180 Days of
Number Sense Routines
Grade 2
Days 161-180

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.

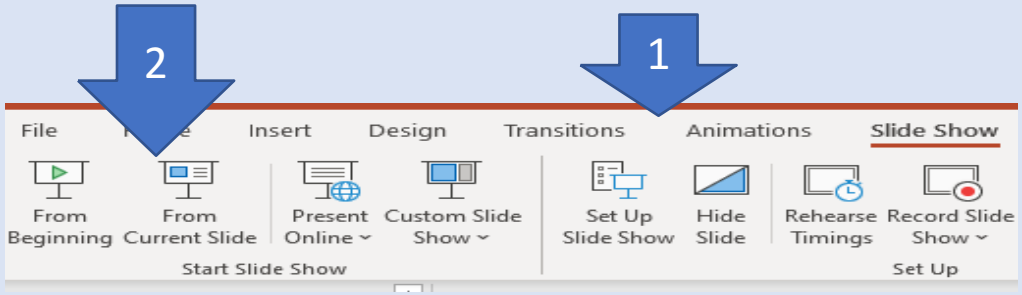
WHAT ARE THE CCPS IMPLEMENTATION EXPECTATIONS? Number sense routines have been developed for all 180 instructional days in grades 1-5. These routines are to be used every day, including early dismissal, late arrival, and field trip days. Because the routines do not require a specific order, it is permissible 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 161

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.

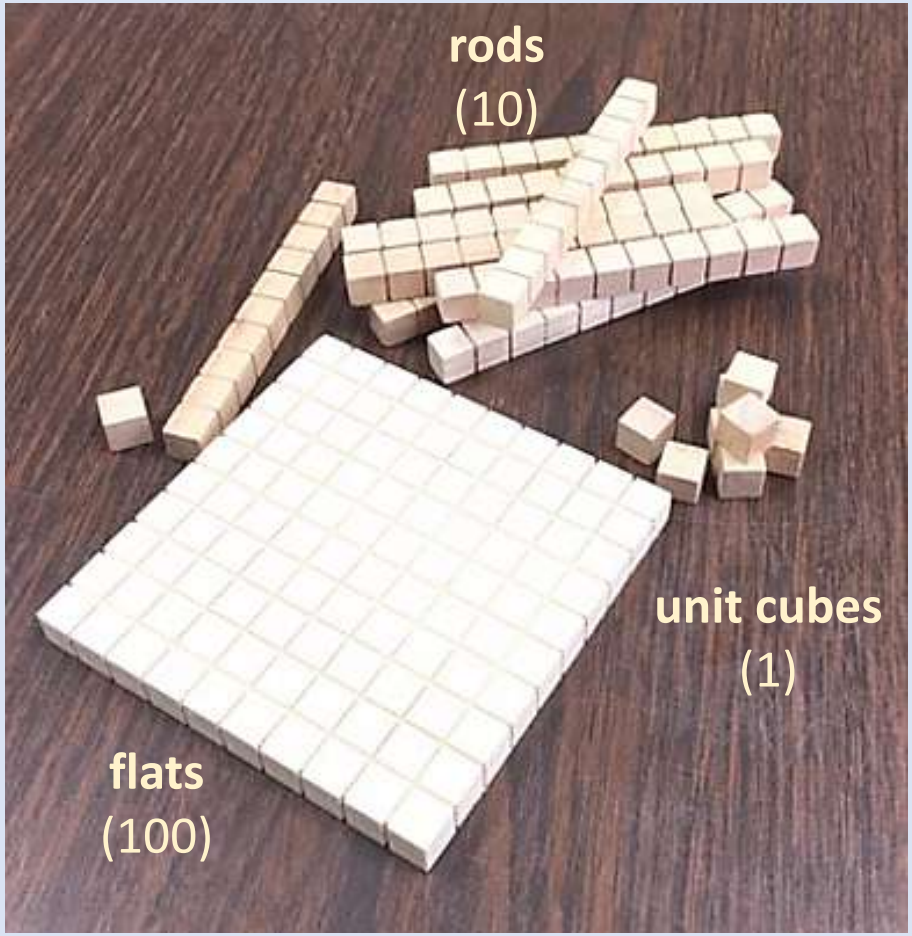
Students may benefit from using paper and pencil to work through possibilities or consider creating a class chart where possibilities are added and crossed off as each clue is revealed.

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.

