180 Days of
Number Sense Routines
Grade 4
Days 101-120

Calvert County Public Schools

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 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.

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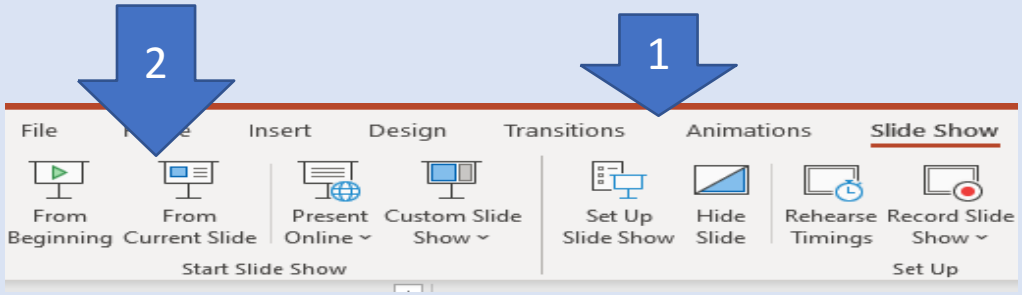
HOW TO RUN POWERPOINT IN SLIDE SHOW MODE:

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 borrowed OER materials. We have made our work available in Open Educational Resources so that others may benefit as we have. 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

Adding 3/8

Day 101

- For today's routine, let's **add three-eighths** (3/8).
  We'll begin with 3/8. What is 3/8 plus 3/8? (6/8)
- Use the next page to record the values as students count.
  Remind students that we are counting ALL TOGETHER and they should count slowly (together!) so you can write the numbers on the chart.
- Encourage students to be on the lookout for patterns that are emerging.
- After writing 5 or 6 numbers**, stop** and ask students to consider any patterns they see emerging.

OPTIONS: You may write the numbers as values that are not mixed numbers and then evaluate mixed values in your post-discussion or you may count slowly with students giving the mixed number value as they count – don't worry if the count must be very slow to do it this way. As students count, record their numbers on the next page.

- Option A: 3/8, 6/8, 9/8, 12/8, 15/8 ….
  Then go back and discuss as mixed numbers
- Option B: 3/8, 6/8, 9/8 which would be 1-1/8, 1-4/8, 1-7/8, 1-10/8 which would be 2-2/8, 2-5/8, 3, 3-3/8, etc.

When finished counting, **discuss any patterns** they notice.

CHORAL COUNTING

Day 101

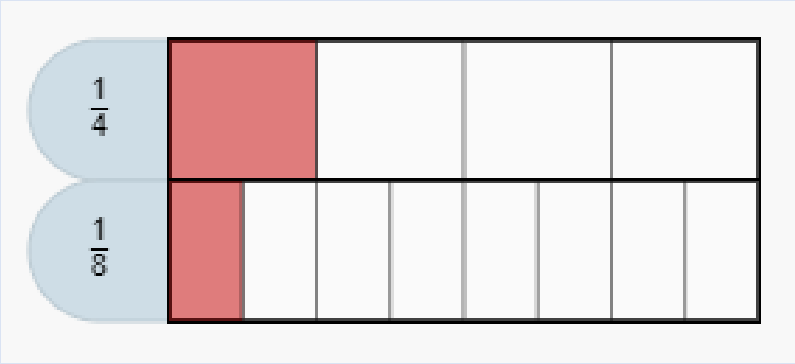
Adding 3/8

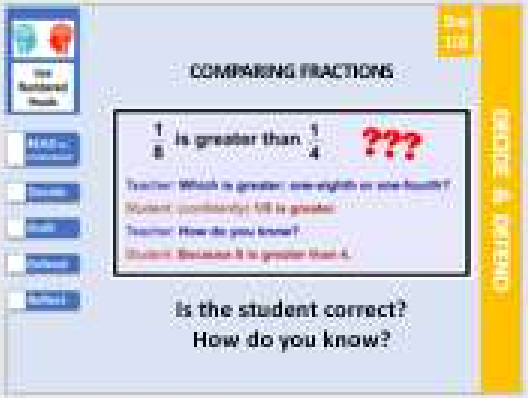
3/8	6/8		

CHORAL COUNTING

Day 102

Use the NEXT SLIDES with students.





Many students believe that 1/8 is greater than ¼ because 8 is greater than 4.
It is important to include a visual reference as evidence that ¼ is greater than 1/8.
Remember, the WHOLE being compared must to be the SAME size.
Use rectangular shapes, not circles – makes for easier side-by-side comparisons.
Discuss that as the whole is partitioned into more pieces, the pieces get smaller, so 1 out of 8 is a smaller piece than 1 out of 4 when the whole is the same.

>>> TRY: https://apps.mathlearningcenter.org/fractions/ to create fraction visuals like the one shown above.

DECIDE & DEFEND

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Use Numbered Heads

READ to Understand

Decide

Draft

Defend

Reflect

COMPARING FRACTIONS

Day 102

$\frac{1}{8}$ is greater than $\frac{1}{4}$???

Teacher: **Which is greater: one-eighth or one-fourth?**

Student: (*confidently*) **1/8 is greater.**

Teacher: **How do you know?**

Student: **Because 8 is greater than 4.**

Is the student correct?
How do you know?

DECIDE & DEFEND

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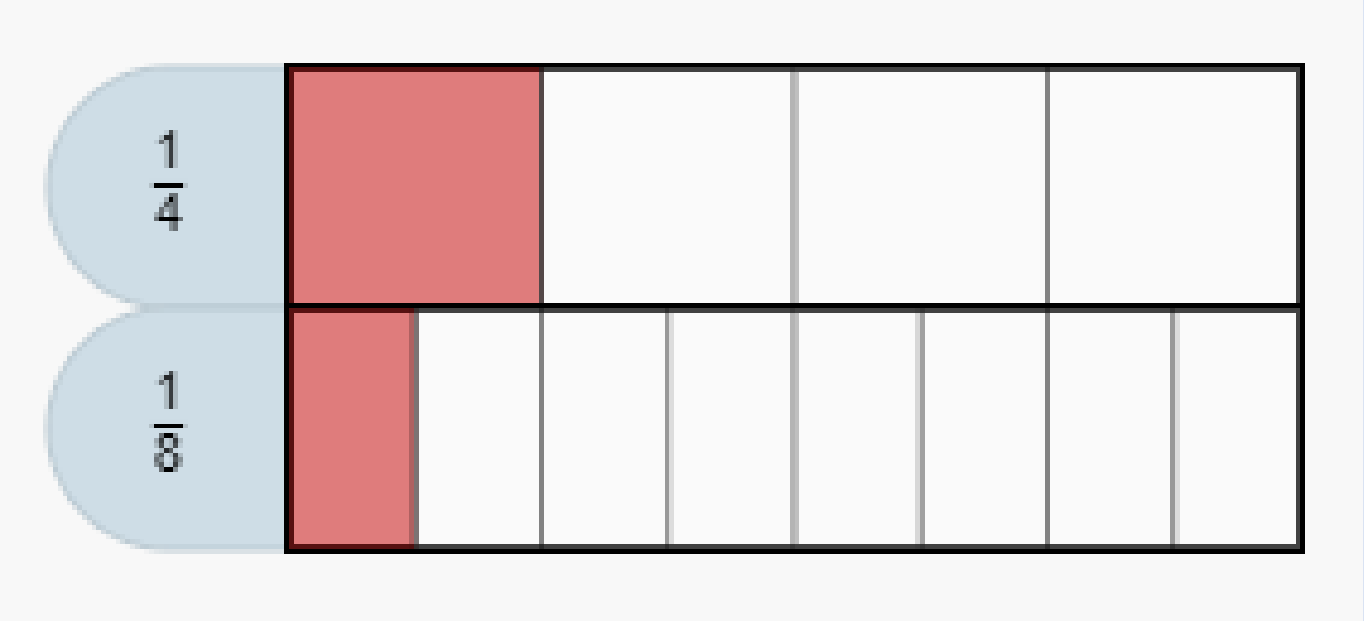
Day 102

Is $\frac{1}{8}$ greater than $\frac{1}{4}$?



