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M0713

First Grade – Standards

- 1. Developing understanding of addition, subtraction, and strategies for addition and subtraction within 20** – Students develop strategies for adding and subtracting whole numbers based on their prior work with small numbers. They use a variety of models, including discrete objects and length-based models (e.g., cubes connected to form lengths), to model add-to, take-from, put-together, take-apart, and compare situations to develop meaning for the operations of addition and subtraction, and to develop strategies to solve arithmetic problems with these operations. Students understand connections between counting and addition and subtraction (e.g., adding two is the same as counting on two). They use properties of addition to add whole numbers and to create and use increasingly sophisticated strategies based on these properties (e.g., “making tens”) to solve addition and subtraction problems within 20. By comparing a variety of solution strategies, children build their understanding of the relationship between addition and subtraction.
- 2. Developing understanding of whole number relationship and place value, including grouping in tens and ones** – Students develop, discuss, and use efficient, accurate, and generalizable methods to add within 100 and subtract multiples of 10. They compare whole numbers (at least to 100) to develop understanding of and solve problems involving their relative sizes. They think of whole numbers between 10 and 100 in terms of tens and ones (especially recognizing the numbers 11 to 19 as composed of a ten and some ones). Through activities that build number sense, they understand the order of the counting numbers and their relative magnitudes.

- 3. Developing understanding of linear measurement and measuring lengths as iterating length units** – Students develop an understanding of the meaning and processes of measurement, including underlying concepts such as iterating (the mental activity of building up the length of an object with equal-sized units) and the transitivity principle for indirect measurement. (Note: students should apply the principle of transitivity of measurement to make direct comparisons, but they need not use this technical term.)
- 4. Reasoning about attributes of, and composing and decomposing geometric shapes** – Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

MATHEMATICAL PRACTICES

- 1. Make sense of problems and persevere in solving them.**
- 2. Reason abstractly and quantitatively.**
- 3. Construct viable arguments and critique the reasoning of others.**
- 4. Model with mathematics.**
- 5. Use appropriate tools strategically.**
- 6. Attend to precision.**
- 7. Look for and make use of structure.**
- 8. Look for and express regularity in repeated reasoning.**

OPERATIONS AND ALGEBRAIC THINKING

Represent and solve problems involving addition and subtraction.

- 1.OA.1** Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. (Note: See Glossary, Table 1.)
- 1.OA.2** Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Understand and apply properties of operations and the relationship between addition and subtraction.

- 1.OA.3** Apply properties of operations as strategies to add and subtract. (Note: Students need not use formal terms for these properties.)
Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) To add $2 + 6 + 4$, the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$. (Associative property of addition.)
- 1.OA.4** Understand subtraction as an unknown-addend problem. *For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.*

Add and subtract within 20.

- 1.OA.5** Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
- 1.OA.6** Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

Work with addition and subtraction equations.

- 1.OA.7** Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.*
- 1.OA.8** Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = \square - 3$, $6 + 6 = \square$.*

NUMBER AND OPERATIONS IN BASE TEN

Extend the counting sequence.

- 1.NBT.1** Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Understand place value.

- 1.NBT.2** Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
 - 10 can be thought of as a bundle of ten ones – called a “ten.”
 - The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
 - The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
- 1.NBT.3** Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.

Use place value understanding and properties of operations to add and subtract.

- 1.NBT.4** Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

1.NBT.6 Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

MEASUREMENT AND DATA

Measure lengths indirectly and by iterating length units.

1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.

1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

Tell and write time.

1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.

Represent and interpret data.

1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

GEOMETRY

Reason with shapes and their attributes.

1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

1.G.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)

1.G.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

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Mathematical Practice: 4, 5, 6, 7

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Standard: 1.MD.4 | **Additional/Supporting Standard(s):** 1.G.1, 1.G.2

Mathematical Practice: 2, 3, 4, 5, 6

Student Outcomes: I can organize and represent data. I can analyze and interpret data. I can answer questions based upon my collected data. I can reason with shapes and their attributes.