2.OA.A.1
2.NBT.A.4



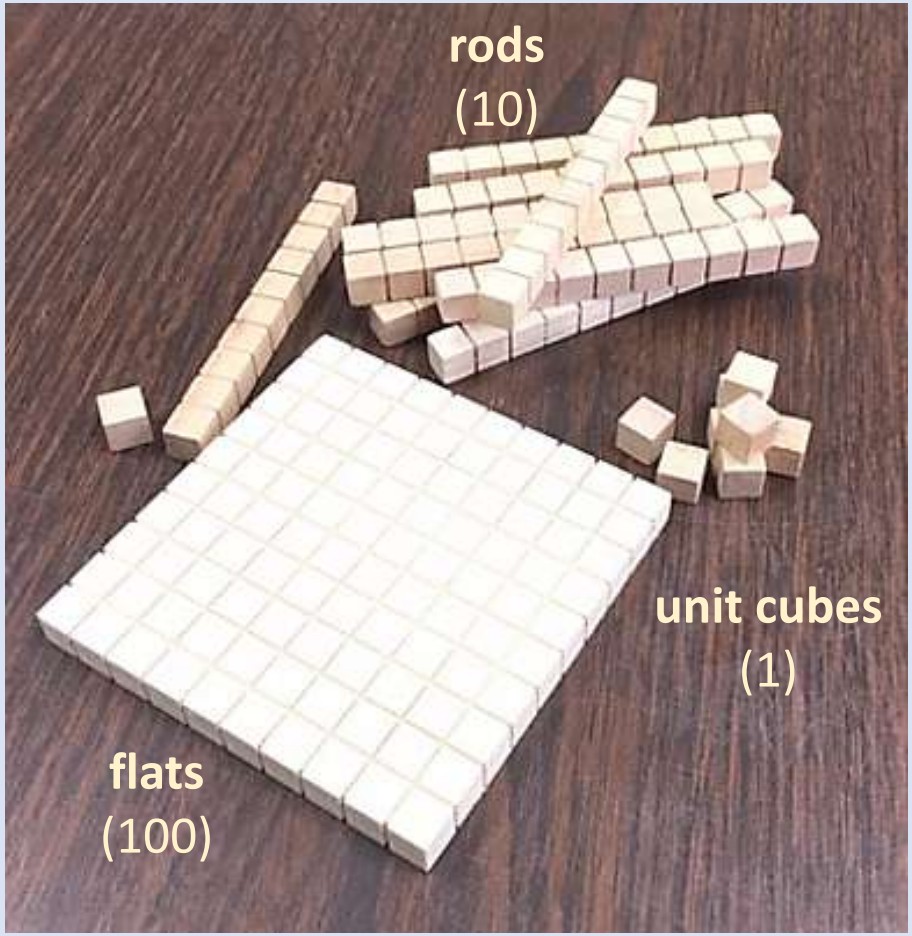
Clue #1
The large flat is worth 100

Clue #2
The rods are worth 10

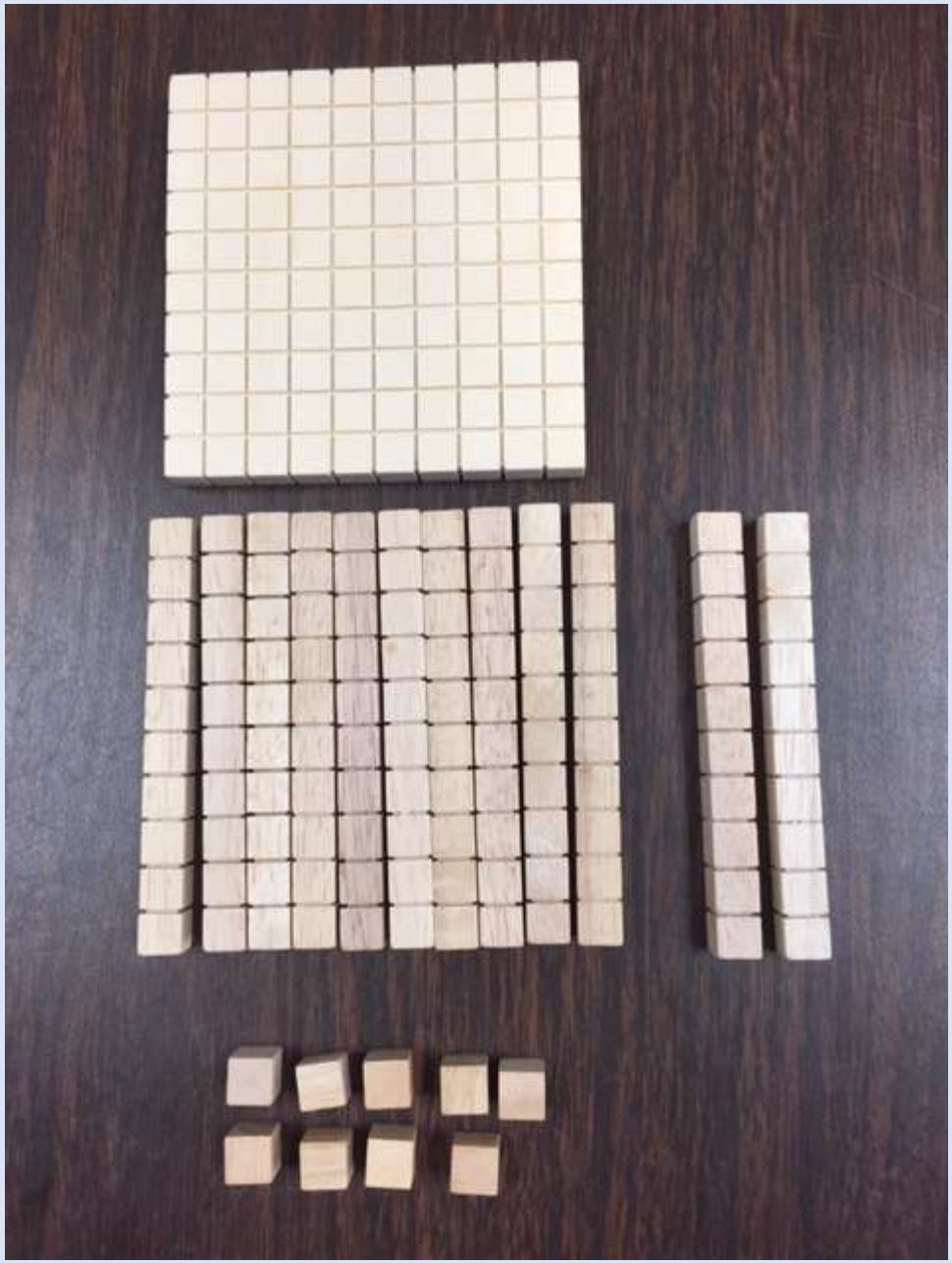
Clue #3
The total value is greater than 200

Clue #4
There are 12 rods

Clue #5
Some are stacked and hidden, but there are 9 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 162

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 162

DECIDE & DEFEND

The discussion should focus on efficient strategies for adding.

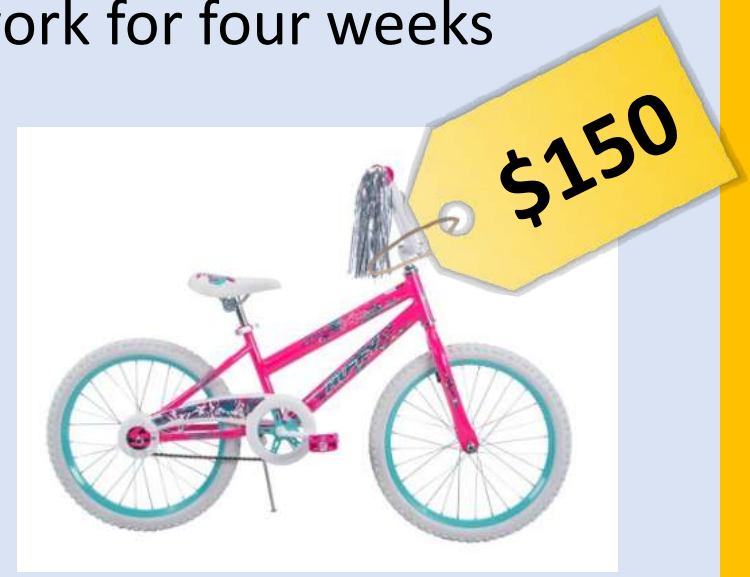
- 35+35 = 70 and 70+70=140 because 7 tens and 7 tens equals 14 tens
- 3 tens + 3 tens + 3 tens + 3 tens = 12 tens = 120 and then 5 + 5 + 5 + 5 = 20, so 120 + 20 = 140
- Some students may add 40s then subtract 5s like this: 40 + 40 = 80 and 80 + 80 = 160 but 160 – 20 = 140

Elena will NOT have enough money. She will have $140 but she needs $150, so she needs $10 more.

Day 162

What question is being asked?
How can you begin building understanding?

Elena gets $35 every Saturday for helping her aunt. Elena says that she will need to work for four weeks to buy a new bicycle.