DECIDE & DEFEND

This slide may be used as a visual to support your discussion with students

Day 102

Reflect on Learning

- A new math idea I learned today is….
- Next time I interpret someone else's work, I will…. *(ask myself, pay attention to,…)*
- When you are trying to convince someone of your mathematical ideas, it is important to….

DECIDE & DEFEND

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Day 103

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

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How many blueberries?

Suggestion: Allow students to use a 100 chart (either individual or within the group discussion) to keep track of possible solutions as each clue is revealed.

As the clues appear, use the information to narrow the possibilities to a smaller set.

Clue #1

There are between 50 and 75 blueberries in the jar

Clue #2

The number is a multiple of 3

Clue #3

6 is not one of the digits

Clue #4

It is an odd number

Clue #5

It is a multiple of 19

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

The Reveal
Click to see the answer.

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2 x 324
151 x 6
3 x 609

Day 104

NUMBER TALK

TEACHER NOTES

BEFORE

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

DURING

Multiplication – Partial Products

- The goal of today's Number Talk is for students to recognize that one efficient way to multiply numbers is to use the Partial Product method for multiplying.
- 2 x 324 = 2x300 + 2x20 + 2x4 = 600+40+8 = 648
- 151x6 = 100x6 + 50x6 + 1x6 = 600+300+6 = 906
- 3x609 = 3x600 + 3x9 = 1800+27 = 1827

Remember, students will come with a variety of strategies. 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

Bring students attention back to the strategies that were highly efficient. In this case, using Partial Products to mentally multiply these larger numbers works nicely.

Day 104

NUMBER TALK

2 x 324

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Day 105

OPEN NUMBER LINE

FRACTIONS on the NUMBER LINE

INITIAL PROMPT

- On a Post-It or other small piece of paper, **have each student write a fraction**.
- SAY: ***As you write your fraction, think about whether your fraction is greater or less than 1 whole. How do you know?*** Encourage discussion with partners.
- SAY: ***Consider whether your fraction is greater or less than ½. How do you know?*** Allow partner discussion before beginning the whole class activity with the slips of paper.

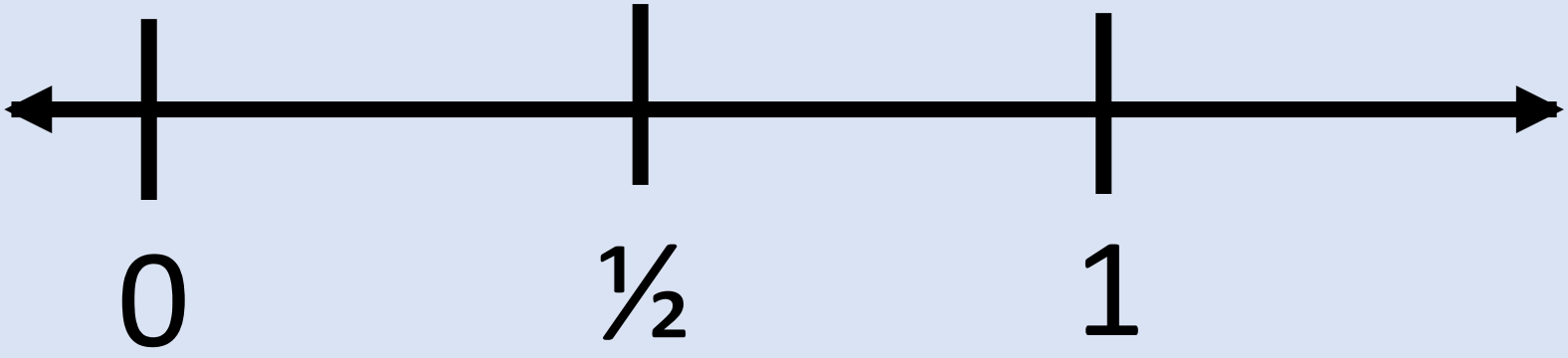
ACTIVE ENGAGMENT

The goal of this next part is to place fractions on the number line (use the next slide if desired). NOTE: With a whole class this could be chaos without the proper management.

- Begin by saying, "***I am looking for 2 fractions that would fall between 0 and ½***." Students will raise hands. Pick two and collect their slips of paper.
- Read each fraction one at a time and ask the class if the fraction meets the criteria of falling between 0 and ½. Be sure to have students provide the reasoning.
- Have students discuss which of the two would fall CLOSER TO ZERO and discuss the reasoning.
- Next ask for 2 fractions that fall between ½ and 1. Repeat the process described above.
- Finally, ask for 2 fractions that would be greater than 1. Repeat the process described above.
- If you wish to include a written component, have student teams write a paragraph or number line diagram where the remaining fractions within their group would fall on the number line AND the REASONING (remember, you only used 6 of the slips of paper from earlier).

Day 105

OPEN NUMBER LINE



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Directions for QUICK COUNT routines

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

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

Day 106

QUICK COUNT

What do you NOTICE?

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Day 106

QUICK COUNT

What did you NOTICE?

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Day 106

QUICK COUNT

How many spaces are filled?

What counting shortcut did you use?

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I noticed ____ so I _____

(They) noticed ____ so they___

Day 106

QUICK COUNT

Day 106

Reflect

What was mathematically important?

QUICK COUNT

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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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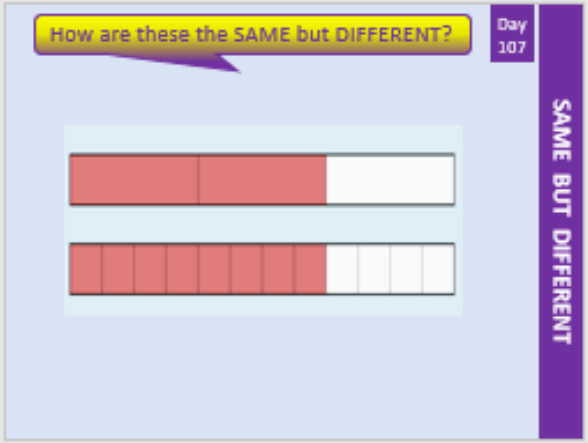
Day 107

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….”



