

180 Days of Number Sense Routines Grade 1 Days 41-60





- 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.





HOW WILL THESE NUMBER SENSE ROUTINES BENEFIT ME AND MY STUDENTS? What teachers do and how they do it is critically important and has a profound impact on the quality of the educational experience of our students. Effective pedagogy, the art and science of teaching, is a key element in the learning process. The Number Sense are models of effective pedagogy and ensure that the critical Number Sense instruction we provide is equitable to all our students regardless of geography, teacher experience, or student circumstance. As we prepare our students to be mathematically proficient in their lives beyond the classroom walls, these Number Sense routines will help to lay the critical foundation for all future mathematical endeavors.

WHAT ARE THE CCPS IMPLEMENTATION EXPECTATIONS?

Number sense routines have been developed for all 180 instructional days in grades Prekindergarten through Grade 5. These routines are to be used every day, including early dismissal, late arrival, and field trip days. Because the routines do not require a specific order, it is permissible to trade routines among days within the week to best match the time available. Number Sense must be built over time. With consistency, we can build students' number sense creating a strong mathematical foundation. If students or the teacher is struggling with a routine, the teacher collaborate with colleagues to build capacity in that routine – do not just choose to skip the routine. If additional help is needed, the teacher should seek the assistance of their content specialist or mathematics supervisor.







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>





Acknowledgements

We are grateful to those who have inspired this project – and there have been many. These slide decks were designed for Grades 1–5 with custom-built daily routines for each grade level. The nine routines blend original creations, adaptations, and OER materials. We have made our work available in Open Educational Resources so that others may benefit as we have from the collaboration of other educators. Our deepest gratitude and respect to all those who helped move our work forward, and a special thank you goes to the following whose own work had such a tremendous impact on our 180 Days of Number Sense Routines:

- *Decide & Defend* and *Quick Count* routines were adapted from templates created by Grace Kelemanik and Amy Lucenta at http://FosteringMathPractices.com
- Estimation Clipboard, Esti-Mysteries, and Splat! templates created by www.SteveWyborney.com
- Same But Different discussion from Developing Grayscale Thinking by Looney Math Consulting at https://www.samebutdifferentmath.com
- Which One Doesn't Belong tasks adapted from http://wodb.ca by Mary Bourassa
- As Close As It Gets https://www.mathisfigureoutable.com/ascloseasitgets by Pam Harris

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Add 2

- Let's count all together by adding 2 to each number.
- Instead of starting at 2, let's begin counting from the number <u>23</u>.
- Use the chart on the next page to chart the count.
- Begin by circling 23 on the chart.
- Count continues as you circle: 25, 27, 29....
- Stop after counting and circling about 4 or 5 rows of numbers.
- Discuss the patterns. Discuss WHY those patterns happened.
- Pick a number near the bottom of the chart. Ask, "If we look at the pattern that is being created, will we circle number 94? Explain how you know."



Day

SAY:

The numbers we counted are circled on this chart. (circle more if needed).

ASK: What do you notice about the numbers we counted?

- The circles SKIP a number each time (Use this observation to discuss that when we count by 2s or add 2, we skip one number between each counted number).
- The numbers in each column have the same digit in the ones place value.
- The numbers in each row have the same digit in the tens place value.

ASK: If we keep counting, what is the next number that we will circle?

ASK: If we keep counting, will we circle the number 94? How do you know?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120

Add 2

1.NBT.A.1

1.0A.A.1



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 <u>decide</u> which solution is correct (note: partners may not agree and that is fine provided they can justify their own thinking).
- **DRAFT**: Students <u>draft</u> 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 <u>defend</u> their reasoning with the whole group. Encourage active listening and <u>accountable talk</u>.
- **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



Dav

Use the NEXT SLIDE with students.

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

Chase and Skye have three jars of snacks. Chase says if they put the snacks together, they will have 16 snacks. Skye says they will have 17. Who is correct? 6 snacks 7 snacks 4 snacks

Discuss the various strategies. Ask students which strategy(ies) seem to be more efficient. Discuss why that is true.

GOAL: Students come to recognize efficient ways to calculate the total (i.e. 4+6=10 then 10+7=17) rather than using a "counting all" strategy.



Dav

Chase and Skye have three jars of snacks. Chase says if they put the snacks together, they will have 16 snacks. Skye says they will have 17. Who is correct?





7 snacks



1.0A.C.6

1.R.3

Day

Reflect on Learning

- A new math idea I learned today is...
- When you want to convince someone of your ideas, you should...
- To work carefully like a mathematician, I need to...





Estimation Activity

Have you already watched the teacher information video?

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

PROMPT: How many dice are in the vase?