Will Elena have enough money in four weeks?

35 + 35 + 35 + 35

What strategy can Elena use to find the total amount of money she has?

Does she have enough money to buy the bike?

DECIDE & DEFEND

2.MD.C.8
2.NBT.B.6

Day 162

Reflect on Learning

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

DECIDE & DEFEND

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.

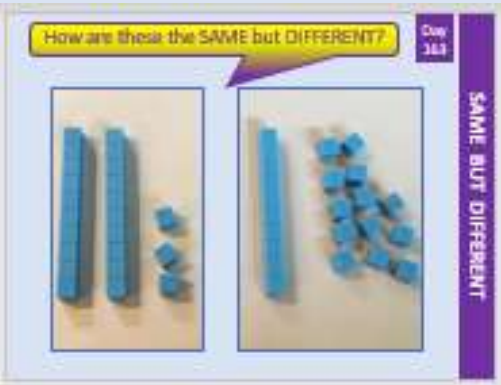
CALVERT COUNTY PUBLIC SCHOOLS

Day 163

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….”



SAME:

- Both have a value of 23
- Both use Base Ten Rods and Unit Cubes
- Both have at least 1 ten rod
- Both have at least 3 unit cubes

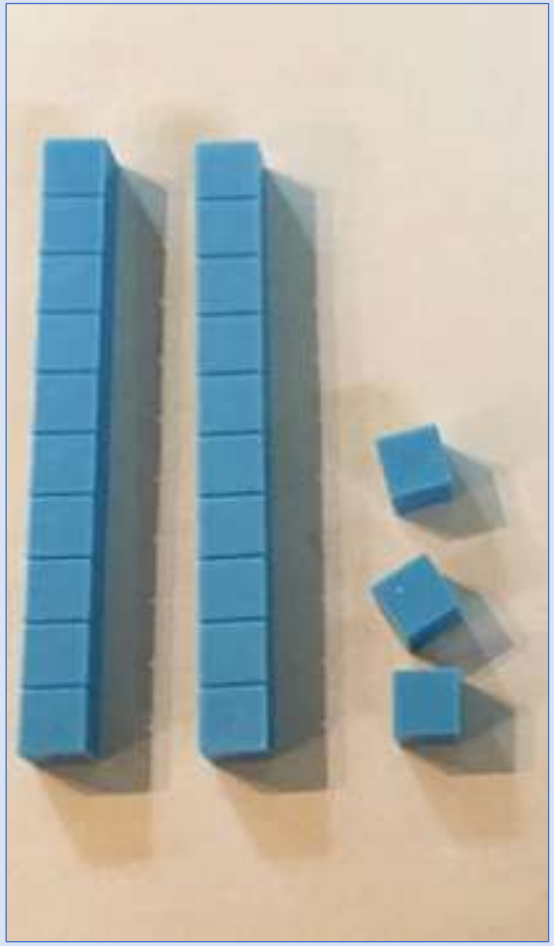
DIFFERENT

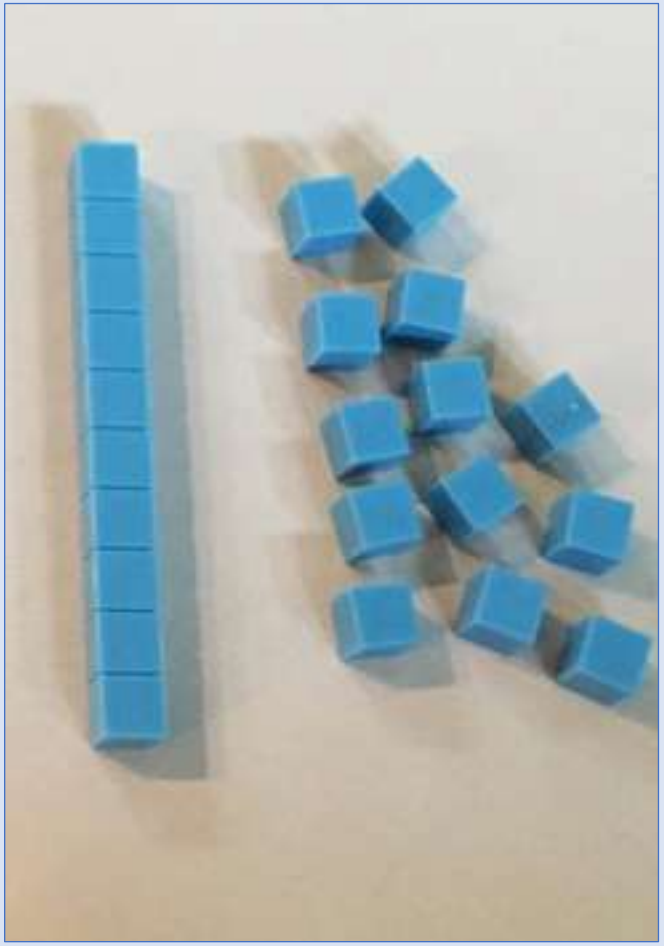
- The first is 20 + 3 while the second is 10 + 13
- The first has 2 tens and 3 ones while the second has 1 ten and 13 ones

SAME BUT DIFFERENT

How are these the SAME but DIFFERENT?

Day 163





SAME BUT DIFFERENT

2.R.1
1.OA.A.1
1.OA.C.6

COUNTING by 10s

Day 164

CHORAL COUNTING

SAY:
Today, we are going to count all together. We will be counting slowly so I can record the numbers we say. When we are done counting, we will look at the chart of numbers we made and will look for patterns.

We are going to skip count by 10s. BUT we are going to ***begin with the number 57****. Are you ready?*

NOTE: Count slowly. Chart the numbers on the next slide as students choral count. Prompt students to keep pace with your writing speed to control the tempo of the counting.

CHORAL COUNTING by 10s

Day 164

				57					

- What patterns do you notice as we skip-counted by 10s?
- What other patterns do you notice?
- Why are those patterns happening?
- If we continue the chart, what number would come next?
- We started with 57. What number goes in the space just BEFORE 57?
- What number goes in the FIRST space on this chart? How do you know?
- Where would the number 10 go on this chart?
  (hint: It does not go on this chart at all. Discuss the reason why.)

CHORAL COUNTING

2.NBT.B.5

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
165

What do you NOTICE?

QUICK COUNT

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

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

Day 165

QUICK COUNT

What did you NOTICE?

Day
165

QUICK COUNT

How many do you see?

What counting shortcut did you use?

I noticed ____ so I _____

(They) noticed ____ so they___

Day 165

QUICK COUNT

Day 165

Reflect

What was mathematically important?

QUICK COUNT

Day 166

WHICH ONE DOESN'T BELONG?

