



Before exploring the exciting content contained in the slide decks for these Number Sense Routines, we encourage you to take time to understand the purpose and value. 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.

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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. These Number Sense Routines are models of effective pedagogy and ensure that the critical Number Sense instruction we provide is equitable to all 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.

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WHAT ARE THE IMPLEMENTATION EXPECTATIONS FOR CALVERT COUNTY PUBLIC SCHOOLS? Number sense routines have been developed for all 180 instructional days. These routines should be used every day. 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 ARE THESE NUMBER SENSE ROUTINES ORGANIZED?

There are 180 instructional slides organized into groups of 20. Plan to engage with each slide for about **5-8 minutes** using just **one slide each day**. Slides representing each of the nine categories appear at least twice within each set of 20 slides. During the first 18 days, the same routine will appear twice in a row to provide repetition as students learn how to engage with the specific routine. The slides decks increase in rigor as the year progresses to challenge students throughout the year.

- Clue by Clue
- Copycat
- Example Not Example
- Measure Mix
- More or Less

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- One More One Less
- Same But Different
- Where Does It Go?
- Would You Rather?



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 Prekindergarten with custom-built daily routines to match the early learning needs of this special group of young mathematicians. The nine routines blend original creations and adaptations of other 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 have inspired and supported us to help move our work forward for the benefit of all students who engage with these slides.

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How to facilitate Clue by Clue

During this routine, students are shown a group of objects. Then they are given clues about the object's attributes that helps them to narrow the possibilities down to just one possible object from the group.

To facilitate this routine,

- 1. Show the group of objects to your students.
- 2. Tell students that you are thinking of ONE of these objects and you will give them clues to help them discover which object you are secretly thinking about.
- 3. Reveal the first clue. Ask students to think about which objects could be your mystery object. Which objects cannot be the mystery object. Discuss.
- 4. Use the annotation tool to visually mark off objects that do not fit the clue. In Slide Show mode, right click to annotate on the slide. Select >Pointer Options>Pen. Cross off images as students determine it does not fit the clue. The answer is revealed after Clue 3 is shown.

Clue by Clue



ASK: Can you guess which person I am describing? I'll give you some clues to help you. NOTES: After each clue, discuss which person does not fit the clue. Each click removes one person.





Clue by Clue

Day

PK.MD.A.1

ASK: Can you use the clues to guess which object I am? FACILITATION NOTE: Use the annotation tool to mark off pictures that do not fit the clue.







Day 2

Clue 2 My color is orange

Clue 3 I am heavy

Clue by Clue

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PK.MD.A.2

How to facilitate Copycat

This routine supports students' ability to recognize and replicate patterns. As the year progresses, this routine will increase in rigor by only showing the image for a short amount of time and then asking students to replicate the pattern from memory.

To facilitate this routine,

- 1. Show the image or play the recording for auditory patterns.
- 2. Ask, "How many are in the pattern?"
- Ask students to replicate the pattern.
 The pattern may require physical blocks, clapping and tapping, or a verbal description of the pattern.
- 4. If the pattern was hidden after showing it for a short time, reveal the pattern again so students can compare their pattern to the original pattern.



Copycat



SAY: Use your objects to copy this pattern. How many objects do you need?



Copycat

SAY: Look at these three frogs. Look how they are sitting next to each other. Watch the frogs hide under the lily pads [click]. Now I will show you some other frogs [click]. Which frogs are sitting in the same pattern as the hidden frogs? Discuss. Click to reveal original frogs to compare.





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Copycat

How to facilitate Example – Not Example

In Slide Show mode, right click to annotate on the slide. Select > Pointer Options > Pen. Circle the images that students think will move to the *Example Ring*. Objects will move when you click the mouse. The items you circled, should move. Discuss as appropriate. Focus on the like characteristic of the items in the Example Ring.

This routine may be presented in one of two different formats:

Format 1:

- 1. Students will be given a single focus category (i.e., Rectangles / Not Rectangles).
- 2. Students will be asked to sort objects into groups. One group should contain the objects that are EXAMPLES of the category, and the other group contains objects that are NOT EXAMPLES of the category. Discuss student reasoning throughout the routine. [NOTE: The objects in the slides are NOT drag and drop. After the discussion, all objects will move when the slide is advanced].

Format 2:

- 1. Students will be shown a group of objects.
- 2. The class decides on ONE category [i.e., round things]
- 3. Discuss which items should be moved into the Example Ring.
- 4. Circle the objects that belong in the ring.
- 5. Erase the drawn circles and have students name a different category. Repeat the process.
- 6. As the slide is advanced, SOME of the examples will be revealed.



Example – Not Example



PK.MD.B.3 & PK.G.A.2



PK.MD.B.3

How to facilitate Measure Mix

This routine is designed to build vocabulary specific to the measurable attributes of objects. In addition to these routines, the foundation of these understandings must come from experiences with real objects to explore heavier/lighter, longer/shorter, etc.

To facilitate this routine,

- 1. Show the image on the slide (up to 3 objects will be presented)
- 2. Ask the question shown on the slide. The question will focus on a single measurable attribute (weight, length, height).
- 3. Allow students to discuss their ideas with a partner first (this gives them time to gather their ideas and allows all students an opportunity to talk).

Measure Mix

- 4. Ask a few students to share their ideas with the whole group.
- 5. Prompt students to also answer the question "How do you know?"