Focus: Equivalent Fractions

Possible Responses:

- Both have the SAME size whole, but they are divided into a DIFFERENT number of parts
- Both have the SAME amount of the whole shaded, but one has 2 parts shaded, the other has 8 parts shaded
- Both represent 2/3 of the whole shaded.
- Both have 1/3 unshaded. One is 1 out of 3; the other is 4 out of 12

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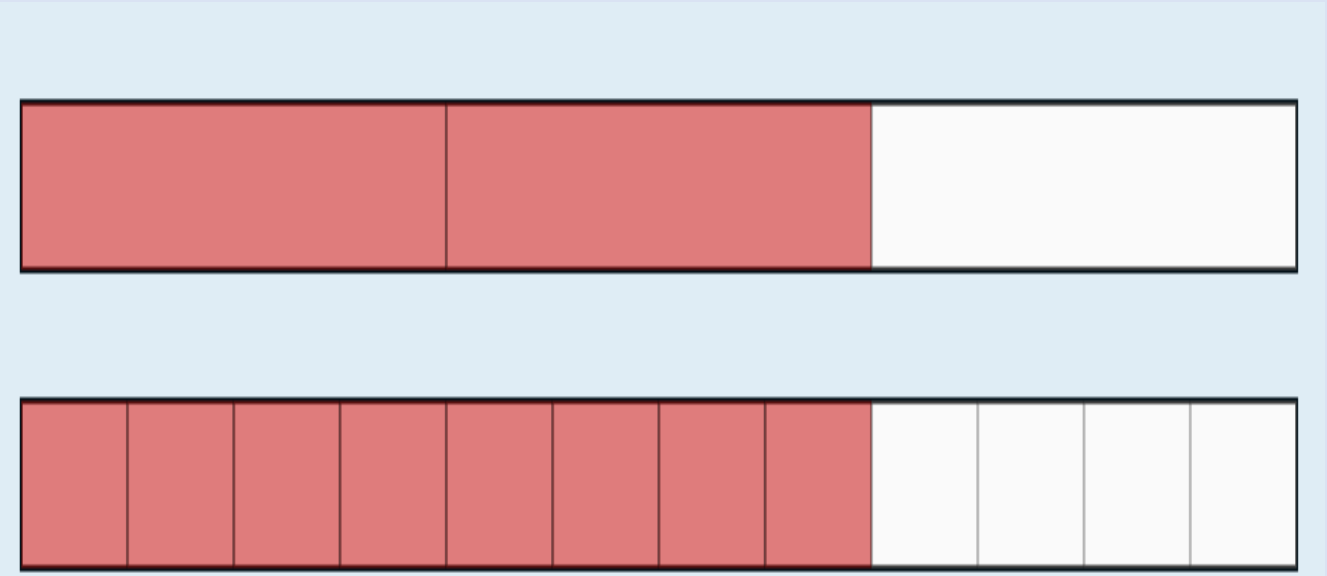
SAME BUT DIFFERENT

How are these the SAME but DIFFERENT?

Day 107



SAME BUT DIFFERENT

Day 108

SPLAT!

14

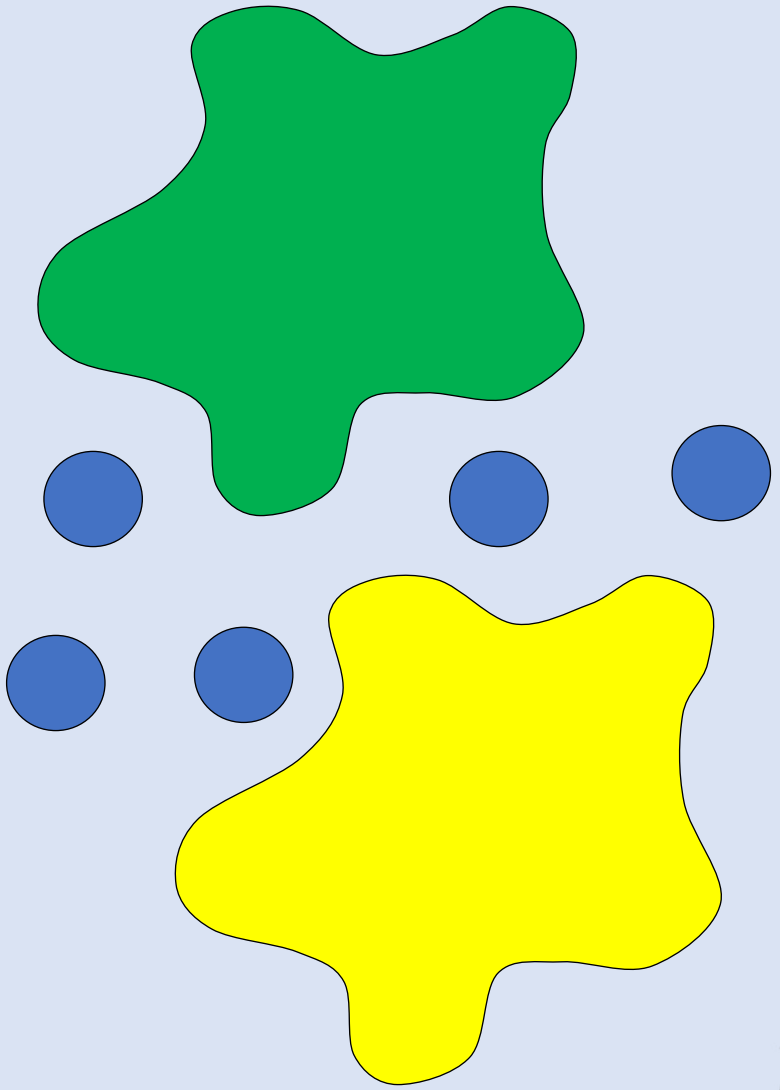
How many blue dots do you see?
How did you count them?

These splats are different colors.
When splats are different colors, they must be covering different numbers of dots.

How many dots could be under the green splat?
How many could be under the yellow splat?
What *combinations* are possible?

Let's look under one splat to see how many dots are there.

How man
under the othe t?

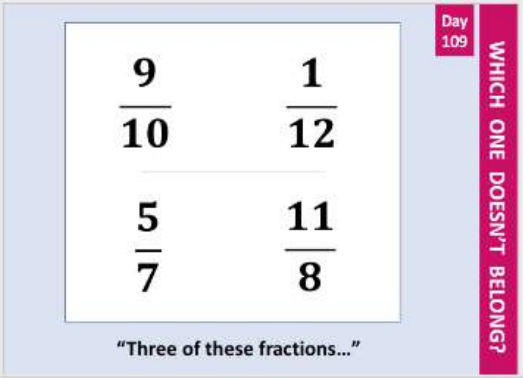


Use the NEXT SLIDE with students.

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

Day 109

WHICH ONE DOESN'T BELONG?



Possible Responses:

- Three of these fractions are more than one part away from a whole. 9/10 is not more than one part from a whole, it is exactly one part from a whole.
- Three of these fractions have a value that is greater than ½. The fraction 1/12 is not greater than ½.
- Three of these fractions are partitioned into an even number of parts. The fraction 5/7 is not an even number of parts since 7 is an odd number.
- Three of these fractions have a value that is less than one whole. The fraction 11/8 has a value that is more than one whole.

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Day 109

WHICH ONE DOESN'T BELONG?