Use the NEXT SLIDE with students.

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

Possible Responses:

- Three of these coin sets have 5 coins. Set A does not have 5 coins.
- Three of these coin sets are all the same type of coin. Set B is not the same type of coin.
- Three of these coin sets show some coins on heads and some on tails. Set C does not show the tails side of the coins.
- Three of these coin sets have a value of 50 cents. D does not have a value of 50 cents.

Day 166

WHICH ONE DOESN'T BELONG?

A

B

C

D

Three of these coin sets ….

2.MD.C.8

Day 167

52 – 20
52 – 19
41 – 29
152 – 48

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

Subtraction Using Compensation Strategies

Key Ideas:

- 52 – 20 students should be able to easily recognize the difference as 32 since no regrouping is needed
- 52 – 19 IF this were 52 – 20, it would be easy. We can compensate by thinking of the 29 as 30 (+1) and the 52 as 53 (+1). Because we increase both by 1, the difference (distance on the number line) remains the same. Some students may also use the equation prior to come to a solution of 33.
- 41 – 29 >>>>> Think 42 – 30 = 12 so 41 – 29 also equals 12
- 152 – 48 >>>> 154 – 50 = 104 so 152 – 48 also equals 104

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 how compensation can be used to change the number while keeping the distance the same yielding the same difference when subtracting.

NUMBER TALK

52 – 20

Day 167

NUMBER TALK

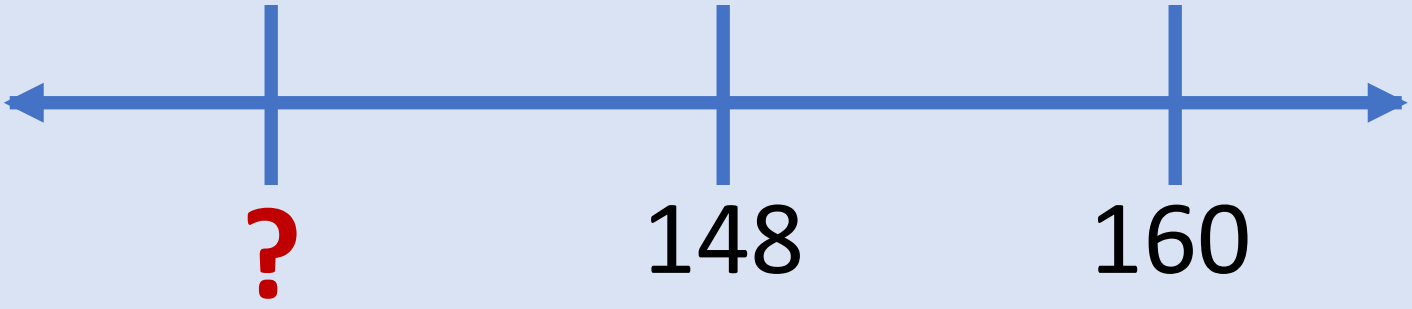
2.NBT.B.6
2.NBT.B.9

Day 168

What is the missing number?

How do you know?

How else could you know?



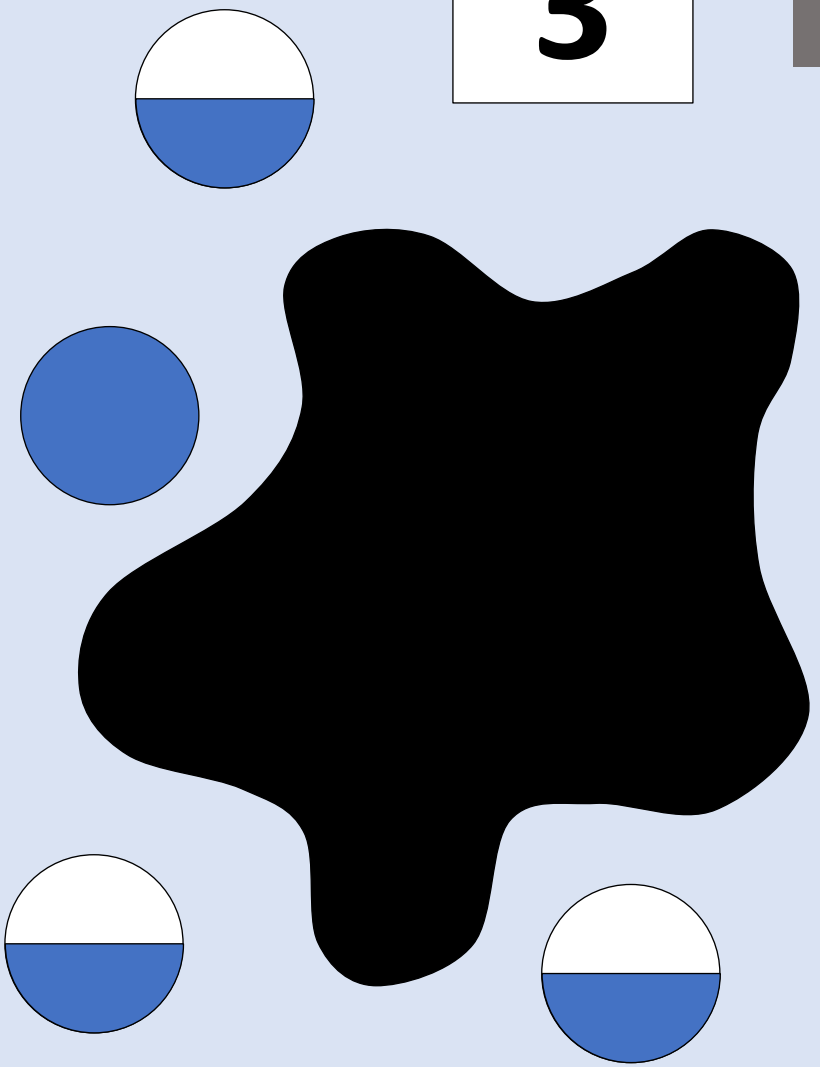
OPEN NUMBER LINE

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

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

Day 169

3



Based on the total value, what value must be hiding

How do you know?

How else could you know?

Let's look under the splat to see hiding.

What can we learn from this picture?

SPLAT!

Adapted from www.stevewyborney.com

2.G.A.2

Day 170

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 car may not be exactly 4 feet tall, but 4 inches would be much too small since 1 inch is the about the width of 2 fingers. One yard is about how far a child can stretch their arms out, so 4 yards would be much too tall for a lady and the car is shorter than the lady. Adult women, like the one in this photograph, are often a little taller than 5 feet tall. Since the car is a little shorter than the woman, the car is probably about 4 feet tall.*

ESTIMATION

How tall is the car?