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Standard: 1.NBT.2 | **Additional/Supporting Standard(s):** 1.NBT.1, 1.NBT.5

Mathematical Practice: 1, 2, 4, 5, 6

Student Outcomes: I can understand that the two digits in a two digit number represent the number of ones and tens. I can unitize a collection of 10 objects. I can count (up to 120) starting at any number less than 120. I can represent a numeral with objects in groups of tens and ones.

Number Bingo 22

Standard: 1.NBT.3 | **Additional/Supporting Standard(s):** 1.NBT.1, 1.NBT.2

Mathematical Practice: 1, 2, 4, 5, 6

Student Outcomes: I understand the counting sequences of numbers 0-100. I understand the position of a numeral within a number changes its value. I understand that the two digits of a two-digit number represent amounts of tens and ones. I can use mathematical words to compare the values of two numbers.

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Mathematical Practice: 2, 3, 4, 5, 6, 7

Student Outcomes: I understand the quantities to 99. I understand that the two digits of a two-digit number represent amounts of tens and ones. I can unitize a collection of 10 objects. I can model the values of tens and ones for a given two digit number. I can explain in words the values of two- digit numbers.

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Student Outcomes: I can use addition and subtraction to solve problems within 20. I can decompose a number leading to a 10. I can mentally find 10 more and/or 10 less than a number and explain my reasoning. I can justify the reasonableness of my answer and explain my strategies.	
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Mathematical Practice: 1, 2, 3, 4, 5, 6, 8

Student Outcomes: I can use addition and subtraction to solve problems within 20. I can determine the unknown whole number in addition and subtraction equations relating to three whole numbers ($10-8=2$). I can justify the reasonableness of my answer and explain my strategies.

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Standard: 1.OA.1 | **Additional/Supporting Standard(s):** 1.OA.3, 1.OA.8, 1.NBT.4

Mathematical Practice: 1, 3, 4, 5, 6

Student Outcomes: I can use addition and subtraction to solve problems within 20. I can determine the unknown whole number in an addition equation relating to three whole numbers ($16+?=20$). I can justify the reasonableness of my answer and explain my strategies.

Snap 65

Standard: 1.OA.6 | **Additional/Supporting Standard(s):** 1.OA.4, 1.OA.8

Mathematical Practice: 1, 2, 3, 4, 5, 6, 7

Student Outcomes: I can add and subtract within 20. I can use relationships between addition and subtraction. I can determine the unknown whole number in addition and subtraction equations relating to three whole numbers. I can justify the reasonableness of my answer and explain my strategies to others.

What is the Missing Number 71

Standard: 1.OA.8 | **Additional/Supporting Standard(s):** 1.OA.3, 1.OA.7

Mathematical Practice: 1, 6, 7

Student Outcomes: I can determine the unknown whole number in addition or subtraction equations. I can use mental strategies to add and subtract numbers within 10 with ease. I can use the equal sign appropriately.

Lots of Lines

Common Core Standard:

Measure lengths indirectly and by iterating length units.

1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

Additional/Supporting Standards:

Measure lengths indirectly and by iterating length units.

1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object.

Standards for Mathematical Practice

4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for make use of structure.

Student Outcomes:

- I can measure a line using a length unit.
- I can use the process of measurement.
- I can express the length of the lines with a unit and number.
- I can order and compare 3 lines in order from shortest to longest.
- I can use mathematical words to measure the length of a line.

Materials:

- Lots of Lines Mats
- Unifix cubes, pop cubes, colored square tiles, toothpicks, straws, etc.
- White wipe-off boards
- Markers

Advance Preparation:

- Reproduce Lots of Lines Mats for each group and/or pair of students.
- The teacher needs to assess the students' understanding of the process of measurement.

