180 Days of
Number Sense Routines
Grade 5
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.

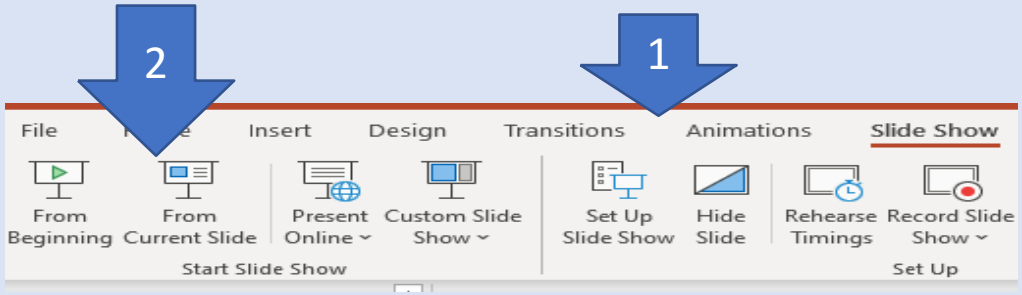
WHAT ARE THE CCPS IMPLEMENTATION EXPECTATIONS? Number sense routines have been developed for all 180 instructional days in grades 1-5. These routines are to be used every day, including early dismissal, late arrival, and field trip days. Because the routines do not require a specific order, it is permissible 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

Day 141

Use the NEXT SLIDE with students

This will be an Esti-Mystery routine with a bit of a bonus – at the beginning of the activity, students will be shown an activating video clip to allow them to contextualize the prompt and to really get them thinking!

1. Show the video clip on the next slide.
2. Then move to the slide that follows to see the Esti-Mystery clues
    - Give time and space for students to work between each clue
    - Discuss and CHART possible solutions with your class
    - Discuss the remaining possibilities after each clue
    - Be sure to discuss strategies, too – after all, it's not just about the number!

ESTIMATION

CALVERT COUNTY PUBLIC SCHOOLS

How many Girl Scout Cookie boxes can fit in the back of this vehicle?

Day 141

Click “return/enter” on the keyboard to play the video.
Discuss your initial estimates before continuing to the clues.

Credits:
Esti-Mystery template by Steve Wyborney
Nissan cookie video edited by Dan Meyer

ESTIMATION

Clue #1

If each box is $5.00, you would spend $4,500-$4,800

Clue #2

There is a 4 in the ones place

Clue #3

Of the 6 possibilities, it is not the two with the least value

Clue #4

The boxes can be placed in 3 equal groups

Clue #5

It's the smaller of the 2 remaining choices

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

Note: These videos do not play. Go to next page.

The Reveal

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.

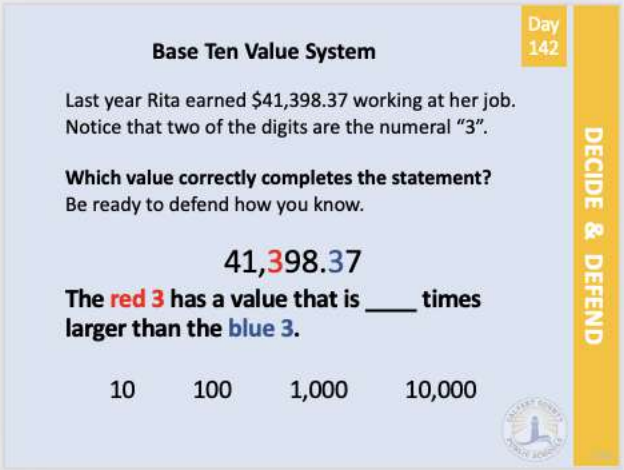
NOTE: This is the CCPS adaptation of the original Decide and Defend protocol

Use the NEXT SLIDES with students.

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

Day 142

DECIDE & DEFEND



300 is ONE THOUSAND times larger than 0.3

The decimal technically does not move since it is a fixed mathematical notation; however, we can think about the decimal in different locations among a set of numbers. As the numbers shift at the decimal, one strategy is to encourage students to count 10, 100, 1000, 10000, 100000, etc. as the decimal shifts within the digits and the value is the desired amount larger/smaller than the original value.

0.30 x 1 = 0.30
0.30 x 10 = 3.00
0.30 x 100 = 30.00
0.30 x 1000 = 300.00

Day 142

Base Ten Value System

Last year Rita earned $41,398.37 working at her job. Notice that two of the digits are the numeral “3”.

Which value correctly completes the statement?
Be ready to defend how you know.

41,398.37

The red 3 has a value that is ____ times larger than the blue 3.

10 100 1,000 10,000

DECIDE & DEFEND

Day 142

Reflect on Learning

- A new math idea I learned today is…
- Next time I plan to… because…
- To convince a skeptic, it's important to ….

DECIDE & DEFEND

Day 143

4 x (3 – 1)
(3 – 1) x 4
(12 – 6) ÷ 2 x 5
5 x (12 – 6) ÷ 2

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

Order of Operations

Key Ideas:

- Students should understand that expressions in the group should be solved prior to working with that value and operations outside of the parentheses
- 4 x (3 – 1) = 4 x 2 = 8
- (3 – 1) x 4 = 2 x 4 = 8 in both cases the 3-1 must be completed first before moving to the x4 part of the expression
- (12 – 6) ÷ 2 x 5 = 6 ÷ 2 x 5 = 3 x 5 = 15 discuss how (and why) the solution is impacted if you multiply 2x5 first then divide by that value rather than dividing by 2 THEN multiplying by 5
- 5 x (12 – 6) ÷ 2 = 5 x 6 ÷ 2 = 30 ÷ 2 = 15 notice that is does not make a difference if the multiply or divide calculation is first

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 in the mathematics world, there is an agreed upon order for solving expression to the find the solution. Anything that is in a grouping (parentheses, exponential terms, the denominator or the numerator of a fraction, etc. is simplified to a digit value before proceeding to operations outside of the group. Also, all multiplication and division expressions are calculated BEFORE all addition and subtraction calculations unless the +/- is within a group.

NUMBER TALK

Day 143

$4 \times (3 - 1)$

NUMBER TALK

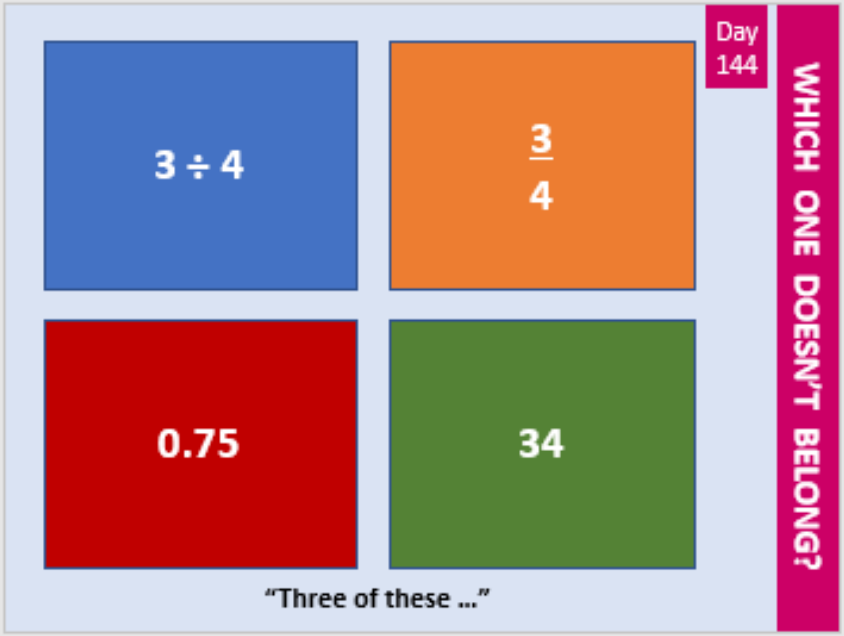
5.OA.A.1

Use the NEXT SLIDE with students.

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

Day 144

WHICH ONE DOESN'T BELONG?