Day 170

Choose the answer that is

As Close as it Gets

4 inches

4 feet

4 yards

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

ESTIMATION

2.MD.A.3

Day 171

57 – 20
57 – 29
51 – 30
51 – 27

NUMBER TALK

TEACHER NOTES

BEFORE

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DURING

Subtraction Using Compensation Strategies

Key Ideas:

- 57 – 20 ----- students should easily see that the difference is 37
- 57 – 29 ----- students can compensate 58 – 30 is the same distance since both were increased by 1 thus leaving the same distance as the original to = 28
- 51 – 30 ------ students should easily see the difference at 21
- 51 – 27 ------- students can use compensation to adjust (+3) 54 – 30 = 24

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 how compensation can be used to change the number while keeping the distance the same yielding the same difference when subtracting.

57 – 20

Day 171

NUMBER TALK

2.OA.C.4

Day 172

WHICH ONE DOESN'T BELONG?

Use the NEXT SLIDE with students.

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

Possible Responses:

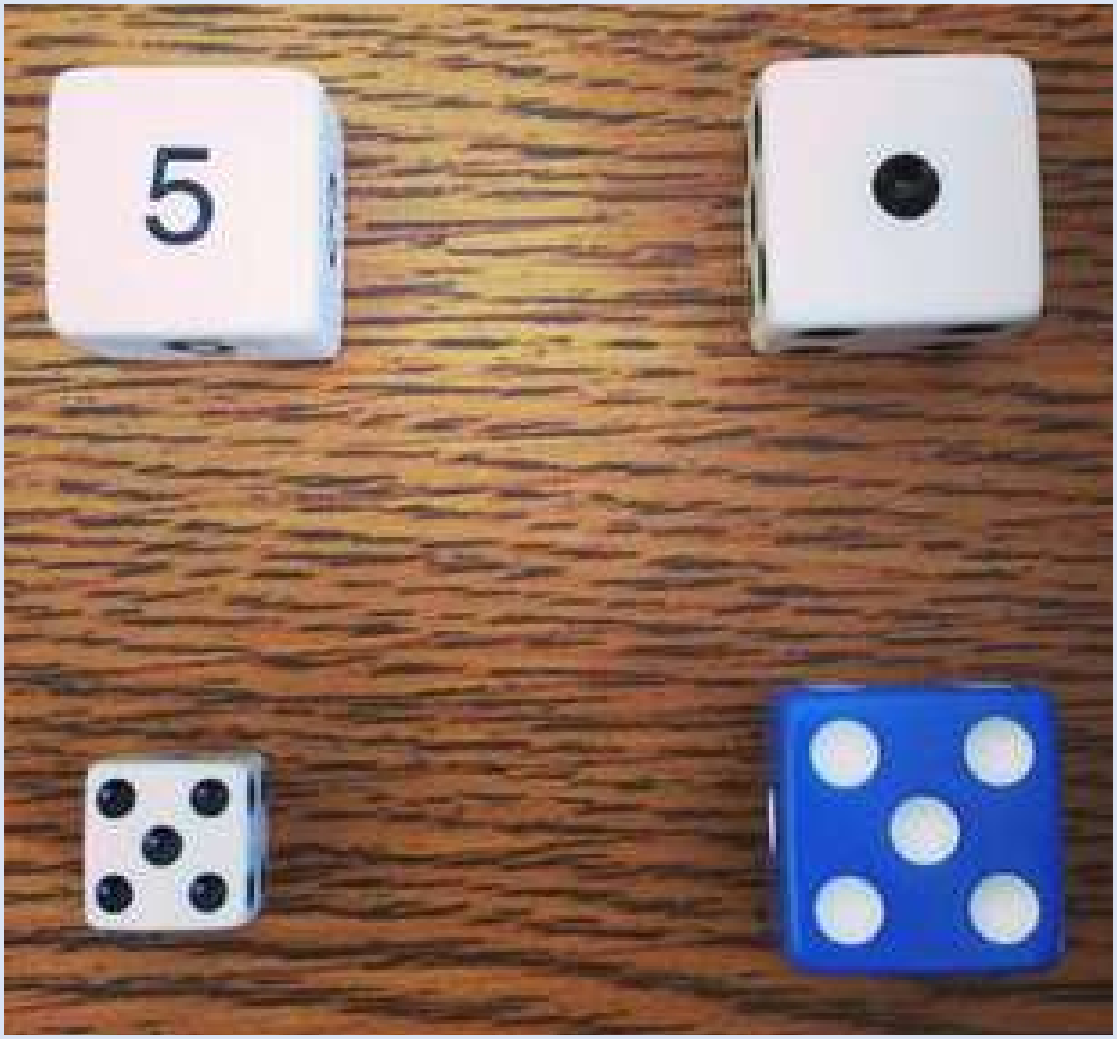
- Three of these dice have "pips" or dots. Dice A does not have pips, it has a number.
- Three of these dice represent the number 5. Dice B does not have a value of 5.
- Three of these dice are larger. Dice C is smaller.
- Three of these dice are white. Dice D is not white.

Day 172

WHICH ONE DOESN'T BELONG?

A

B



C

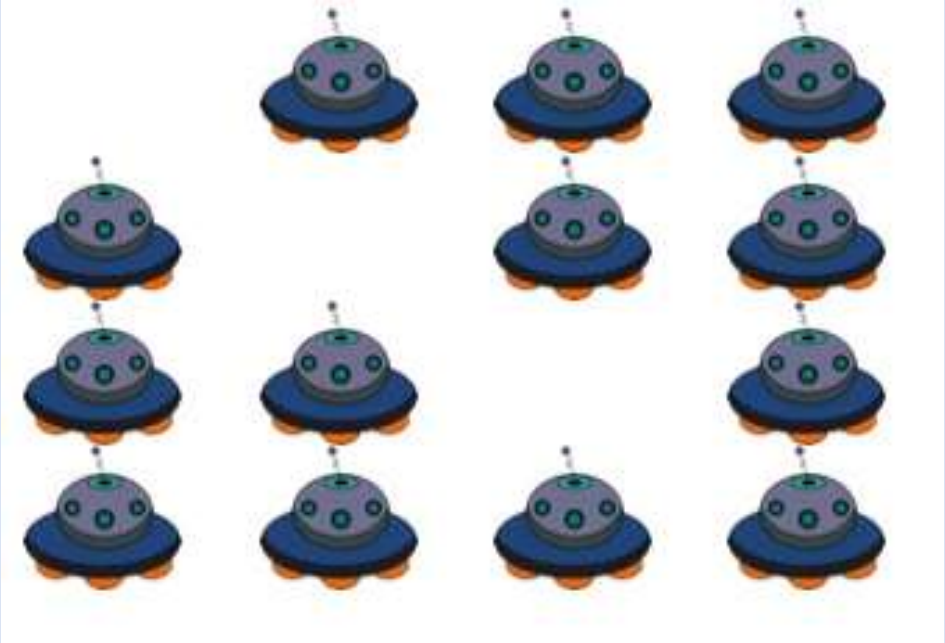
D

Three of these dice….