Steps of the process of measurement

Determine the attribute to be measured

Choose an appropriate unit that has the same attribute

Determine how many of that unit is needed by matching the object

Directions:

1. The teacher will show one of the Lots of Lines Mats A, B, and C (more mats are available but for the first lesson use the simple lines). Discuss with the whole group what attribute of the line might be measured, what units might be used to measure the attribute, and how would the unit be used to measure the attribute.
2. The teacher will distribute a set of mats to each small group or pair of students.
3. Students will estimate the total length of the line compared to the unit (Unifix cubes, pop cubes, colored square tiles, toothpicks, straws, etc.)
4. Students will record the estimations on the white wipe-off boards.
5. The students will use the Unifix cubes/pop cubes, colored square tiles, toothpicks, or straws to measure the lines.
6. The teacher will circulate and observe how the students are measuring the lines. The teacher will see if the students are laying multiple length units end to end with no gaps or overlaps (iteration) and starting and stopping in the appropriate positions.
7. The students will write the measurement (# and name of the unit) of the lines on the Lots of Lines mats.
8. Students will arrange the 3 Lots of Lines mats in the order from shortest to longest.
9. The small groups or pairs of students will share and explain their thinking to the whole class by describing where they started measuring the line and how they measure the lines plus expressing the answer with a number and the length unit. The teacher and students will compare answers with agreements or disagreements and why for each.

Questions to Pose:

Before the task:

- Tell me how do you measure the length of lines?

As student work on the task and during the class discussion:

- Tell me how do you measure the length of lines?
- How do you know which line is longer?
- How do you know which line is the shortest?
- How do you know the order of the 3 lines?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Students cannot represent numbers with the number and a unit and/or the process of measurement.	Have students to work in a small group to model these concepts more with the teacher so the process of measurement will be developed. Pair struggling students to work with each other during centers/math tubs with the process of measurement. Have students to use 2 Mats instead of 3 Mats.

Special Notes:

Steps of the process of measurement

- Determine the attribute to be measured
- Choose an appropriate unit that has the same attribute
- Determine how many of that unit is needed by matching the object

Concepts of measurement

- Units: the attribute being measured dictates the type of unit used; the unit must have the same attribute as the attribute to be measured
- Unit Iteration: units must be repeated in order to determine the measure
- Scale: Understanding if you are comparing two lengths the starting point is the same location
- Conservation: an object maintains the same size even if it is rearranged in various ways
- Transitivity Property: If line A is longer than line B, and line B is longer than line C, then line A is longer than line C. Example: A _____