$\frac{9}{10}$	$\frac{1}{12}$
$\frac{5}{7}$	$\frac{11}{8}$

$\frac{1}{2}$

"Three of these fractions…"

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Equivalent Fractions

Day 110

NOTE: This MUST be run in POWERPOINT to work properly

CHORAL COUNTING

SAY:

- Today's choral counting is going to be a little different than others we have done in the past. Today, you will see a visual model as we count together.
- We will begin with ½ and will find equivalent values.
- Don't worry, I will prompt you with each transition.
- We'll go slowly so we can count the fractions together.
- As we count, watch for patterns that emerge – you will see both visual patterns and numerical patterns – there will be several patterns to discuss when we get all the models on the board.

CLICK ("enter" or the "right arrow" button) – the slides will transition revealing each part of the routine. **Work slowly**. **Stop often for discussion.**

- When you get to 10/20, discuss the patterns.
- Then discuss what the NEXT pattern could look like based on what you know about the pattern.

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Day 110

CHORAL COUNTING

$\frac{1}{2} \times \frac{2}{2}$

$\frac{1}{2} \times \frac{3}{3}$

$\frac{1}{2} \times \frac{4}{4}$

$\frac{1}{2} \times \frac{5}{5}$

$\frac{1}{2} \times \frac{6}{6}$

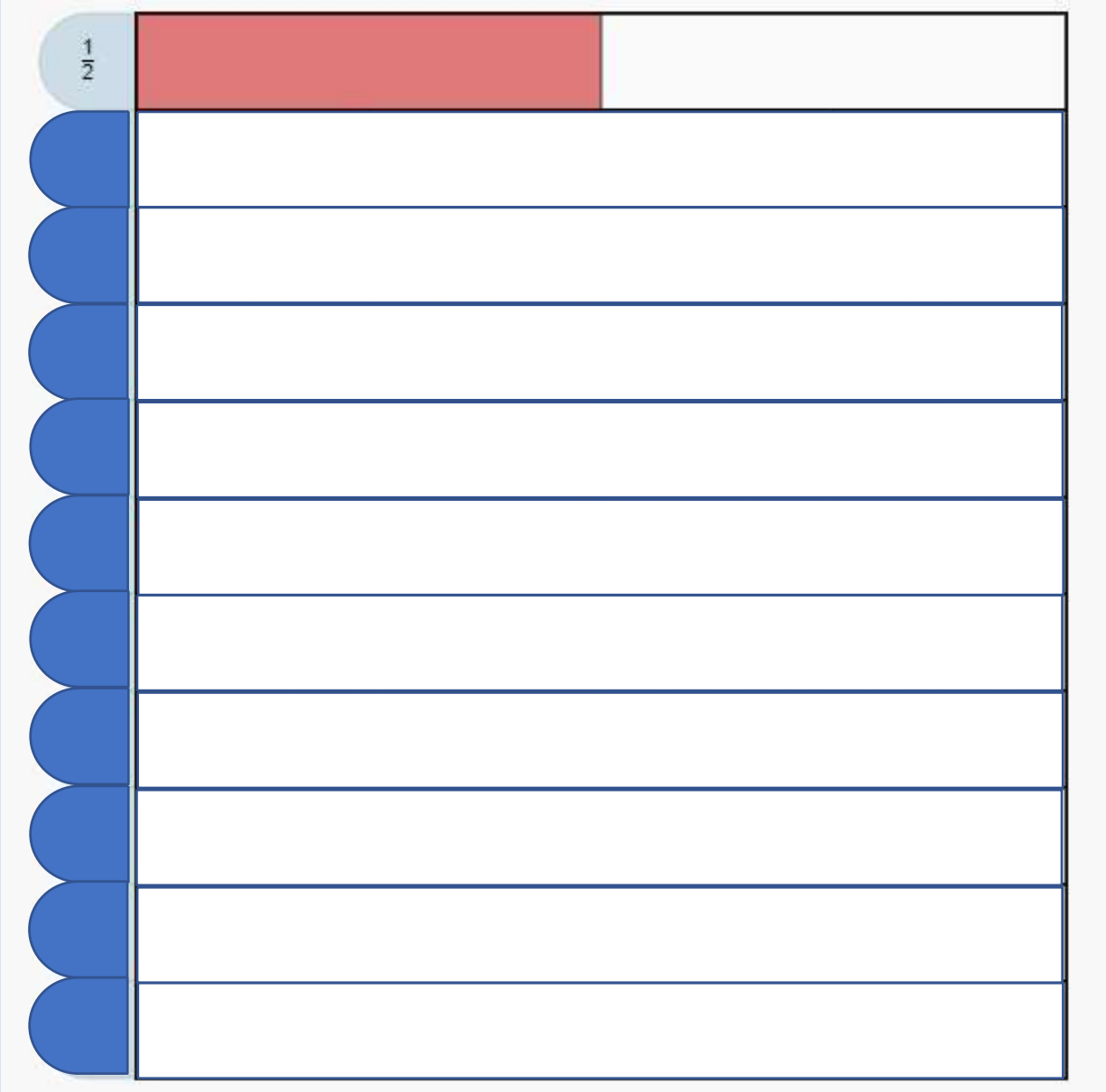
$\frac{1}{2} \times \frac{7}{7}$

$\frac{1}{2} \times \frac{8}{8}$

$\frac{1}{2} \times \frac{9}{9}$

$\frac{1}{2} \times \frac{10}{10}$

$\frac{1}{2} \times \frac{?}{?}$



Day 111

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

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How many baby carrots?

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 number of baby carrots is an even number

Clue #2

There are fewer than 45

Clue #3

The number is a multiple of 3

Clue #4

It is not a multiple of 9

Clue #5

The answer is not 24

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

The Reveal
Click to see the answer.

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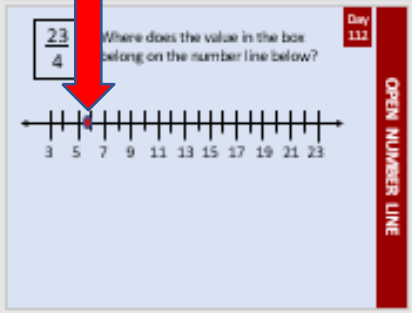
Use the NEXT SLIDES with students.

Day 112



This type of activity might be called "PLACE THE FRACTION"
This is a great activity to show that whole numbers and fractions live together on the same number line.

- Show students the fraction 23/4.
- Ask students where this belongs on the number line.
- Allow for a wide range of answers. Some students may believe that 23/4 belongs at a place that is not shown on the number line
    - some think it will be after 0 but before 1
    - others will believe it belongs much farther to the right than 6 because of the 23
- Remember to allow plenty of Think Time
- Allow partner discussion before the whole group discussion
- Listen for student ideas that you will ask students to share during whole the class discussion
- As students tell where they believe 23/4 belongs, ask them to explain "How they Know"

SOLUTION: 23/4 is equivalent to 5¾ so it belongs between 5 and 6 with it being a bit closer to 6 than 5.