Possible Responses:

- Three of these are numbers on a number line. The blue box is not a single number, but rather, a mathematical operation.
- Three of these do not show a denominator value. The orange box shows the denominator value of 4.
- Three of these use the digits 3 and 4. The red box does not contain the digits 3 or 4.
- Three of these have an equivalent value. The green box is not equivalent to ¾.

Day 144

WHICH ONE DOESN'T BELONG?

$3 \div 4$

$\frac{3}{4}$

0.75

34

"Three of these …"

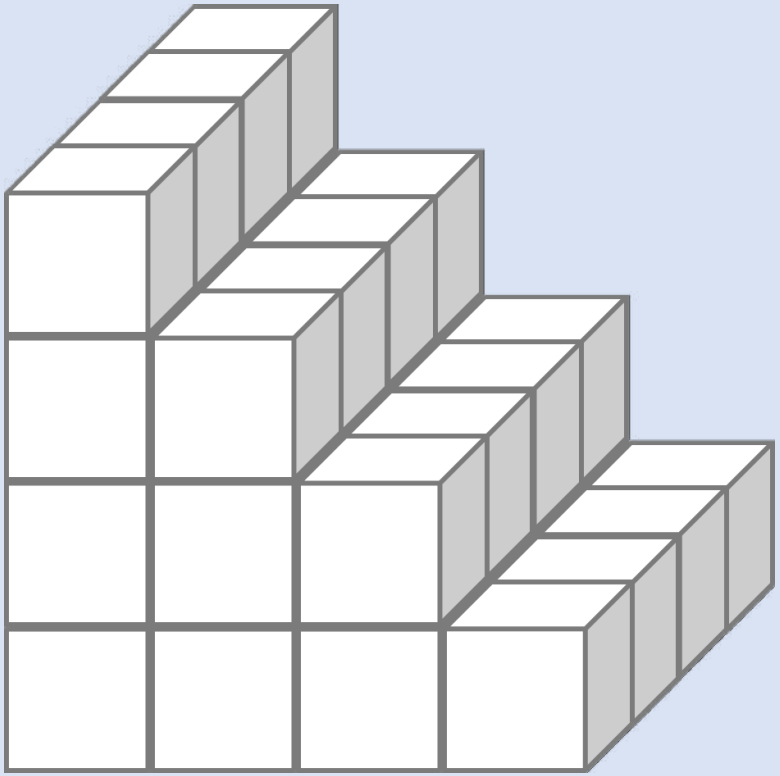
Directions for QUICK COUNT routines

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

Day 145

What do you NOTICE?



QUICK COUNT

Day 145

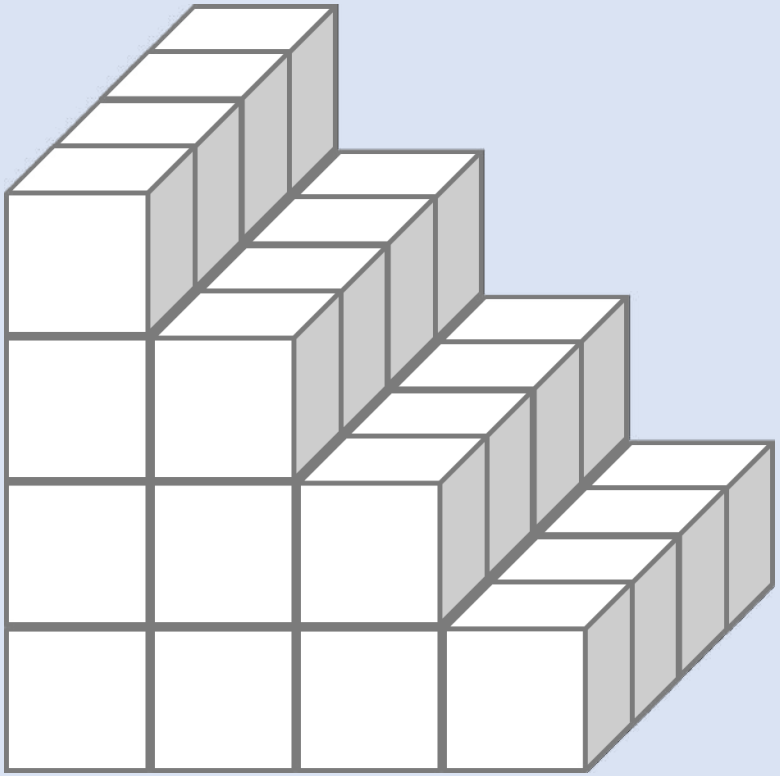
QUICK COUNT

What did you NOTICE?

Day
145

How many blocks were used?

What counting shortcut did you use?

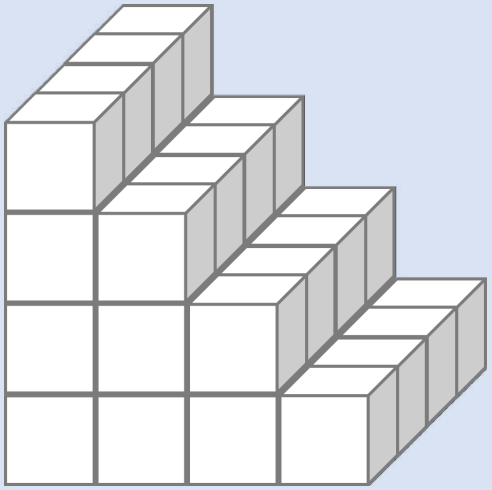


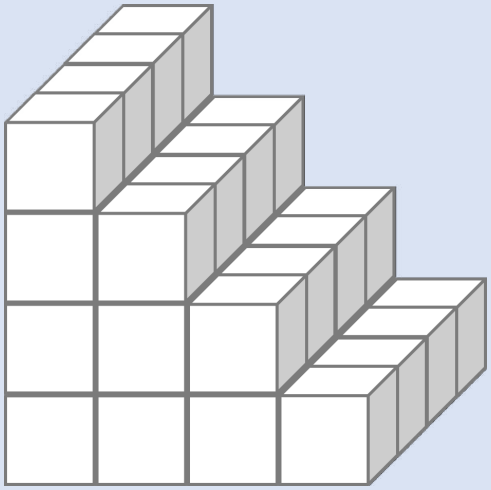
QUICK COUNT

I noticed ____ so I _____

(They) noticed ____ so they___

Day 145





QUICK COUNT

Day 145

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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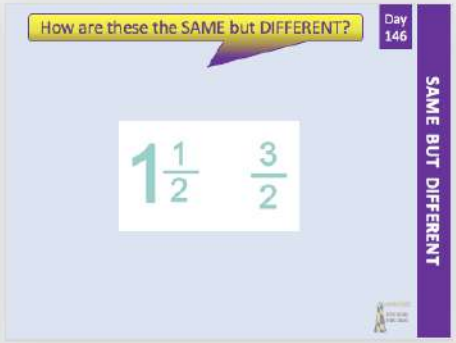
Use the NEXT SLIDE with students.

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

Day 146

- 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….”



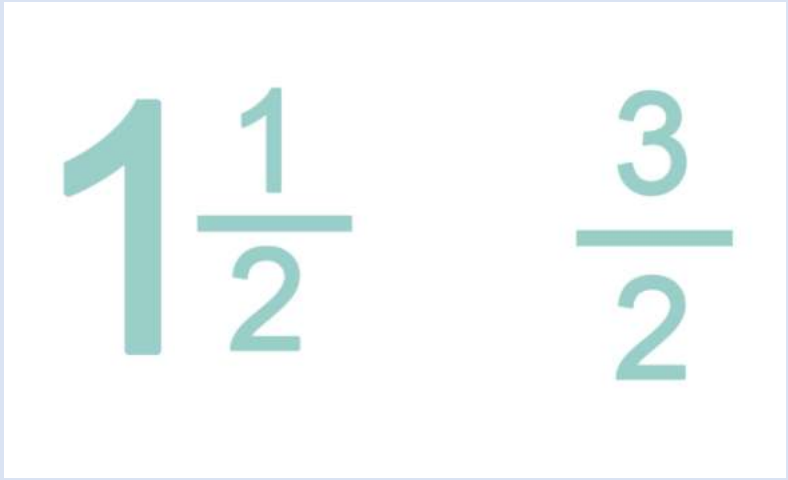
The goal of this activity is to help student articulate what they know while solidifying their ideas.
Our brains constantly make sense of new learning by comparing it to what we already know.
This activity provides targeted opportunities to make these comparisons.