2.R.1
1.G.A.2
K.MD.A.2

Day
173

QUICK COUNT



What do you NOTICE?

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

2.OA.C.4

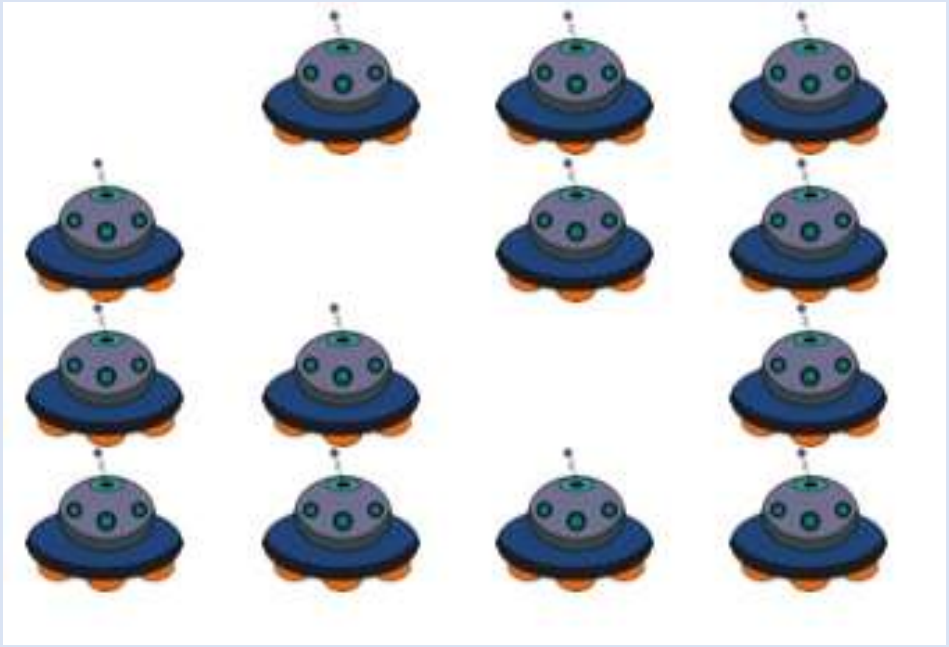
Day 173

QUICK COUNT

What did you NOTICE?

Day
173

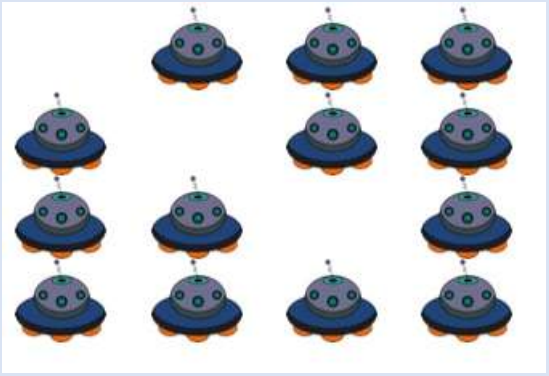
QUICK COUNT



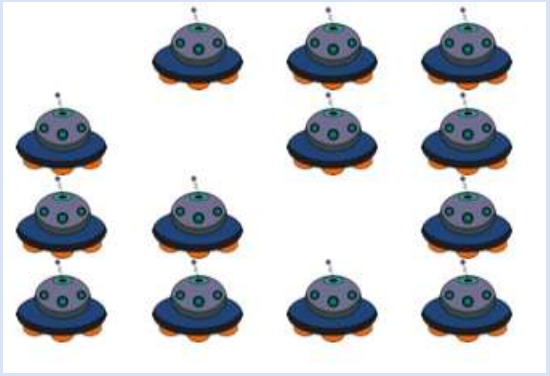
How many do you see?

What counting shortcut did you use?

I noticed ____ so I _____



(They) noticed ____ so they___



Day 173

QUICK COUNT

Day 173

Reflect

What was mathematically important?

QUICK COUNT

4 + 6 + 5 + 5
14 + 6 + 12
8 + 13 + 7 + 2
53 + 28 + 7

Day 174

NUMBER TALK

TEACHER NOTES

BEFORE

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DURING

Addition to make multiples of 10

Possible Responses:

- 4 + 6 + 5 + 5
  4+6 = 10 and 5+5=10, so 10+10=20 encourage students to look for efficient ways to make 10
- 14 + 6 + 12
  14+6 = 20 and then 20+12 = 32
- 8 + 13 + 7 + 2
  8+2 = 10 and 13+7 = 20 and then 10+20 = 30
- 53 + 28 + 7
  53+7=60 and then 60+28=88

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

Highlight the idea that we can make problems easier to solve by looking for efficient combinations to add, such as multiples of 10