OPEN NUMBER LINE

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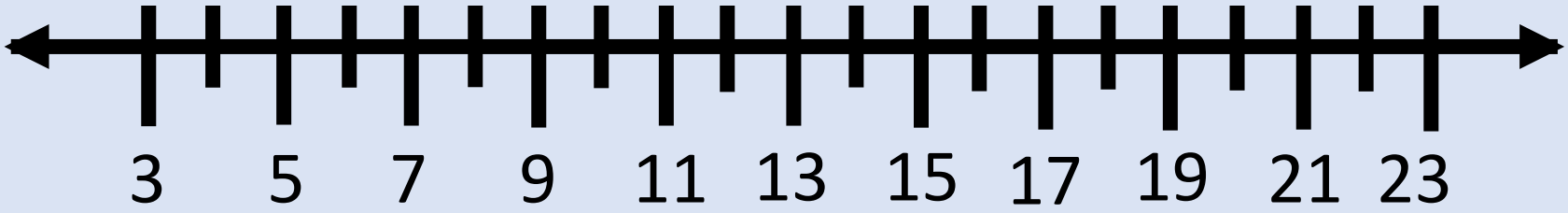
Day 112

$\frac{23}{4}$

Where does this value belong on the number line below?

How do you know?



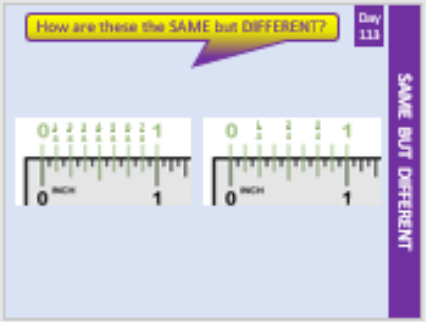
OPEN NUMBER LINE

Day 113

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:

- They both show a ruler from 0 to 1
- Both are measuring in the unit of INCH
- They are both marked in increments of sixteenths, but the green notation is in eighths and fourths
- The both have equal intervals marked but the first is eighths, the second is fourths
- The green marks and the black marks are in the SAME place on both rulers, but the written numbers are eighths and fourths
- 0, ¼, 2/4, ¾, and 1 are marked on both rulers but the ruler on the left uses equivalent values in eighths rather than fourths.

SAME BUT DIFFERENT

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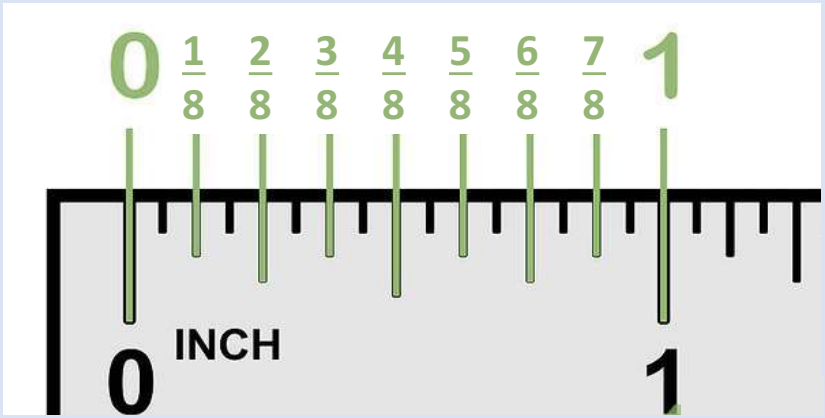
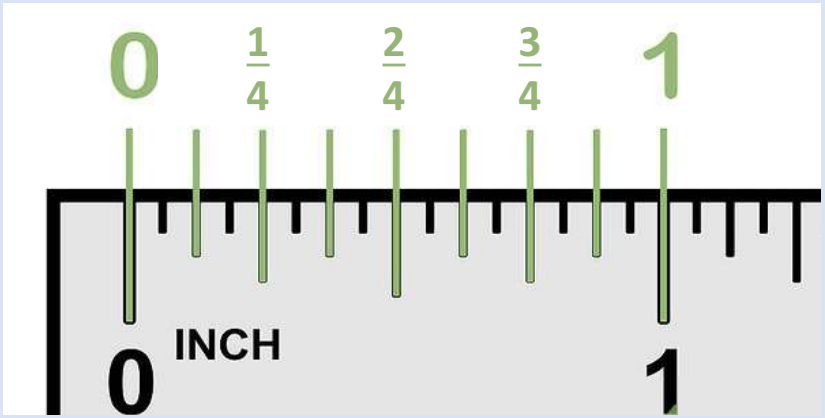
How are these the SAME but DIFFERENT?

Day 113

SAME BUT DIFFERENT





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Day 114

NUMBER TALK

TEACHER NOTES

BEFORE

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

DURING

Making Landmark or Friendly Numbers – Three and four digit addends.
Both addends are one or two away from a multiple of ten or landmark number.

Possible reasonings:

- Students may recognize that 1999 is just one away from the Landmark number 2000. Students might quickly add 2000+2000=4000 then subtract the 2 additional that they added in to make the number easy to add.
- 2499+2499 >>> think 2500+2500=5000 >>> 5000-2=4998
- 4298+4298 >>> think 4300+4300=8600 >>> 8600-4=7596
- 1198+1199 >>> think 1200+1200=2400 >>> 2400-3=2397

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 that numbers that are very close to Landmark Numbers can be mentally added as those Landmark numbers and then the extra that we put in to make it a Landmark Number (Friendly Number) can be quickly subtracted back out at the end.

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You don’t need paper… **think about mathematical shortcuts**….

Day 114

1999 + 1999

NUMBER TALK

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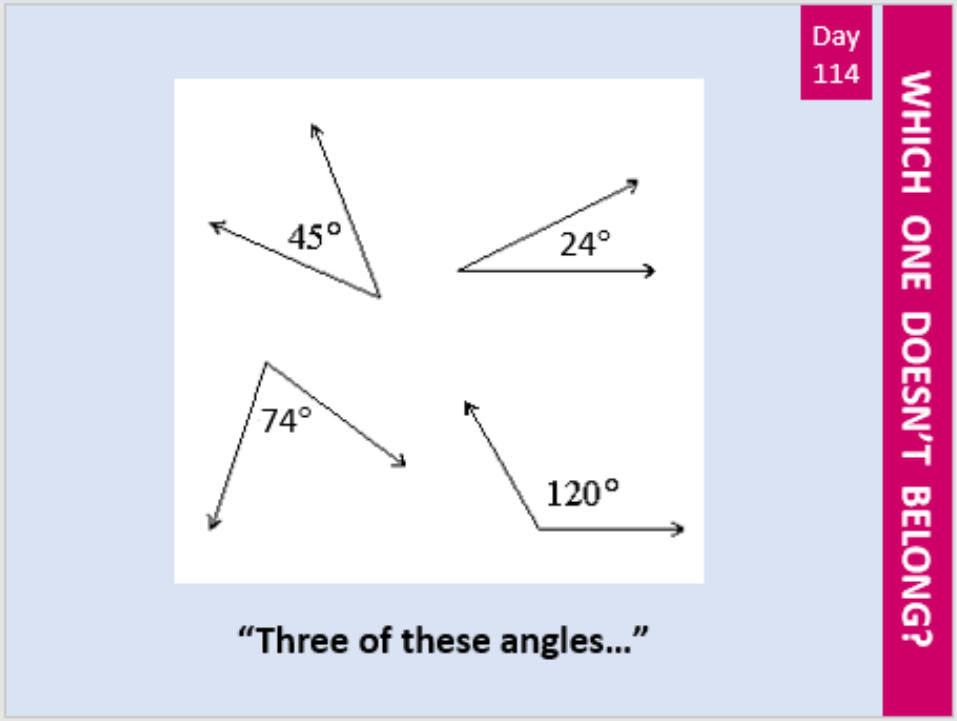
Use the NEXT SLIDE with students.