- Both have a value greater than 1
- Both represent the same quantity but are expressed in different forms
- The left value uses a whole number in its representation; the right value does not but they are the same overall value
- The left show 1 whole and 1 of two parts. The right shows 3 of 2 parts. Both are the same value.
- One is written as a mixed number the other is an “improper fraction” but both represent a value greater than 1.

SAME BUT DIFFERENT

How are these the SAME but DIFFERENT?

Day 146



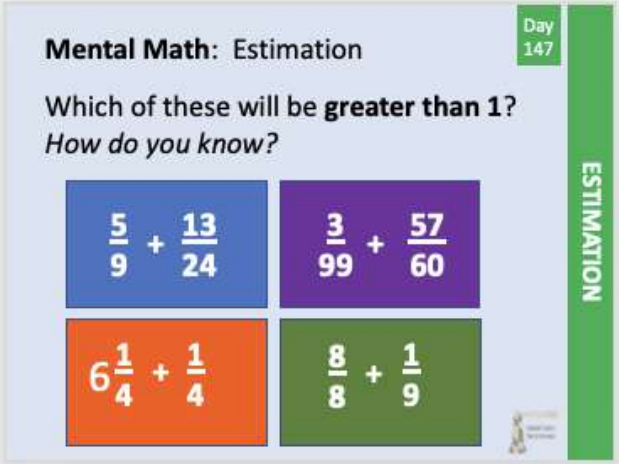
SAME BUT DIFFERENT

Use the NEXT SLIDE with students.

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

Day 147

ESTIMATION



- BLUE: Yes, greater than 1 because 5/9 and 13/24 are both **greater than** ½ and ½ + ½ = 1
- PURPLE: No. we need 3/60 to add to 57/60 to make 1 whole. And 3/99 is much smaller than 3/60 so it will not be enough to make 1 whole
- ORANGE: Yes, because we already have 6 wholes, the fractional parts are inconsequential
- GREEN: Yes, because 8/8 is equal to 1 whole, we have 1/9 more than 1 whole when we add these together

Day 147

Mental Math: Estimation

Which of these will be **greater than 1**?

How do you know?

$\frac{5}{9} + \frac{13}{24}$

$\frac{3}{99} + \frac{57}{60}$

$6\frac{1}{4} + \frac{1}{4}$

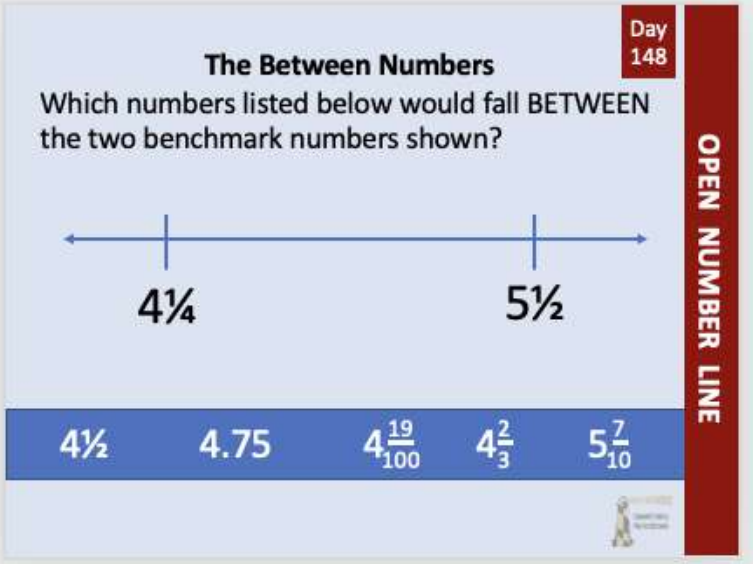
$\frac{8}{8} + \frac{1}{9}$

ESTIMATION

Day 148

Use the NEXT SLIDE with students.

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



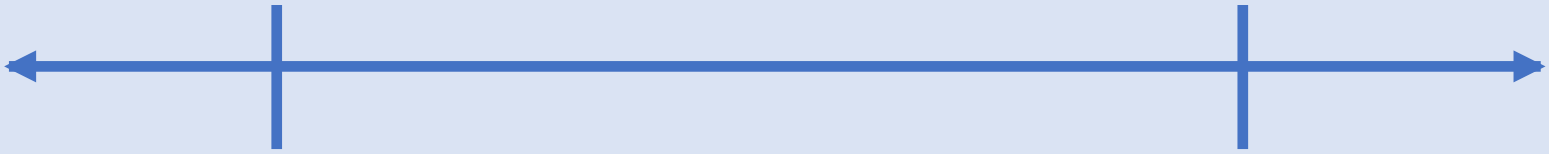
- YES: 4½ 4.75 4-2/3
- NO: 4-19/100 because 4¼ = 4-25/100 which is greater than 4-19/100
- NO: 5-7/10 because 5-1/2 = 5-5/10 which is less than 5-7/10

OPEN NUMBER LINE

Day 148

The Between Numbers

Which numbers listed below would fall BETWEEN the two values shown on the number line?



4¼ 5½

4½ 4.75 $4\frac{19}{100}$ $4\frac{2}{3}$ $5\frac{7}{10}$

OPEN NUMBER LINE

4.NF.A.2

Day 149

SPLAT!

7

The total is…

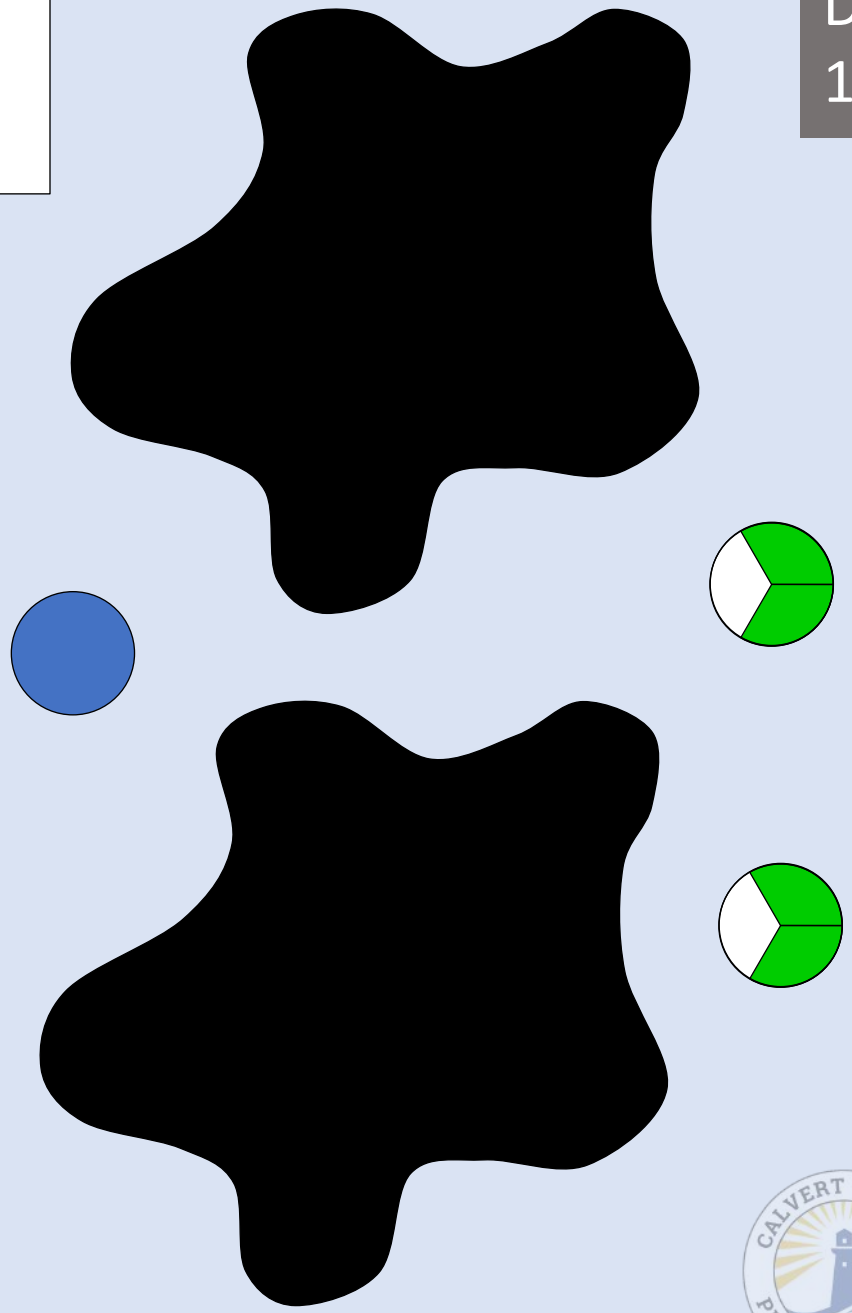
What is the total value that is hiding?
How do you know?