Day
174

$4 + 6 + 5 + 5$

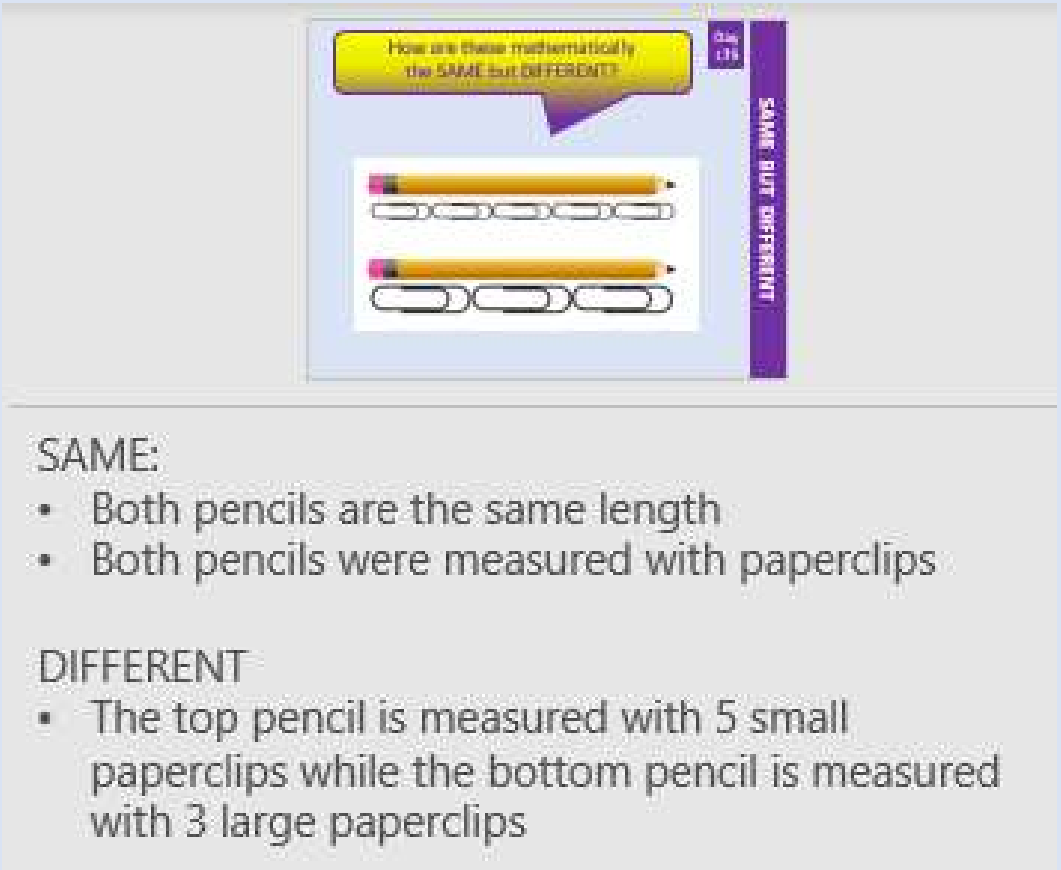
NUMBER TALK

2.OA.B.2
2.NBT.B.9

Use the NEXT SLIDE with students.

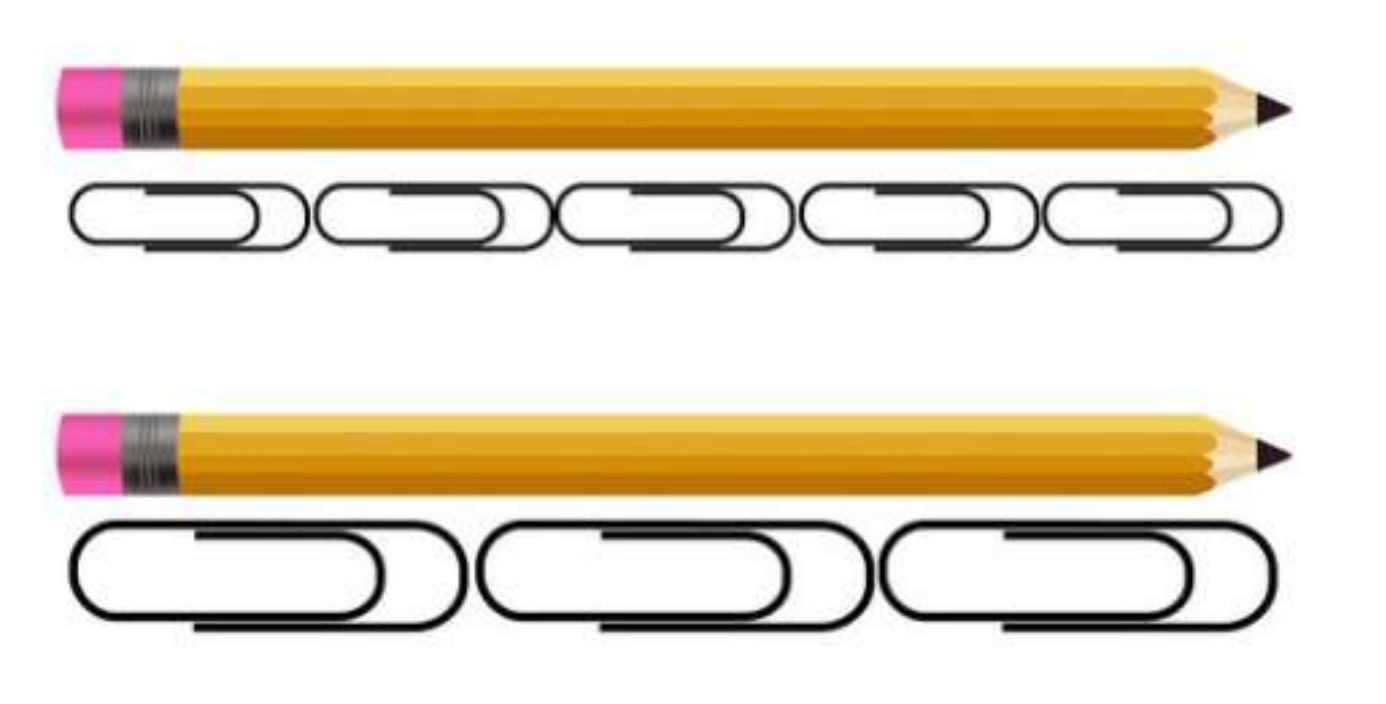
Here is are some possible responses. This list is not all-inclusive.
Additional ideas encouraged!

- 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….”



How are these mathematically the SAME but DIFFERENT?

Day 175

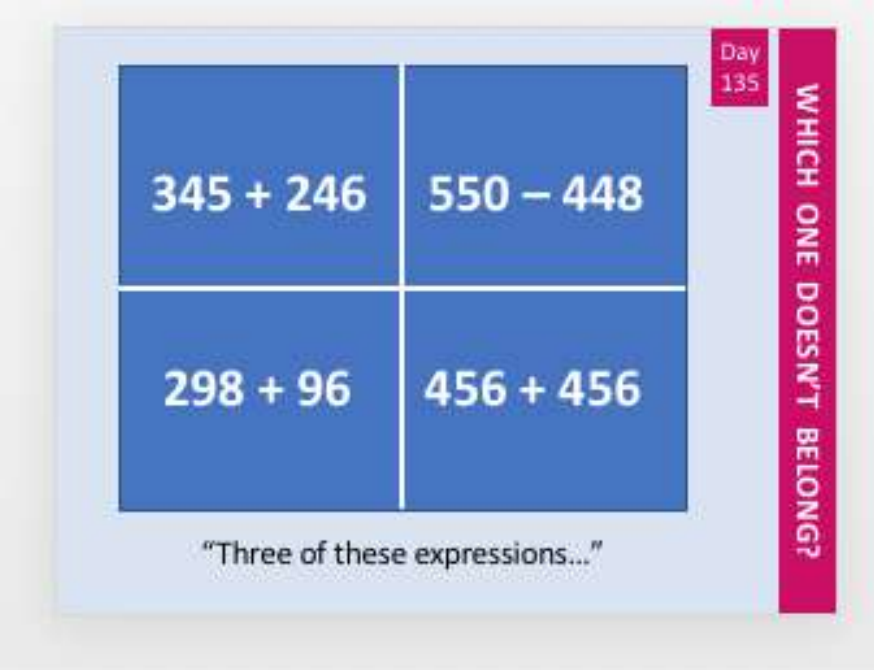


SAME BUT DIFFERENT

2.R.1
1.MD.A.1

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 expressions have two even numbers.
  345 + 46 is not two even numbers.
- Three of these expressions are addition expression.
  550 – 448 is not an addition expression.
- Three of these expressions have two 3-digit numbers.
  298 + 96 does does not have two 3-digit numbers.
- Three of these expressions have two different values.
  456 + 456 does not have 2 different values.