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

Day 115

WHICH ONE DOESN'T BELONG?

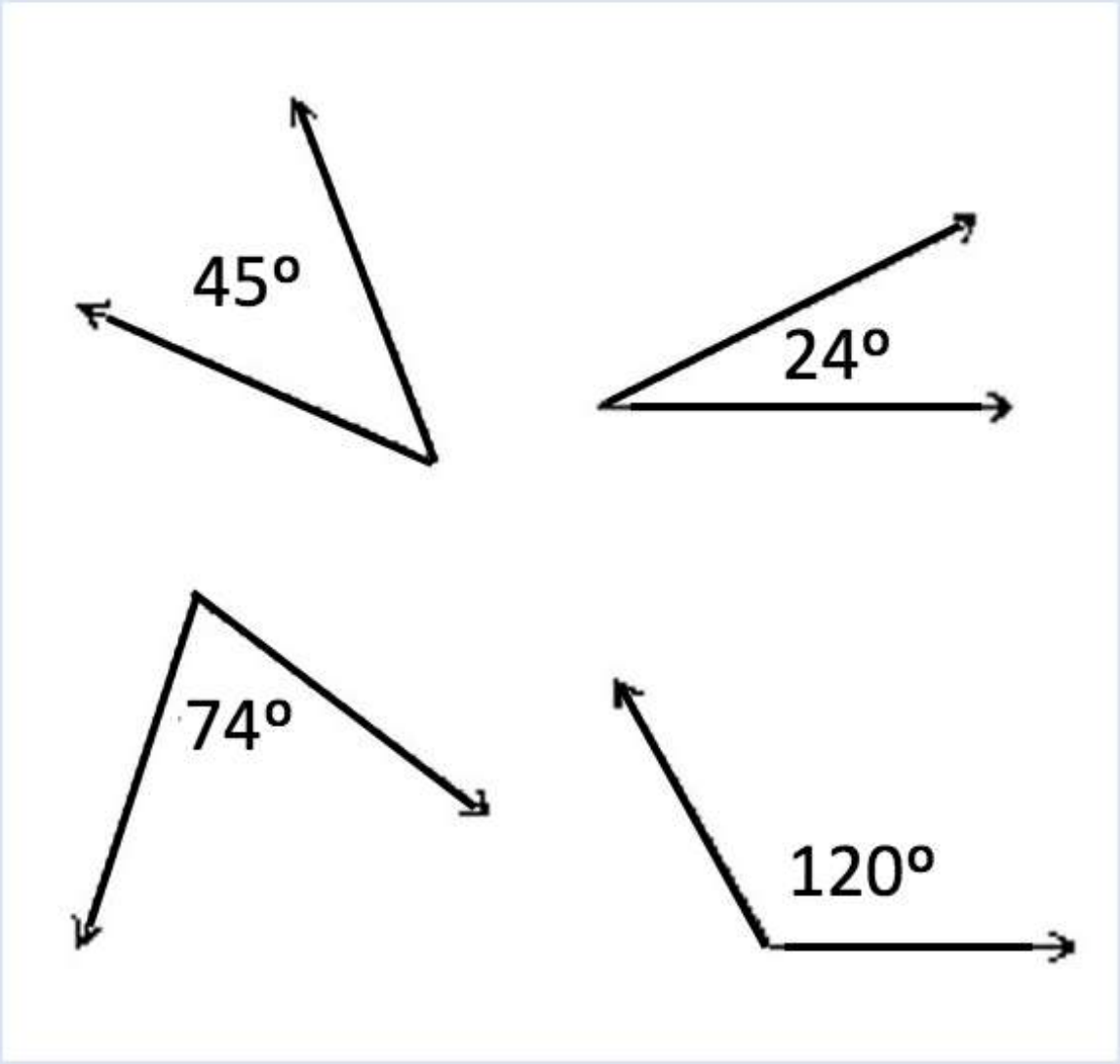


Possible Responses:

- Three of these angles are even numbers. 45 is not an even number; it's odd.
- Three of these angles represent at least an eighth of a circle. 24 degrees is not at least an eighth of a circle (45 degrees = 1/8 of a circle)
- Three of these angles will make a 360 degrees circle with no gap or overlap if they are replicated enough times. 74 degrees does not make a circle when replicated (8x45 degree angles; 15x24 degree angle, 3x120 degree angle)
- Three of these angles are acute angles. 120 is not an acute angle; it's obtuse.

Day 115

WHICH ONE DOESN'T BELONG?



"Three of these angles…"

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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 116

DECIDE & DEFEND

Helping students to understand the math and the reason WHY 0.35 is not correct is critical.
Allow students to DISCUSS with partners/team FIRST.
Then facilitate a class discussion with STUDENTS doing most of the talking and offering justifications.

IMPORTANT DISCUSSION POINTS:

- 0.35 --- begin by simply SAYING the name of this fraction --- thirty-five hundredths
- Help students to convert the spoken name into the fractional form: 35/100
- 35/100 is not equivalent to 3/5 since 3/5 is equivalent to 6/10 which is equivalent to 60/100 (not 35/100)
- Again change 0.6 to its fractional form by SAYING the name of the fraction "six tenths"
- Write the fractional form from the word form 6/10
- 6/10 is equivalent to 3/5 since 3/5 x 2/2 = 6/10 and 6/10 = 0/6, so Amaya is correct

Use Numbered Heads

READ to Understand

Decide

Draft

Defend

Reflect

Day 116

The students cannot enter a fraction into the calculator. They must change $\frac{3}{5}$ to a decimal value. Michael is not sure what to do. Jana and Amaya do not agree on the decimal value that is equivalent to $\frac{3}{5}$. Who is correct?