What value is under EACH Splat?

What could the parts look like?

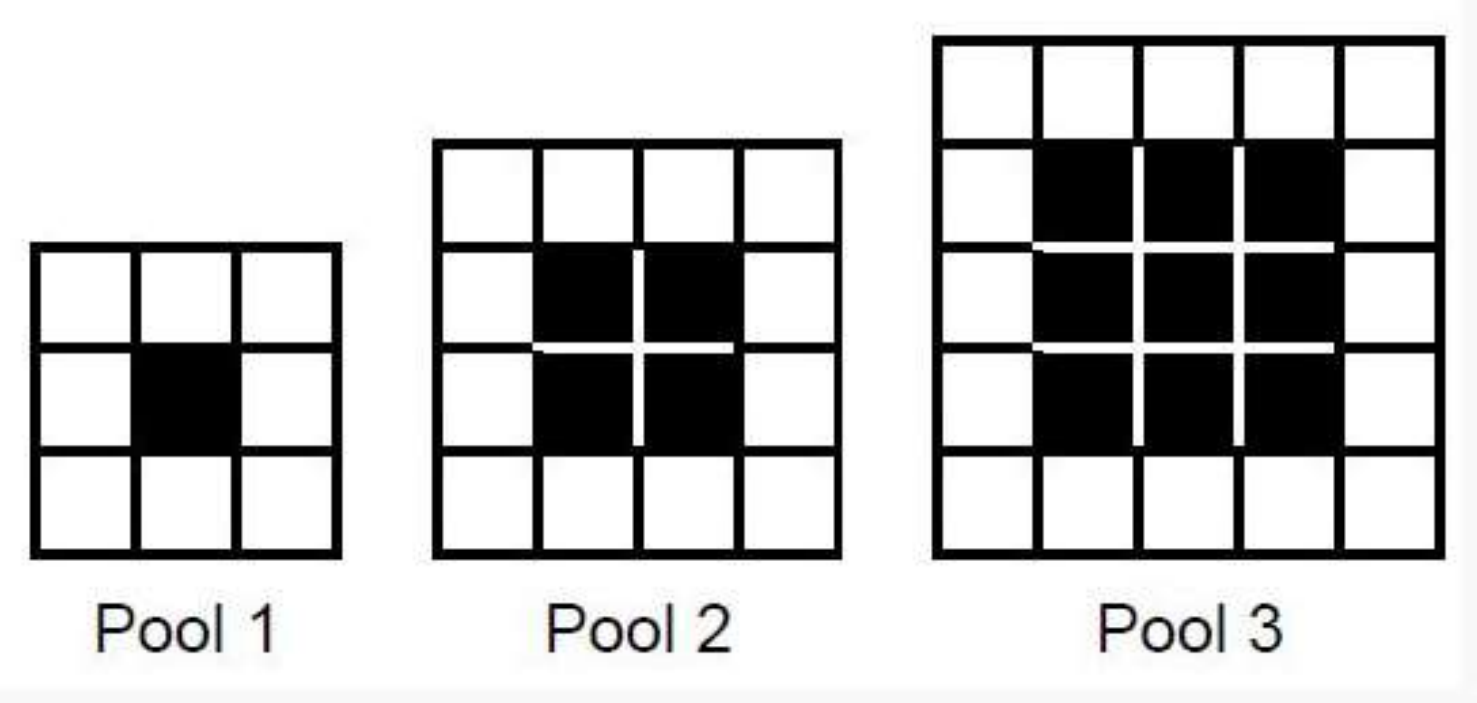
Let's look under the splats to see

What can we learn from this picture?



Day 150

What do you NOTICE?



QUICK COUNT

Day 150

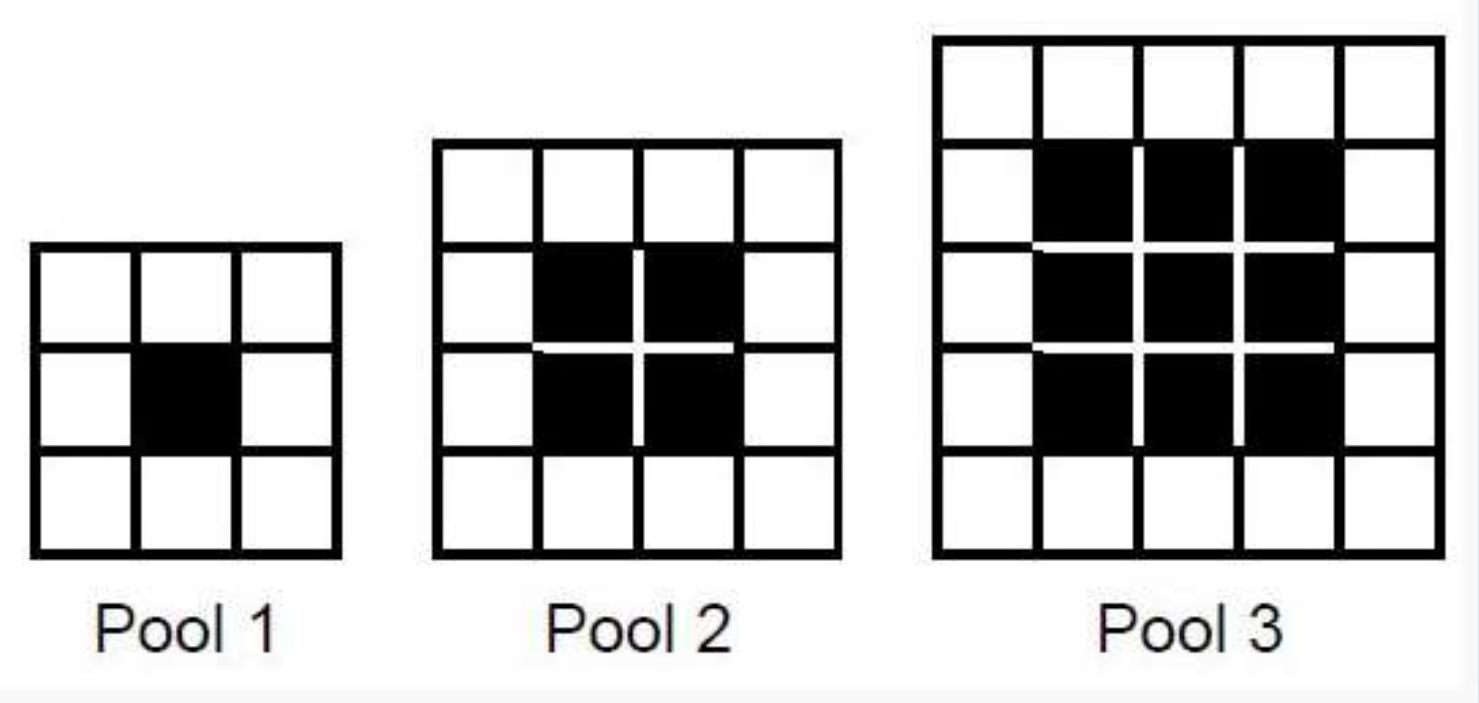
QUICK COUNT

What did you NOTICE?

