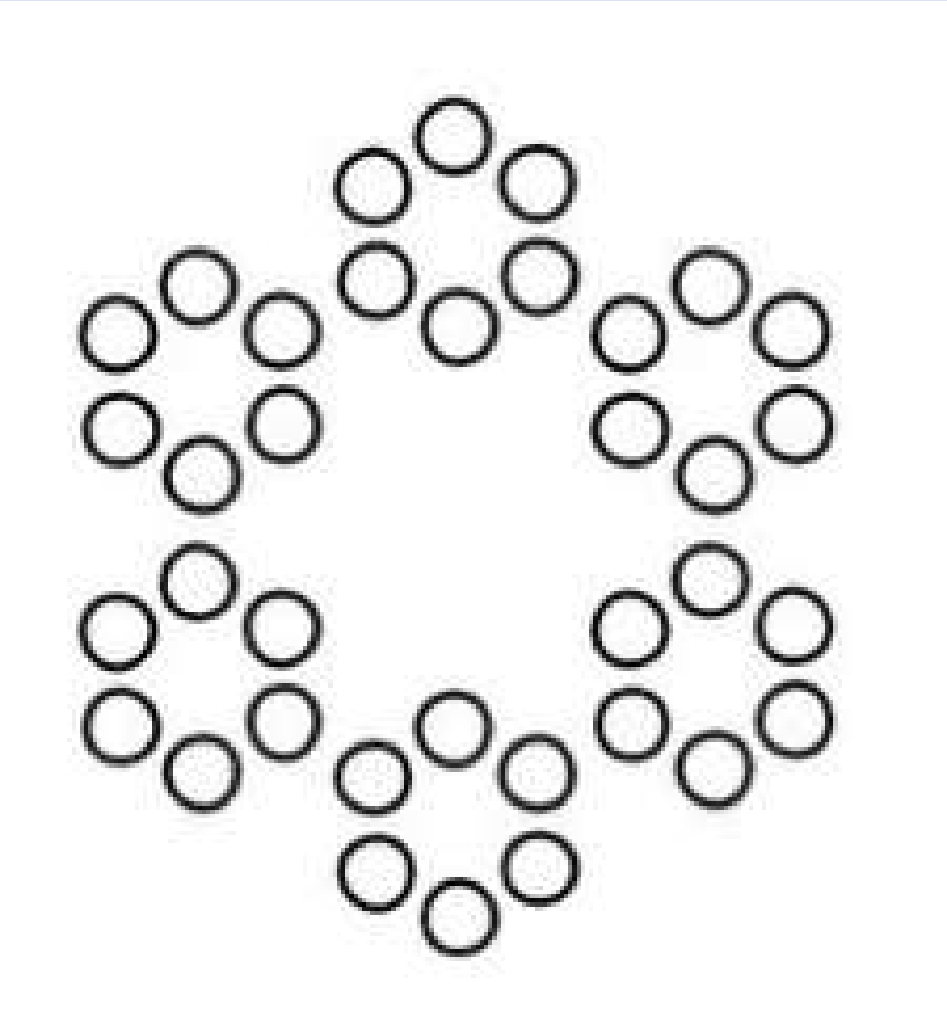
Day 98

QUICK COUNT

What did you NOTICE?

Day 98

QUICK COUNT

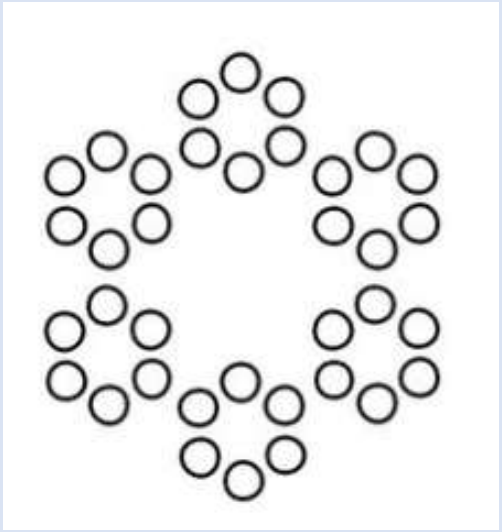


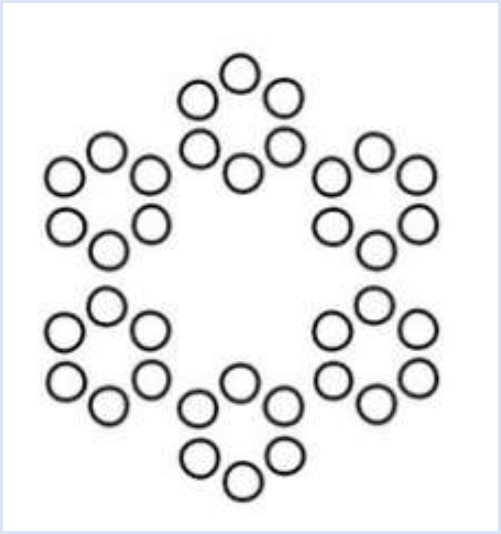
How many do you see?