0.35 Jana

Michael

Amaya **0.6**

DECIDE & DEFEND

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Day 116

Reflect on Learning

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

DECIDE & DEFEND

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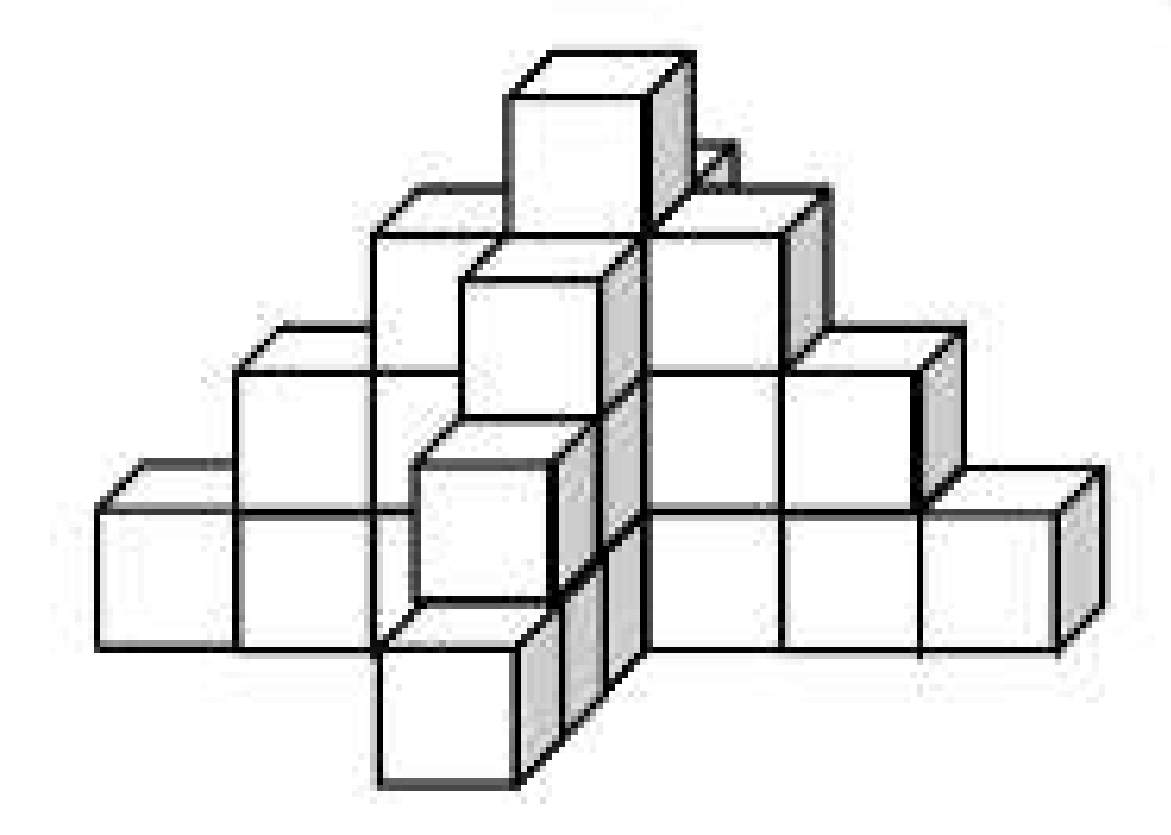
Day 117

What do you notice?



QUICK COUNT

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Day
117

QUICK COUNT

What did you NOTICE?

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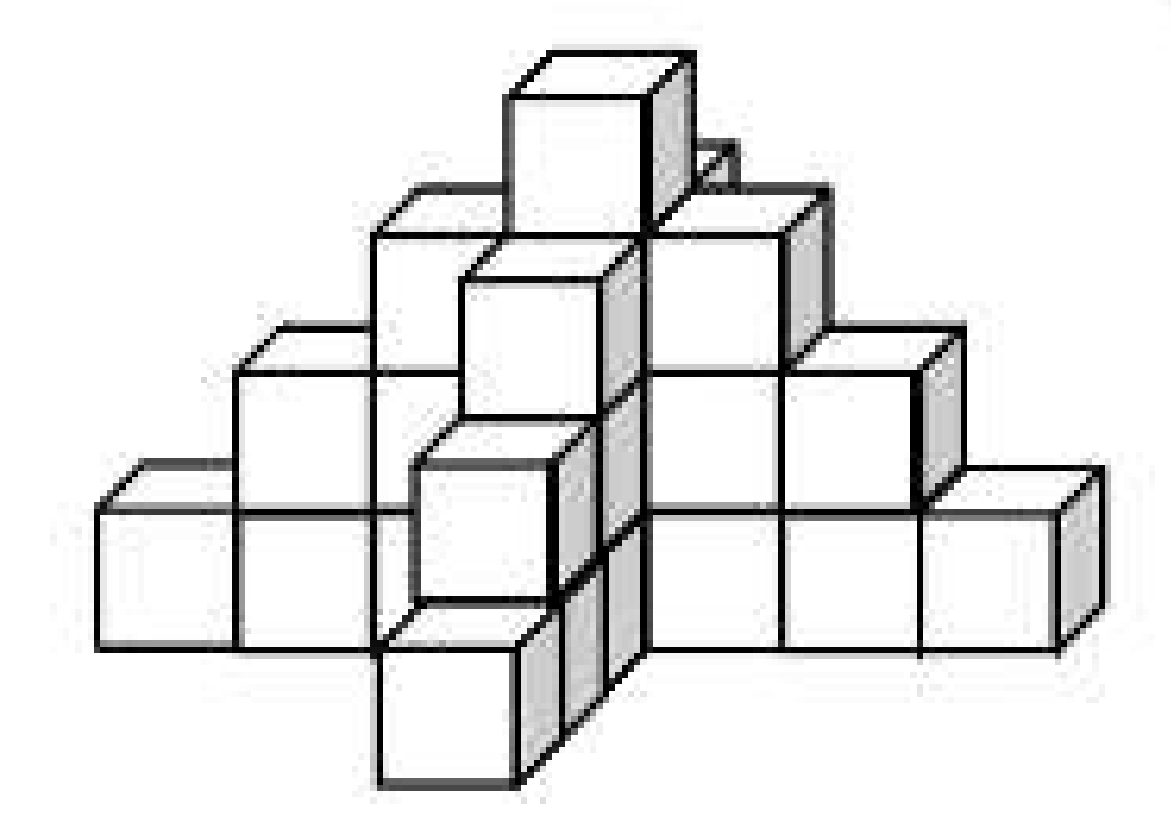
Day 117

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

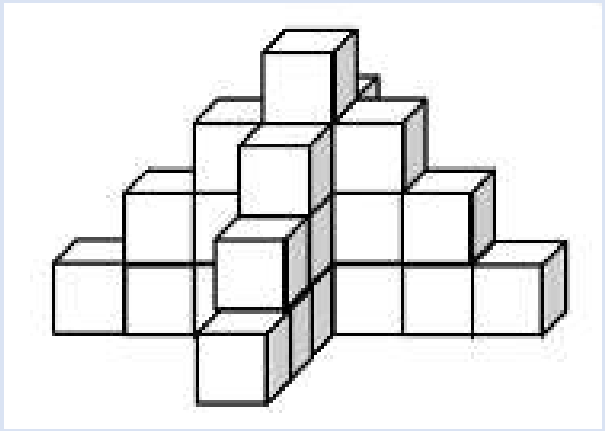


QUICK COUNT

Calvert County Public Schools

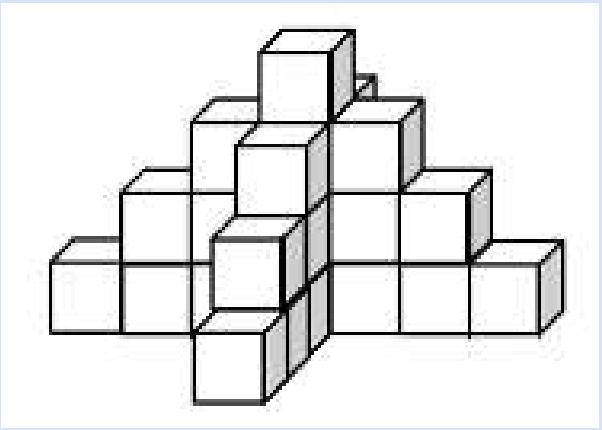
Day 117

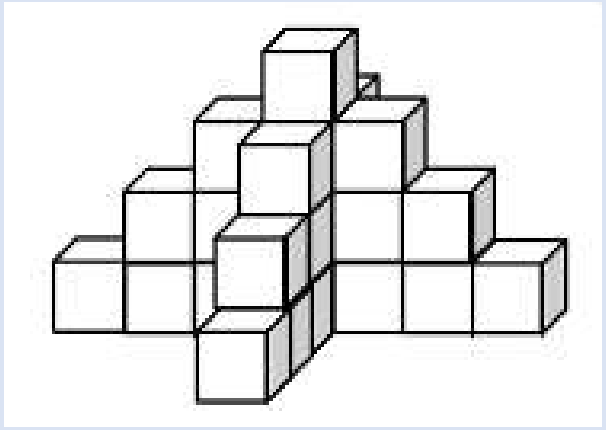
QUICK COUNT



I noticed ____ so I _____

(They) noticed ____ so they _____





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Day 117

Reflect

What was mathematically important?