Day 150

How many do you see?

What counting shortcut did you use?



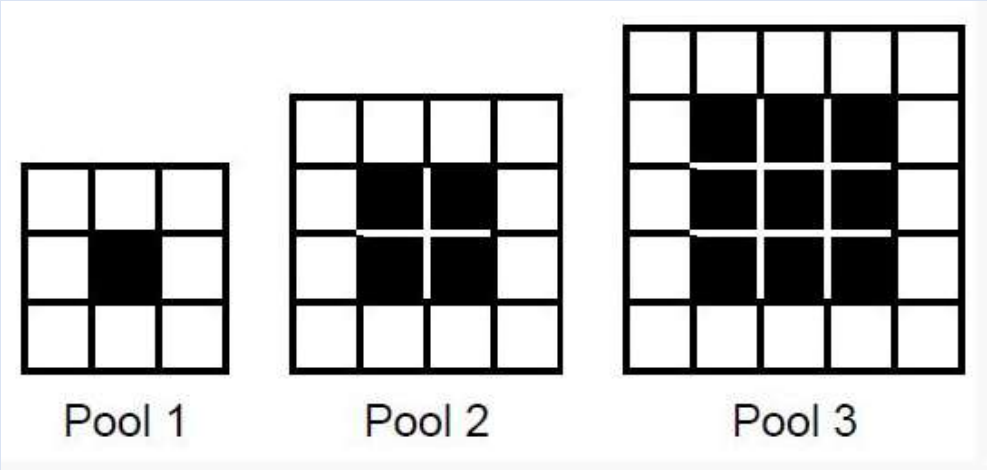
QUICK COUNT

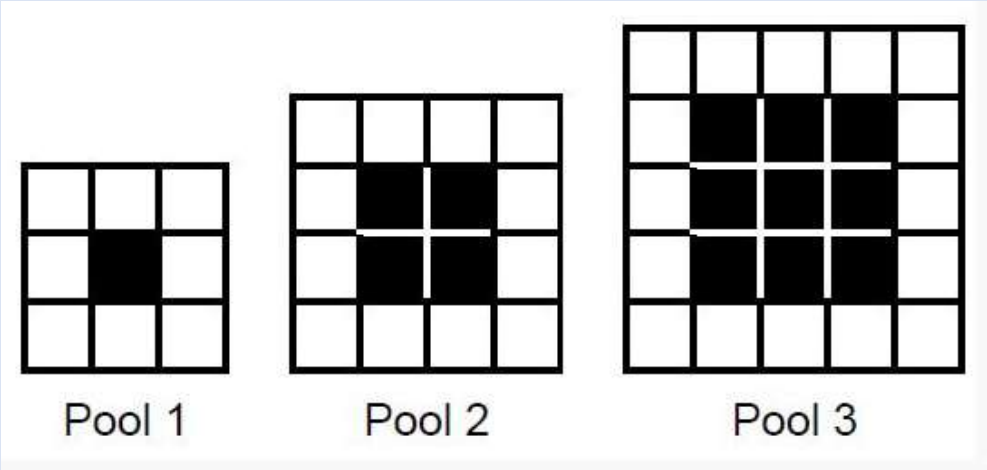
I noticed ____ so I _____

(They) noticed ____ so they___

Day 150

QUICK COUNT





Day 150

Reflect

What was mathematically important?

QUICK COUNT

Day 151

3.5 + 3.5 x 10
10 x (3.5 + 3.5)
12.56 x 100 + 50
50 + 12.56 x 100

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

Order of Operations

- Students should understand that expressions in the group should be solved prior to working with that value and operations outside of the parentheses
- 3.5 + 3.5 x 10 = 3.5 + 35 = 38.5
- 10 x (3.5 + 3.5) = 10 x 7 = 70 notice that the solution is different than the first because Order of Operations requires that the multiplication operation is completed before addition UNLESS the addition/sub is in a grouping, as it is in this second example
- 12.56 x 100 + 50 = 1256 + 50 = 1306
- 50 + 12.56 x 100 = 50 + 1256 = 1306 notice that these last two have the exact same solution because there is no grouping symbol to force us to add first. In both cases, we must multiply first before we complete the addition operation.

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 in the mathematics world, there is an agreed upon order for solving expression to the find the solution. Anything that is in a grouping (parentheses, exponential terms, the denominator or the numerator of a fraction, etc. is simplified to a digit value before proceeding to operations outside of the group. Also, all multiplication and division expressions are calculated BEFORE all addition and subtraction calculations unless the +/- is within a group.

NUMBER TALK

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3.5 + 3.5 x 10

Day 151

NUMBER TALK

5.OA.A.1

Day 152

Esti-Mystery

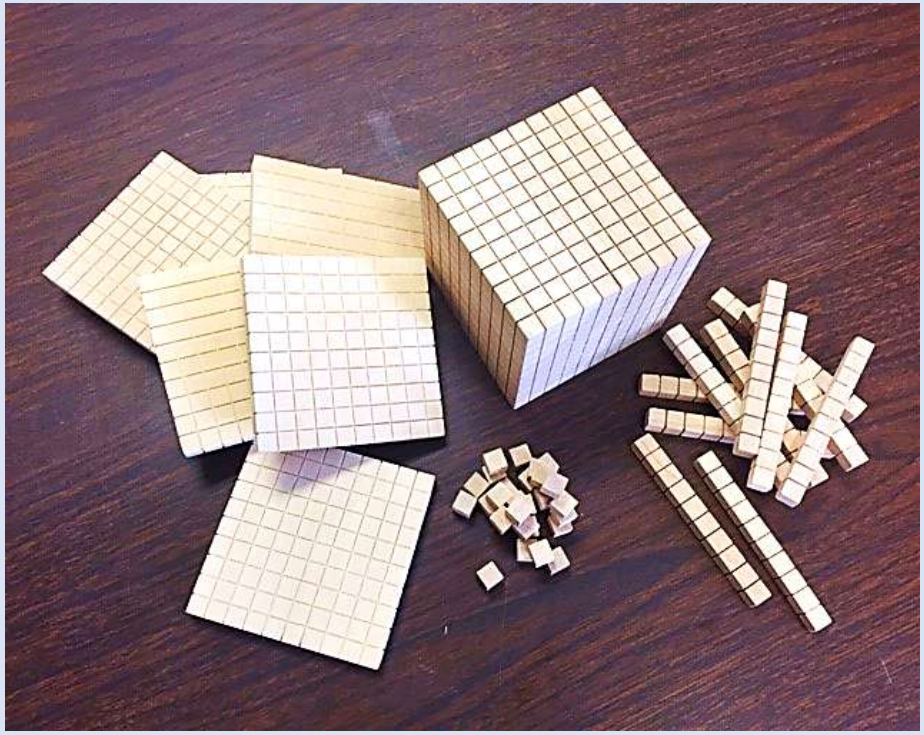
Estimation Activity with clues!

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.

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.