1.NBT.C4 1.R.1

Day



How many dice are being held by the vase? Steve Wyborney

The Reveal

www.stevewyborney.com



43 dice

The Reveal

The Reveal



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

Counting All/Counting On Using Double Ten-Frames

Ten-frames are an important tool to help students reason about numbers, subitize, build fluency, work with place value, and compute with addition and subtraction. As each problem is shown, ask students, "How many dots do you see? How do you see them?"

- This task can be scaffolded by asking students to focus on the first frame or each pair and asking "How many more are needed to make a ten?"
- This task can be extended by asking, "How many more are needed to make 20?"

Notice that the second frame needs fewer to fill the frame. It is a very efficient strategy to "fill" the second frame to make a ten and then count on the remaining dots from the first.

Annotate the frames to model "filling" one of the frames, knowing it is ten when full, and then counting on the leftovers. The goal is for students to build automaticity that 10 and 6 more is 16, for example.

<u>AFTER</u>

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



Day 44







Which numbers are hiding? How do you know?



TIP: Write student ideas below the missing number boxes. Discuss all the ways that students use to determine the missing numbers. For more Open Number Line Activities, visit <u>http://www.MathSnack.blogspot.com</u>



1.NBT.A.1



Which numbers are hiding? How do you know?





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

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 (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. After 3-5 seconds, advance the slide to hide the image.
- 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 without hiding it so they can 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 describe the shortcut counting strategy they used. Give time for partner discussions. Listen in 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. This 2-step process is important for building listening comprehension and students' ability to articulate the ideas of others.
 - a. Use your notes to select different students with different approaches.
 - b. The student explains his/her shortcut as the teacher **gestures** over the image.
 - c. 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.
 - d. Repeat the process using different student-generated shortcut strategies.
- 10. End by asking students to explain what was "mathematically important"



Intro

Use the NEXT SLIDE with students.

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



GOAL: Students find various short cuts for determining the total. Help students to move away from "counting all"

- See two complete rows of 5 and knows that equals 10. Then adds 3 plus 10 for a total of 13.
- Imagines moving 2 yellow cubes to complete the 10-frame. Then sees a complete 10-frame plus 3 extras for a total of 13.
- Begins at 8 and counts on 5 for a total of 13.



Day

What do you NOTICE?





Day 46

What did you NOTICE?



How many do you see? What counting shortcut can you use?



Day













BLIC SCHOO

Reflect



What was mathematically important?



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** <u>both</u> how they are the same <u>and</u> 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* <u>both</u>. 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.



Use the NEXT SLIDE with students.

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

- Students may simply recognize a component that makes them the "same" OR "different"
- Some students may state a same/different relationship and say that they are the "same because.... But different because...."



Possible Responses:

- Both have a total of 13 cubes, but the frame on the left is 8+5 while the frame on the right could be 10+3
- Both have 8 red and 5 yellow, but they are arranged differently on the mat.
- Both have 7 empty spaces, but the location of the empty spaces is not the same.



How are these the SAME but DIFFERENT?



SAME BUT DIFFERENT

1.OA.C.5 1.R.1









SPLAT!

Use the NEXT SLIDE with students.

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



Possible Responses: Find a reason why each one does not belong.

- Three of the number cubes have the value represented by dots. Top left is not made with dots, it is a number digit.
- Three of the number cubes represent the number 5. Top right does not represent the number 5, it is a 1.
- · Three of the number cubes are large dice. Bottom left is not a large dice, it is smaller.
- Three of the number cubes are white. Bottom right is not white, it is blue.



Day

Top Left



Top Right

Day

49

Bottom Right

Bottom Left

Three of the number cubes...



1.G.A.1

Day

50

Subtract 2

- Let's count by subtracting 2 (or counting back by 2s)
- Let's begin counting from the number <u>68</u>
- The teacher begins by saying 68
- USE a visual to help students know the next number and to see patterns (see the "game board" on the next page)
 - Use of a visual scaffolds the activity for students as they count back
- CIRCLE the numbers on the gameboard as students count
- Count continues: 68, 66, 64, 62, 60, 58...
- After each student has counted, review the chart to look for patterns





Show students the "game board". Begin by circling the number 68. Model "going back 2" to number 66. Circle the number 66. Continue counting back together slowly as you circle the numbers on the chart. STOP when you get to the 40s values.

ASK: What do you notice about the numbers we counted so far?

• The circles SKIP a number each time (Use this observation to discuss that when we count back by 2s or subtract 2, we skip one number each time).

ASK: If we keep counting back, what is the next number that we will circle?

ASK: If we keep counting back until we get all the way to ten, will we circle the number 11? How do you know?



Estimation Activity with clues!

NOTE: This Estimation routine contains a number chart. Have students determine which numbers should be eliminated BEFORE clicking to reveal the number chart after each clue.

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

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

******After each clue, discuss/analyze which solutions are no longer possible.

After each clue, the number chart will automatically cover up the eliminated numbers, so be sure to discuss student ideas BEFORE advancing the slide.