QUICK COUNT

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Day 118

84 x 10
84 x 5
84 x 15
84 x 25

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

Multiplication: Halving and Doubling

Possible reasonings:

- Help students to recognize that if this had been 84 x 10, it would have been simple. Because it is 84x5, we know it will be half of 84x10. An efficient model of multiplying for some equations is to use the halving/doubling strategy. If you double one value and half the other value, the overall product remains the same.
- 84x10=840 – the ability to multiply by multiples of ten is an expectation of students in grade 3 and above.
- 84x5= 42x10=420 (notice that 84 was halved and 5 was doubled to make it a multiple of ten which is easy to multiply by)
- 84x15 = 42x30 >>> since 42x3=126, 42x30 must equal 1,260 **which means that 84x15=1,260**
- 84x25 = 21x100 (notice 25 was increased by 4x so 84 was decreased by 4x to keep the product the same) = 2,100

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

AFTER

Help students recognize the strategy of doubling and halving and how it is an efficient strategy if doubling (or halving) will lead to a value that is a multiple of ten making multiplying easier.

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NUMBER TALK

Day 118

84 x 10

How might the 84 x 10 help you solve 84 x 5?

84 x 5

NUMBER TALK

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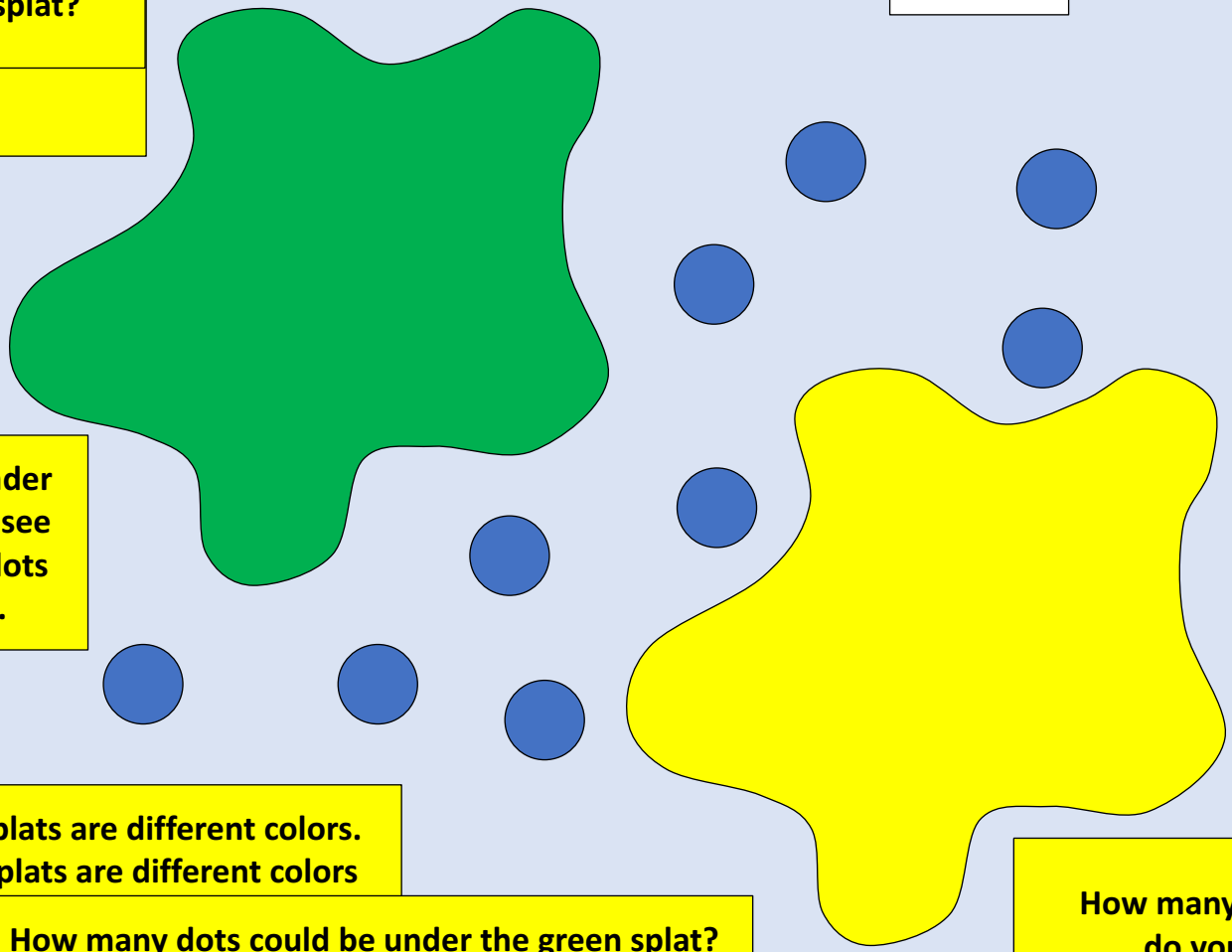
Day 119

21

How many dots are under the other splat?



Let's look under one splat to see how many dots are there.

These splats are different colors. When splats are different colors they r

How many dots could be under the green splat?
How many could be under the yellow splat?
What *combinations* are possible?

How many blue dots do you see?
How did you count them?

SPLAT!

30 X 7
15 X 14
90 X 6
12 x 45

Day 120

NUMBER TALK

TEACHER NOTES

BEFORE

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

DURING

Multiplication: Halving and Doubling

Possible reasonings:

- An efficient model of multiplying for some equations is to use the halving/doubling strategy. If you double one value and half the other value, the overall product remains the same. This is especially useful when one of the factors doubles to create a multiple of ten (i.e. 35 doubles to create 70).

- 30 X 7 – This one is intended to lay the foundation for the next 3 expressions = 210
- 15 X 14 – Hopefully a student will notice and you can build on the idea that the answer to this one is the same as the previous. Why is it the same? No complex 2-digit calculations were needed if you noticed that you could double 15 (to30) and then half 14 (to 7) and the result would be 30 x 7 just like the previous --- amazing strategy, right?
- 90 X 6 = 540
- 12 x 45 = 6 x 90 (by doubling and halving to multiples of ten which are more friendly to multiply) = 540

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 strategy of doubling and halving and how it is an efficient strategy if doubling (or halving) will lead to a value that is a multiple of ten making multiplying easier.

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30 X 7

Day 120

NUMBER TALK

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