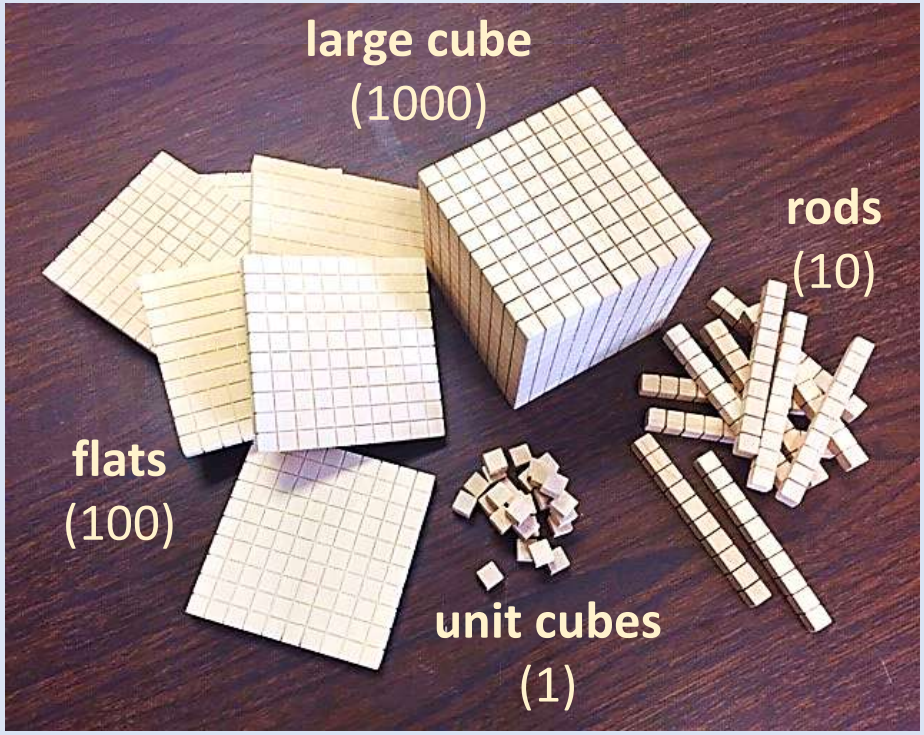
Students may benefit from using paper and pencil to work through possibilities or consider creating a class chart where possibilities are added and crossed off as each clue is revealed.

ESTIMATION



What number do these Base Ten Blocks represent?

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.



Clue #1

The large cube is worth 1000

Clue #2

The total value is < 2000

Clue #3

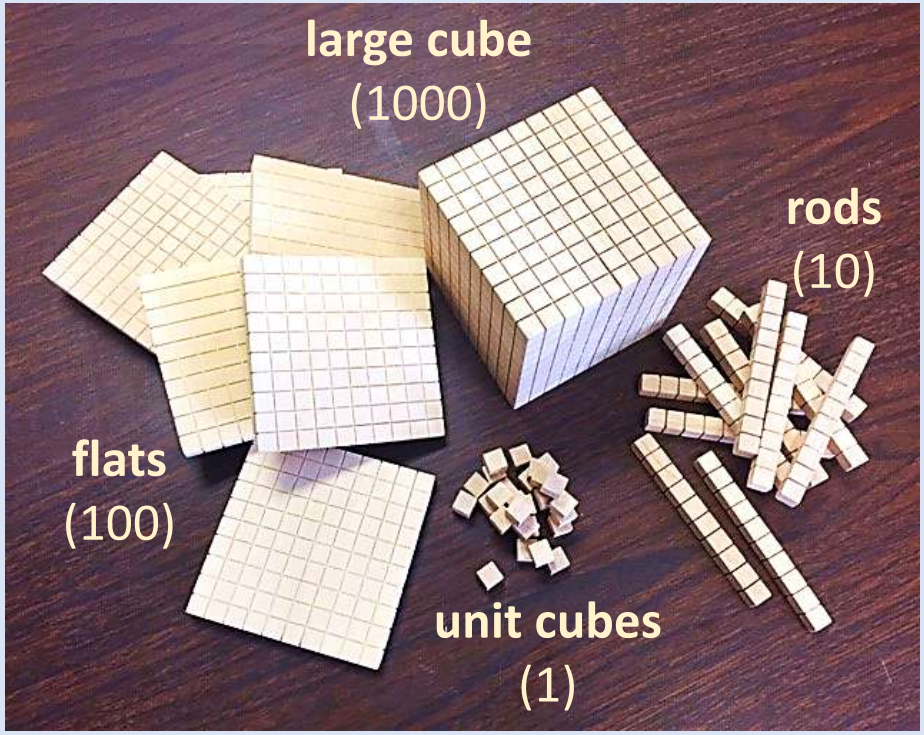
The sum of the flats is 3/5 the value of the large cube

Clue #4

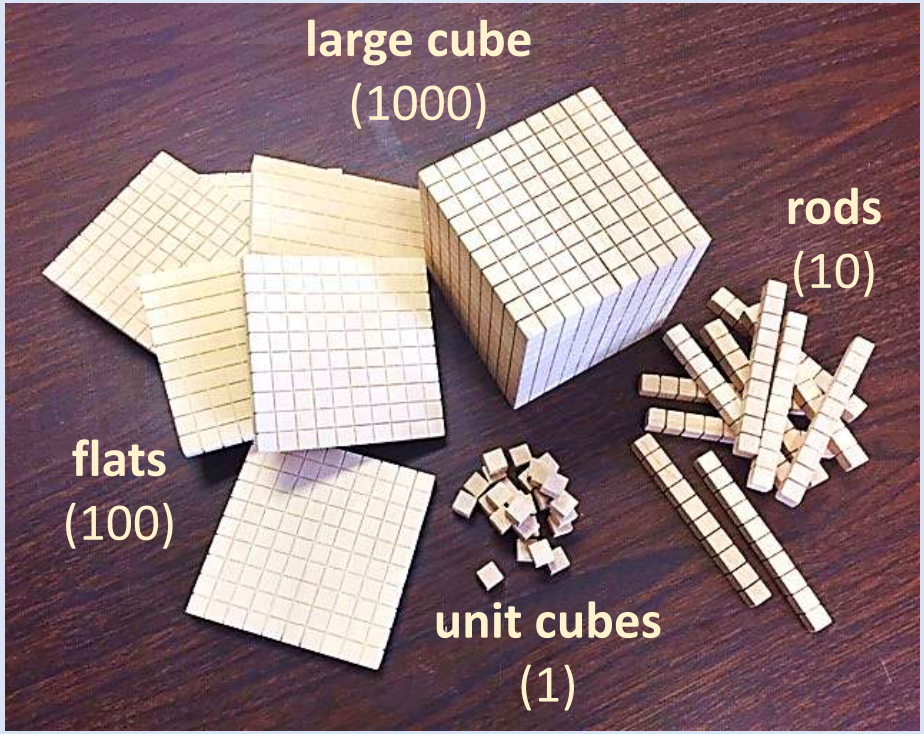
The sum of the pile of rods equals $1\frac{1}{10}$ of a flat

Clue #5

There are 29 unit cubes



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



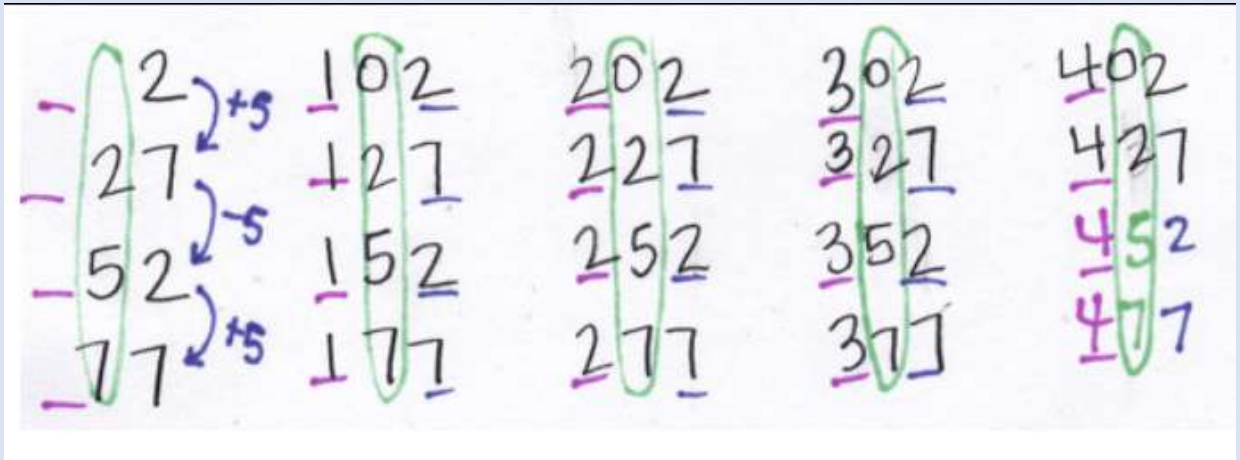
The Reveal
Click to see the answer.