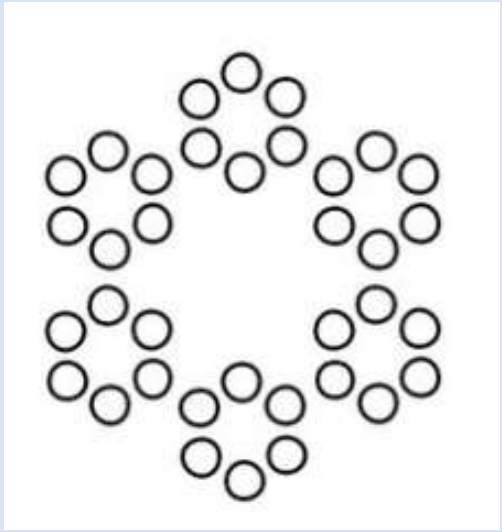
What counting shortcut did you use?

Day 98

QUICK COUNT







I noticed ____
so I _____

(They) noticed
____ so they _____

Day 98

Reflect

What was mathematically important?

QUICK COUNT

Day 99

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.

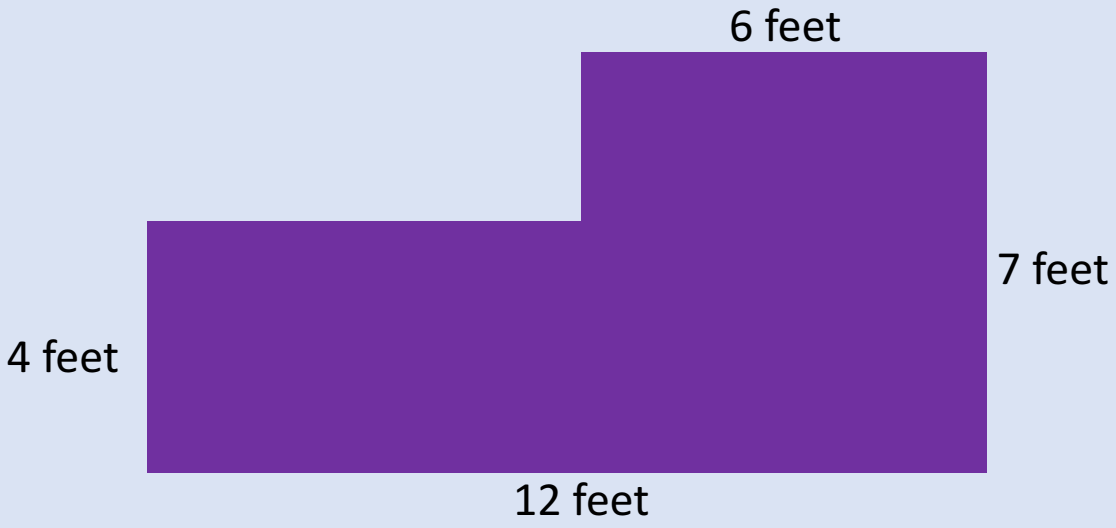
Possible Reasoning: *If the rectangle was complete, it would be 84 square feet (12 x 7). Since a piece is missing (6 x 3), the area of the rectangle is about 20 square feet smaller and 84 – 20 = 64.*

Day 99

Think about the AREA of the shape

Which answer is

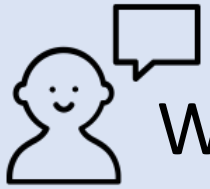
As Close as it Gets?



$44\ ft^2$

$64\ ft^2$

$84\ ft^2$



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

ESTIMATION

3.MD.C.7a

Day 100

Since today is the 100th day of school, let's talk about the number 100.

These 15 full size marshmallows weigh exactly 100 grams.

Look at the items on the next page. Decide which ones weigh MORE than 100 grams.

Be ready to justify your predictions.

DECIDE & DEFEND

Which of these weigh MORE THAN 100 grams?

Day 100

7 baby carrots

Salt & pepper shakers

A pair of reading glasses

Three packs of granola bars

DECIDE & DEFEND

3.MD.A.2

Which of these weigh MORE THAN 100 grams?

Day 100

7 baby carrots
82 grams

Salt & pepper shakers
252 grams

A pair of reading glasses
17 grams

Three packs of granola bars
130 grams

DECIDE & DEFEND

CALVERT COUNTY PUBLIC SCHOOLS

Day 100

DECIDE & DEFEND

Are you ready for a CHALLENGE?

7 baby carrots
82 grams

About how many more carrots are needed to weigh a total of 100 grams?

How do you know?
What calculation did you use to determine that amount?

Day 100

Reflect on Learning

- What was mathematically important in the problem?
- What new math idea did you learn today?
- What suggestions can you offer someone who is trying to convince others of his/her mathematical ideas?

DECIDE & DEFEND