PK.MD.A.2

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ASK: Whose books do you think are heavier? How do you know? [discuss] FOCUS: Weight





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How to facilitate More or Less

For this routine, students will determine which of the images shows "more" or "less" or if the two images show "equal" values.

To facilitate this routine,

- 1. Show the two images.
- 2. Ask the question shown on the slide.
- 3. Allow students to discuss their ideas with a partner first (this gives them time to gather their ideas and allows all students an opportunity to talk).
- 4. Ask a few students to share their ideas with the whole group.





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ASK: Which picture shows FEWER flamingoes? How do you know?

TIP: Remember, even if students identify the picture incorrectly, allow them explain "How they know" This will allow you understand areas where more support may be needed, and students often self-correct when asked to explain their thinking.





Day 9

More or Less

ASK: Which duck has FEWER ducklings? TIP: Students do not need to count to answer this question. By subitizing, they will likely know that one of the ducks has just 4 ducklings while the other has more than 4. This type of reasoning is appropriate to answer this question.





Day 10



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For this routine, students will determine what is ONE more or ONE less than a given value using visual images as cues.

To facilitate this routine,

- 1. Show the image.
- 2. Ask the question shown on the slide.
- 3. Allow students to discuss their ideas with a partner first (this gives them time to gather their ideas and allows all students an opportunity to talk).
- 4. Ask a few students to share their ideas with the whole group.
- 5. Prompt students to also answer the question "How do you know?"



One More One Less



ASK: How many birds are ON the fence? If ONE MORE bird lands on the fence, how many birds will there be?



One More One Less

ASK: How many flamingoes are in the water? If ONE flamingo flies away, how many flamingos are in the water? FOCUS: The concept of ZERO is an important but difficult concept for young children to grasp. Help them understand that zero is a number that means "none" which is one less than one.





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One More One Less

How to facilitate Same But Different

At the start of this routine, students are shown two images. They are asked to identify not only the attributes that are the SAME between the two objects, but also the attributes that are different. This routine helps build students' grayscale thinking where things do not have to be all one or the other, they can be both at the same time.

To facilitate this routine,

- Ask your students to think about what is the same about the two objects AND what is different. If scaffolding is needed, you can ask them to first think about how the objects are the same. Discuss. Then ask how the objects are different. Discuss.
- 2. Ideally, students will state how they are same and different in one sentence: For example, when shown a hula hoop and dinner plate, the student may respond, "They are both <u>round</u> but one is a toy, and the other is a dish."



Same But Different



ASK: How are these two images the SAME but DIFFERENT?



Same But Different

ASK: How are these two images the SAME but DIFFERENT? FOCUS: The focus is on recognizing that the number of balloons is the same but the color, shape, etc. is different.





PK.CC.C.6

Same But Different

How to facilitate Where Does It Go?

This routine is designed to build sequencing skills, mathematical reasoning, and vocabulary.

To facilitate this routine,

- 1. Show students the slide (some will be animated) and ask students to think about where the target object might go.
- 2. After some think time, call on a student to share their idea. Do not acknowledge if the idea is correct or incorrect (yet!).
- 3. If the student does not offer an explanation, prompt the student by asking, "**How do you know?**" (yes, ask even if the answer they provided is not accurate students will often self-correct when prompted to explain).
- 4. Call on another student and repeat Step 4. After several students have shared their ideas, reveal the correct solution (and celebrate!).



Where Does It Go?



PK.G.B.5



PK.G.B.5





How to facilitate Would You Rather?

For this routine, you will notice that there isn't a single right answer. The goal is for your young mathematicians to develop math-related vocabulary that allows them to articulate their ideas and support their choice. Focus on the mathematical attributes, not on a single answer.

To facilitate this routine,

- Ask your students, "Would you rather have "this" or "this"? Tell them each to think about the reason why they picked that one.
- 2. Then have your students share their ideas with a partner (this allows them time to practice and gives everyone a chance to talk).
- 3. Next have a few students share their choice and the reason they made that choice with the whole group.



Would You Rather?

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PK.MD.A.2

ASK: Which dog would you rather have as a pet? FOCUS: There is no right answer. The focus is vocabulary development of big/little and tall/short and heavy/light.



Image Source: Ellen Levy Finch, Wikimedia Commons





ASK: Which group of kittens would you rather have visit you at your house? FOCUS: The focus is vocabulary development of more/less and number sets of five and one.



Image Source: Helena Jacoba, Creative Commons

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For this slide, students will see a set of numbers. The set will rearrange each time. The teacher will prompt the students to look for the number symbol that represents the number word that the teacher reads. SAY: I see the number EIGHT. Where do YOU see the number eight? [students identify the number by color] [click to have the numbers rearrange themselves then say, "I see the number ____ " by reading the number word on the new arrangement. Repeat with each of the five targeted numbers].

I see the number FOUR





PK.CC.B.5

Copycat



ASK: How are these two images the SAME but DIFFERENT?

Same But Different





Many THANKS!

180 Days of Number Sense Routines for Prekindergarten created by the Elementary Mathematics Team of Calvert County Public Schools, Maryland

Want to know more? Reach out to our team youngj@calvertnet.k12.md.us plachnok@calvertnet.k12.md.us cained@calvertnet.k12.md.us

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