Day 153

TEACHER NOTES – Use the next page with students

Say: Today we are going to count forward by 25.
It might sound pretty simple but we are going to start from the number 2 instead of zero, so you'll have to really think about place value and look for patterns that will emerge. When we get to 477 (!), we'll stop counting and look for some patterns the occurred from counting by 25s.

CHART the count on the next slide or on a piece of chart paper.



CHORAL COUNTING

CALVERT COUNTY PUBLIC SCHOOLS

Skip-Counting by 25s

What strategies are you using to know the next number?
What patterns do you see?

2				
27				

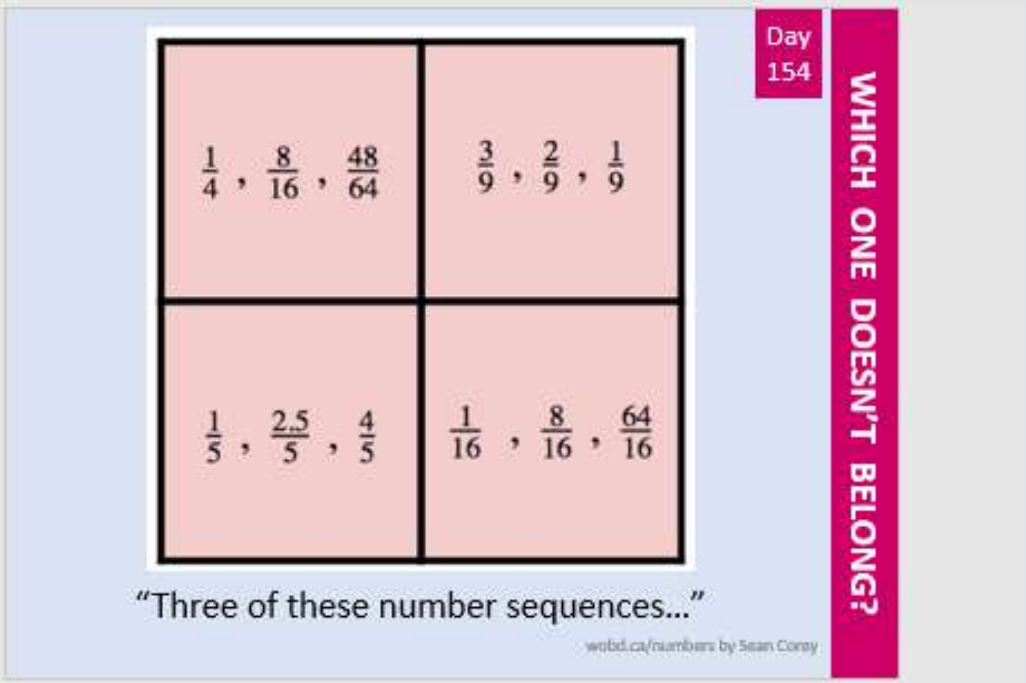
Day 153

CHORAL COUNTING

5.OA.B.3

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 number sequences have common denominators. Set A does not have a sequence that uses common denominators.
- Three of these number sequences increase in value. Set B has a sequence of numbers that does not increase in value.
- Three of these number sequences use whole numbers in the numerator and denominator. Set C does not use just whole numbers.
- Three of these number sequences show only fractions with a value that is less than 1. Set D has a fraction with a value greater than 1.

Day 154
WHICH ONE DOESN'T BELONG?

Day 154

WHICH ONE DOESN'T BELONG?

$\frac{1}{4}, \frac{8}{16}, \frac{48}{64}$	$\frac{3}{9}, \frac{2}{9}, \frac{1}{9}$
$\frac{1}{5}, \frac{2.5}{5}, \frac{4}{5}$	$\frac{1}{16}, \frac{8}{16}, \frac{64}{16}$

"Three of these number sequences…"

Source: wobd.ca/numbers by Sean Corey

Day 155

8 meters by 6 meters by 4 meters
3.5 cm by 7 cm by 10 cm
5¼ inches by 9 inches by 4 inches

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

Calculating Volume – Multiplying 3 values efficiently

Possible reasonings:

- 8x6x4 --- 8x24 = 160+32=192 or 48x4=160+32=192
- 3.5x7x10 ---- 35x10=350 help students to see how we can efficiently eliminate the decimal by multiplying by the 10 first
- 5¼ x 9 x 4 ---- 21 x 9 = 180 + 9 = 189 help students to recognize that since the denominator was 4, we can eliminate the fraction by multiplying by the 4 first

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 recognize the shortcuts that may exist. Teach them to look for ways to multiply the fraction or decimal out by looking for places where they can multiply by 10 or multiply by the denominator value

NUMBER TALK

Day 155

Calculate the volume – Report solutions in cubic units
Think about **efficient ways to multiply** the 3 values

8 meters by **6 meters** by **4 meters**

NUMBER TALK

Day 156

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.

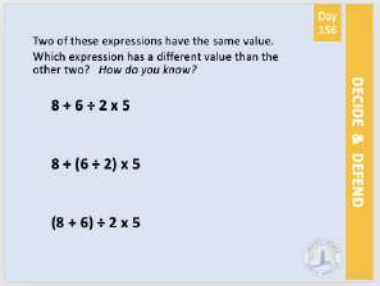
NOTE: This is the CCPS adaptation of the original Decide and Defend protocol

Use the NEXT SLIDE with students.

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

Day 156

DECIDE & DEFEND



The **last expression** with the parentheses around 8 + 6 will have a different solution than the first two expressions.

Note 1: Be careful not to write "run-on equations" (i.e. 8 + 6 = 14 ÷ 2 = 7 since 8 + 6 does not equal 7 as this run-on mathematical sentence leads you to believe)
Note 2: Order of Operations is a mathematical agreement that all mathematicians have about the order that operations of an expression are to be worked to allow for consistency in the language of numbers.

8 + 6 ÷ 2 x 5 We must solve the div/mult before any add/sub. We must work left to right solving the division before the multiplication in this case
8 + 3 x 5 First 6 ÷ 2, then multiply that value by 5
8 + 15
23

8 + (6 ÷ 2) x 5
8 + 3 x 5
8 + 15
23 In this case, the parentheses did not make a difference because the Order of Operations already requires us to divide first.

(8 + 6) ÷ 2 x 5
8 + 6 = 14 In this case, the parentheses required us to add first
14 ÷ 2 = 7
7 x 5 = 35 The final solution is impacted since we are adding 8 + 6 first. In the previous two, the 6 ÷ 2 is calculated first. The parentheses in the second example are unnecessary.

Day 156

DECIDE & DEFEND

Two of these expressions have the same value. Which expression has a different value than the other two? *How do you know?*

8 + 6 ÷ 2 x 5

8 + (6 ÷ 2) x 5

(8 + 6) ÷ 2 x 5

Day 156

Reflect on Learning

- What was mathematically important in the problem?
- What new math idea did you learn today?
- How do parentheses impact an expression?