Day 176

WHICH ONE DOESN'T BELONG?

345 + 246	550 – 448
298 + 96	456 + 456

"Three of these expressions…"

2.NBT.A.1

Day 177

Estimation Activity

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

PROMPT 1: What is the total number of glass gems in all the bowls?
(Reveal answer BEFORE asking Prompt 2)

PROMPT 2: How many glass gems are in each bowl?
(Reveal answers and discuss one at a time)

ESTIMATION

2.OA.A.1

Day 178

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 178

DECIDE & DEFEND

Option 1 gives you $20
Option 2 gives you $24 – students may find this by skip-counting by 2's

IF a student recognizes that Option 2 is more money, but still believes that Option 1 is the better choice since you get it all today, then accept that response as correct since the point is for students to recognize that the amount of prize money will be different.

Day 178

You won 1st place in art contest!
You have two choices for the prize:

Option 1

Get **$20** today

Option 2

Get **$5** a day
each day for 5 days

Which choice is better? Explain.

DECIDE & DEFEND

2.MD.C.8

Day 178

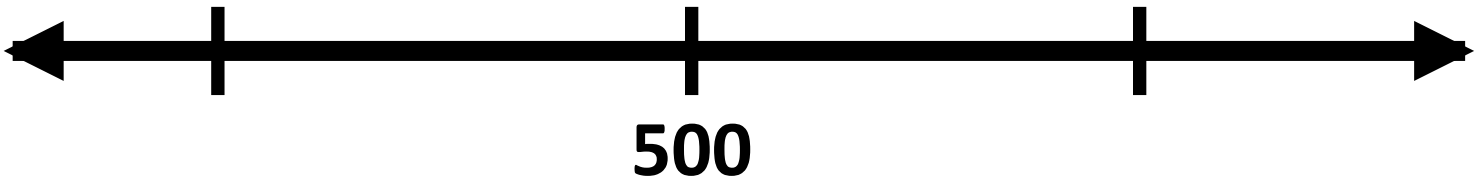
Reflect on Learning

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

DECIDE & DEFEND

Day 179

Would **562 – 59** be more or less than 500?
Use the number line to help justify your choice.



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

OPEN NUMBER LINE

2.NBT.B.7

540

Day 180

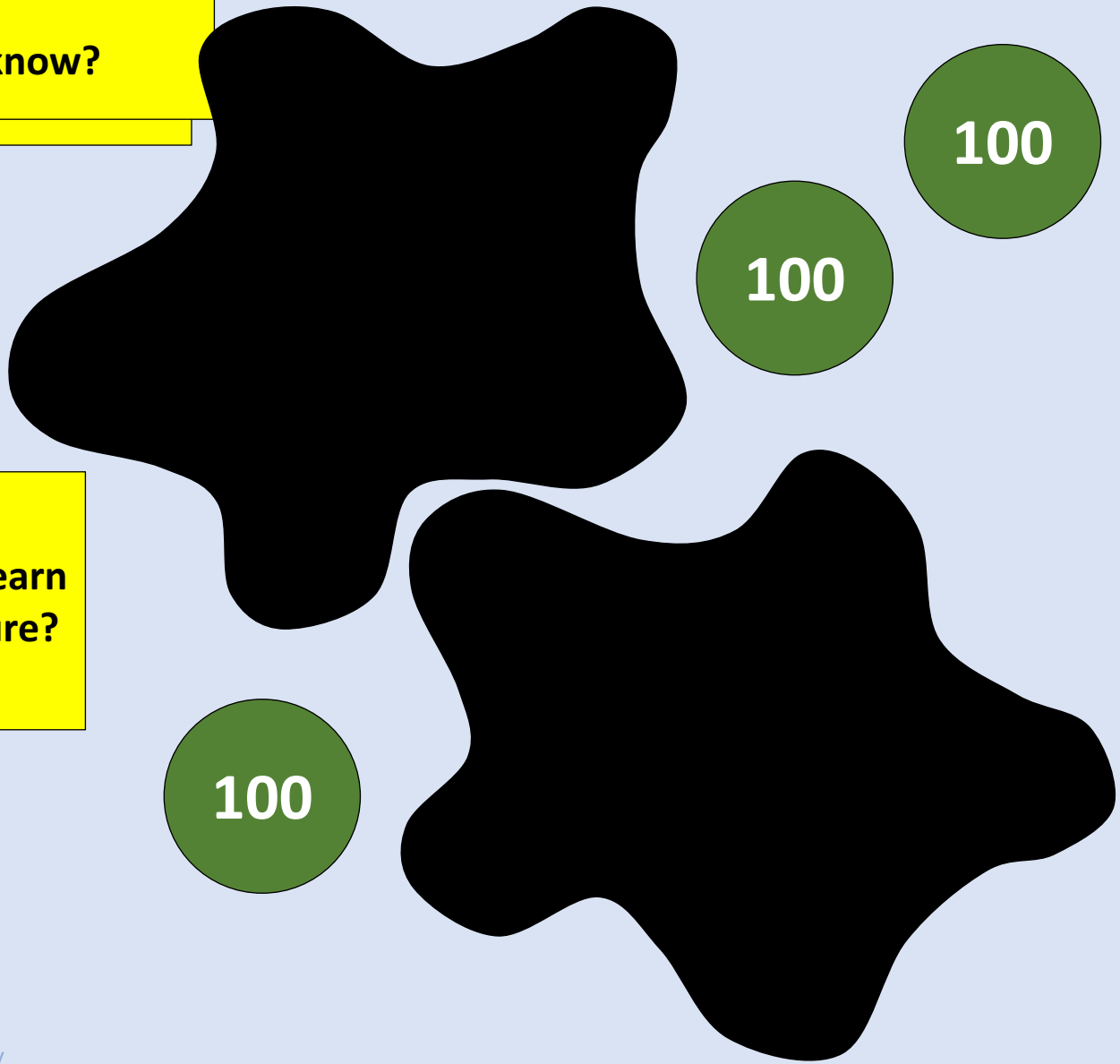
What value must be hiding?

How do you know?

actual value?

How else could you know?

What can we learn from this picture?



SPLAT!

2.NBT.A.2
2.NBT.B.7
2.NBT.B.8