Day

How many bricks?



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

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



1	2	3	4	5	6	7	8	9	10
	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Clue #1

There are less than 30 bricks

<u>Clue #2</u> The number is greater than 10

> <u>Clue #3</u> One of the digits is a 4

Clue #4 There are more than 18 bricks.





After seeing the clues, you have narrowed the possibilities to a small set of numbers. Before you see the answer, select your final estimate. Write it down and explain to someone why you chose that number.



The Reveal Click to see the answer.







Ask each question. Give *Think Time*. Discuss ideas. Fill in the blank.

- What number is BETWEEN 17 and 19? How do you know?
- What number is BETWEEN 11 and 13? How do you know?
- What number come BEFORE 15? How do you know?
- What number comes AFTER 19? How do you know?

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- Students may simply recognize a component that makes them the "same" OR "different"
- Some students may state a same/different relationship and say that they are the "same because.... But different because...."



Possible Responses:

- Both represent value of 10 and 6. One could be seen as 6+10 while the others shows 10+6.
- Both have a sum of 16
- One is a number line; the other is a Rekenrek (or Number Rack) representation

Day







PRO TIP: Allow plenty of Think Time. Encourage students to discuss with partners before whole group discussion.



SAME **BUT DIFFERENT**

1.OA.B.3 1.OA.C.6

Use the NEXT SLIDE with students.

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



Possible Responses: Find a reason why each one does not belong.

- Three of the dot images have 6 dots. Image A does not have 6 dots, it has only 4.
- Three of the dot images are partitioned into equal parts. Image B is not partitioned into equal parts.
- Three of the dot images are partitioned into 2 parts. Image C is not partitioned into two parts, it is partitioned into 3 parts.
- Three of the dot images have 2 dots together as one or more of the groups. Image D does not have 2 dots together, it has 3 dots together.



Day



Three of the dot images...



WHICH ONE DOESN'T BELONG?

1.OA.B.4 1.OA.C.6

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?)
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Dav

Use the NEXT SLIDE with students.

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



Encourage students to discuss ideas with a partner before the whole class discussion of ideas.

Dora is not correct. The Hidden Number is between 28 and 30. The number 29 comes between, 28 and 30. Students may recognize the vertical pattern of all the numbers in that column have a 9 in the ones place.



Day

Is Dora correct? How do you know?

		2	3	4	5	6	7	8	9	10
think the Hidden		12	13	14	15	16	17	18	19	20
Number is 31 because it is		22	23	24	25	26	27	28	10-91-5	30
next to 30.		32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50
	51	52	53	54	55	56	57	58	59	60

Day



Reflect on Learning

• A new math idea I learned today is...

• To work carefully like a mathematician, I need to...



Day

56

4 + 6 = _____ ____ + 6 = 10 4 + _____ = 10

TEACHER NOTES

BEFORE

This slide has a string of problems that focus on "making a ten" and the various configurations of problem structures. Use this slide in Smart Notebook format so you can easily use the pen to annotate. Use the screen shade to show just one equation at a time. Remember, students will come with a wide variety of strategies. Allow student sharing of these strategies and work toward determining which of the ways were most efficient and brain-friendly.

DURING

Make a Ten with Various Problem Structures

Have students calculate the sum of 4+6. Have various students share HOW they knew the sum was 10. Then show the second equation. Ask for solutions as offered by various students. Once possible addends are offered, ask students to support one of the addends offered and to explain how they knew. Allow for various strategies to be discussed by students. Help students to make the connections between the original problem and the two successive problems.

AFTER

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



4 + 6 = _

NUMBER TALK





What do you NOTICE?



What did you NOTICE?





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













Day

Reflect



What was mathematically important?



QUICK COUNT

How many blue shapes do you see?

Did you know different colored Splats have different amounts

How many dots are hiding under the Splats?

What are some

Let's look under each Splat to see

What can we learn from this picture?







TEACHER NOTES

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DURING

Counting All/Counting On Using Double Ten-Frames

Ten-frames are an important tool to help students reason about numbers, subitize, build fluency, work with place value, and compute with addition and subtraction. As each problem is shown, ask students, "How many dots do you see? How do you see them?"

- This task can be scaffolded by asking students to focus on the first frame of each pair and asking "How many more are needed to make a ten?"
- This task can be extended by asking, "How many more are needed to make 20?"

Notice that the second frame needs fewer to fill the frame. It is a very efficient strategy to "fill" the second frame to make a ten and then count on the remaining dots from the first.

Annotate the frames to model "filling" one of the frames, knowing it is ten when full, and then counting on the leftovers. The goal is for students to build automaticity that 10 and 6 more is 16, for example.

<u>AFTER</u>

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







How many blue shapes do you

Splat!

How many shapes are under the splat? How do

How else could

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

What can we learn from this picture?





www.stevewyborney.com