DECIDE & DEFEND

The total is…

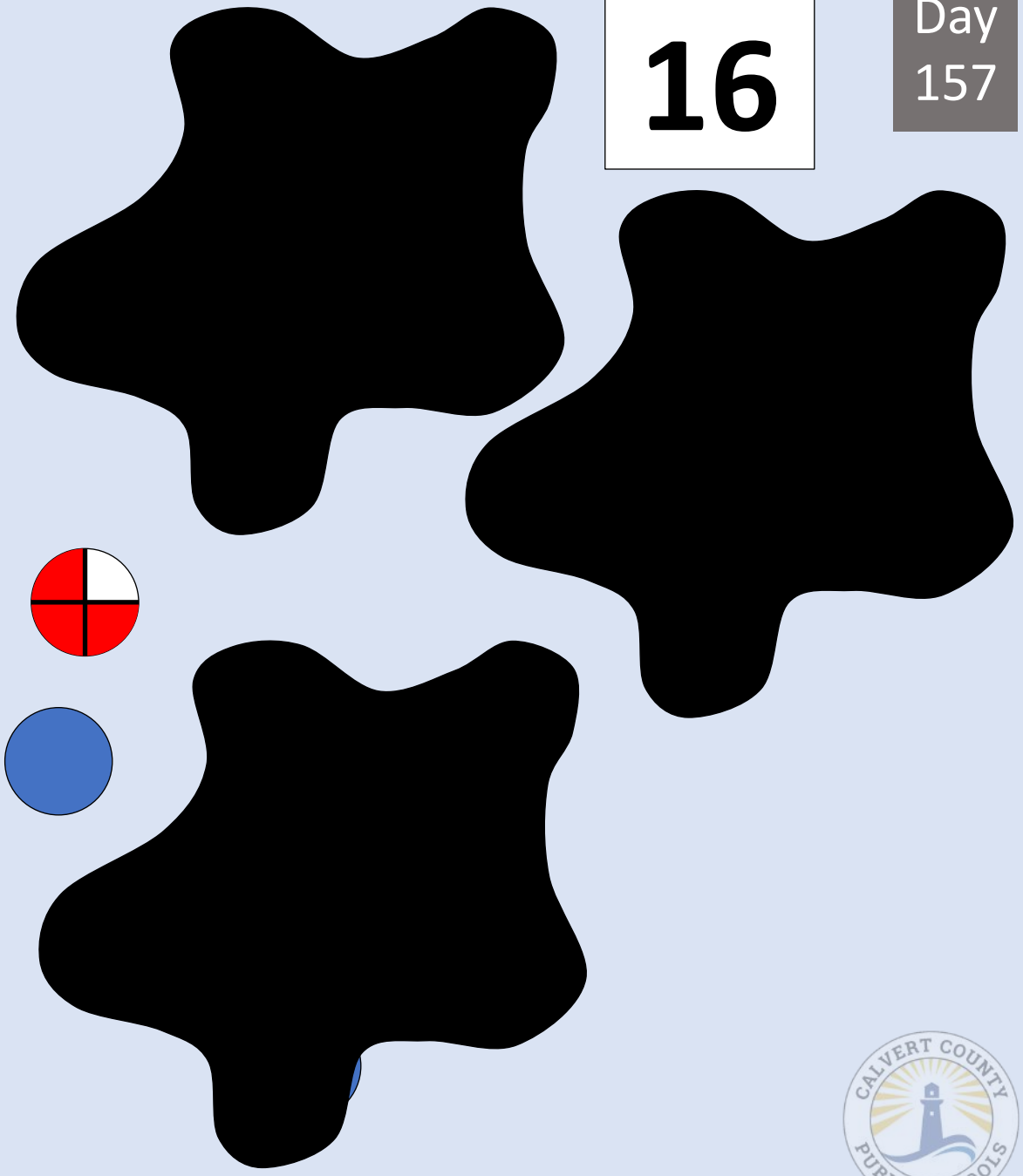
Splat!

What number is under each splat?

How do you

Let’s look under the splats to see what number is

What can we learn from this picture?



16

Day 157

SPLAT!

Day
158

QUICK COUNT

What do you notice?

Day 158

QUICK COUNT

What did you NOTICE?

Day 158

QUICK COUNT

How many blocks are stacked?

What counting shortcut did you use?

I noticed ____ so I _____

(They) noticed ____ so they___

Day 158

QUICK COUNT

Day 158

Reflect

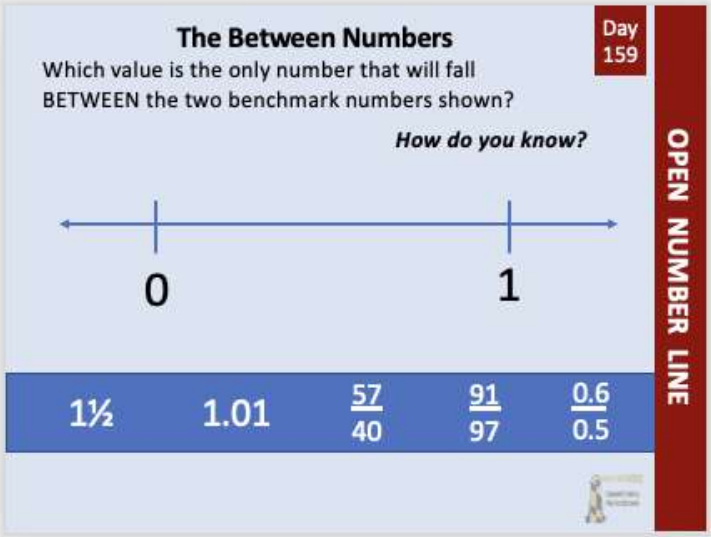
What was mathematically important?

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!



91/97 is the only value that is greater than 0 but less than 1. Students should be able to reason that the other fractions are greater than 1 since their numerators have a greater value than the denominators.

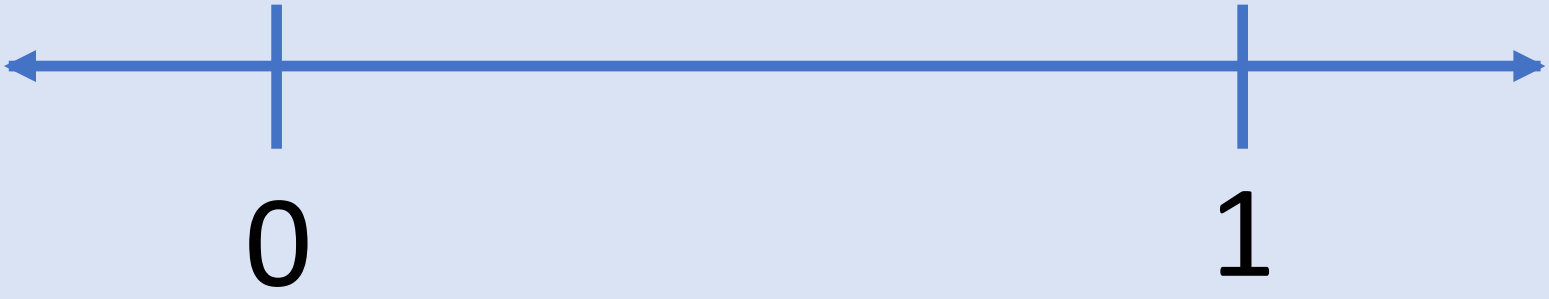
OPEN NUMBER LINE

The Between Numbers

Day 159

Which value is the only number that will fall BETWEEN the two benchmark numbers shown?

How do you know?



1½	1.01	$\frac{57}{40}$	$\frac{91}{97}$	$\frac{0.6}{0.5}$

OPEN NUMBER LINE

Day 160

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.

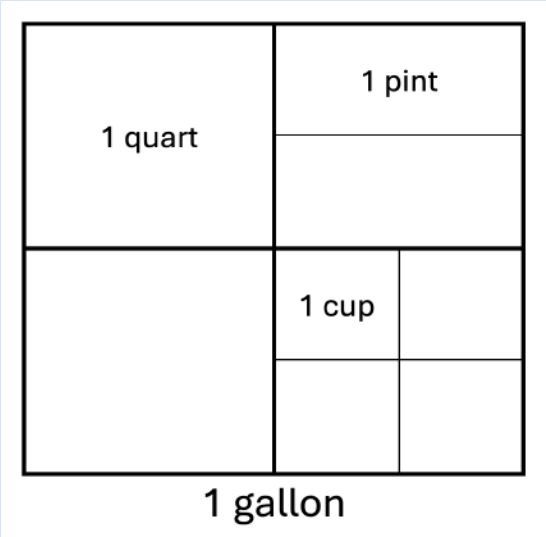
Possible Reasoning: *1 gallon is equal to 16 cups.*
If there were 3 full gallons, there would be 48 cups (16 x 3).
Since one of the gallons is about ½ full, it is holding about 8 cups instead of 16. The equation needed is 16 + 16 + 8 = 40 cups

ESTIMATION

Day 160

Which answer is

As Close as it Gets?



- 10 cups
- 16 cups
- 40 cups
- 48 cups

Each container can hold 1 gallon of soap. About how many cups of soap are shown?

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

ESTIMATION

5.MD.A.1