B _____

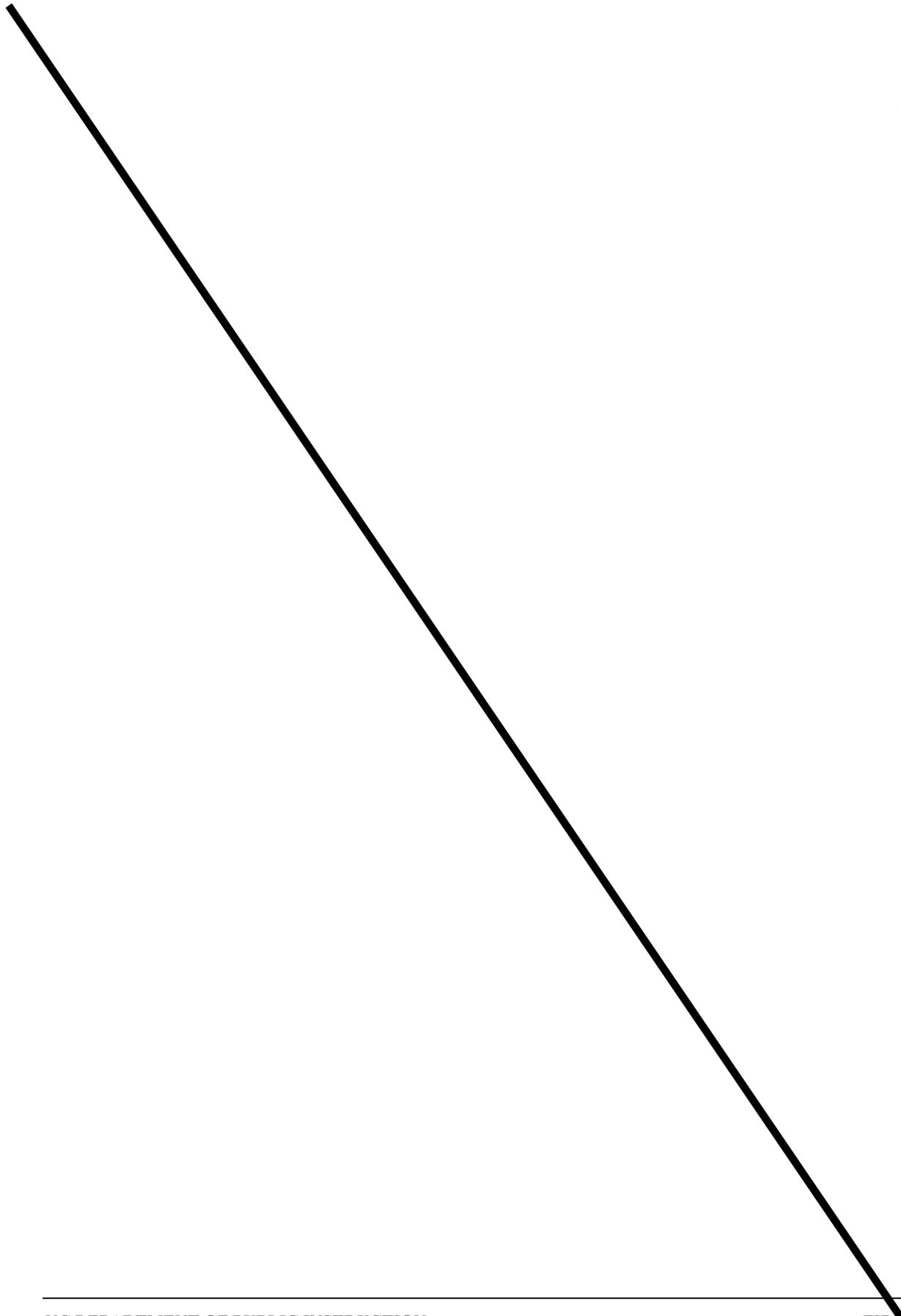
C _____

Students that can measure and record correctly the length of Mats A, B, C are ready to move to the more difficult Mats with corners. Different sizes of length units may be used that would be appropriate for the students' understandings of the process of measurement.

Solutions:

Different answers for the differences of the unit sizes

A



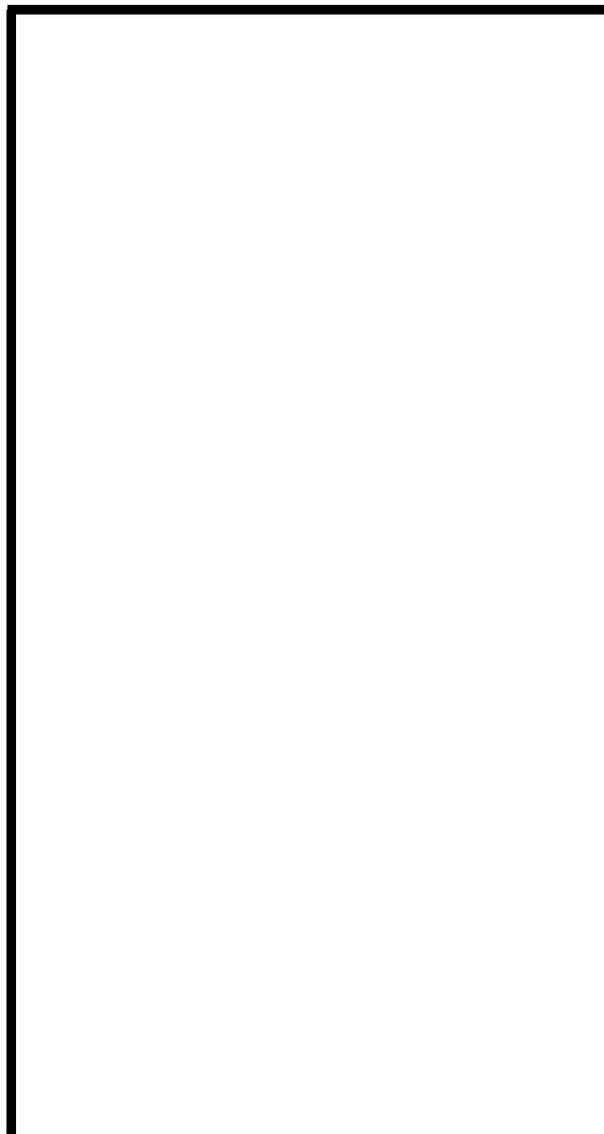
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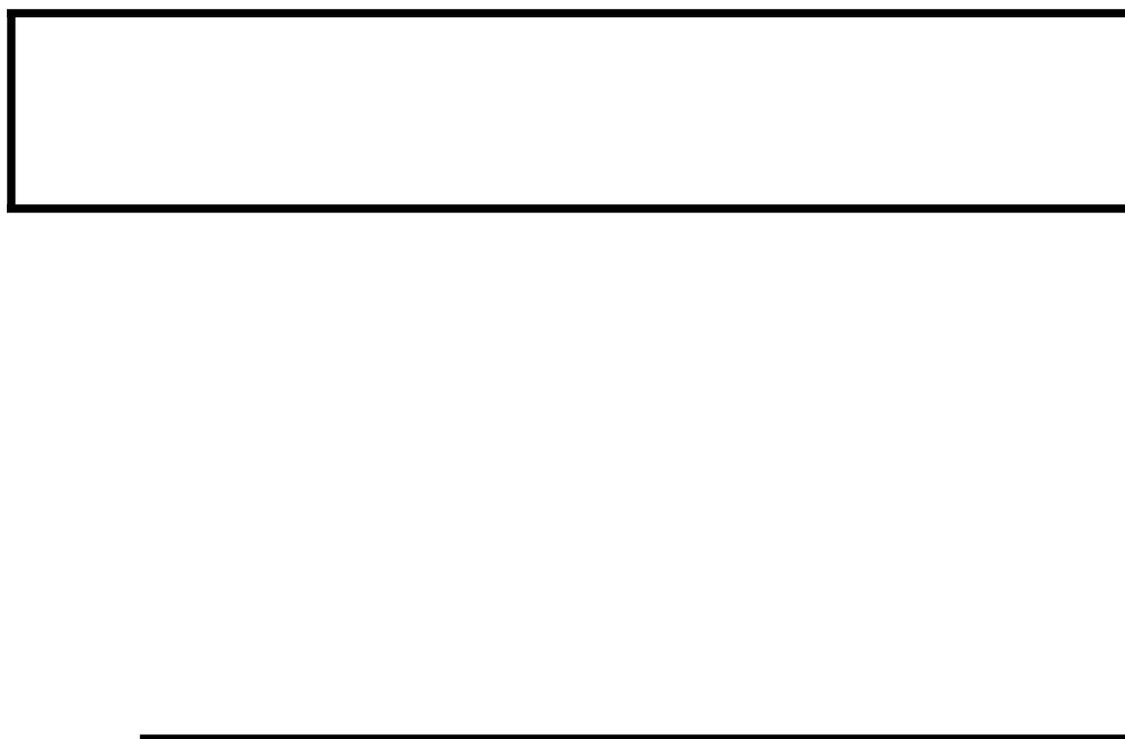
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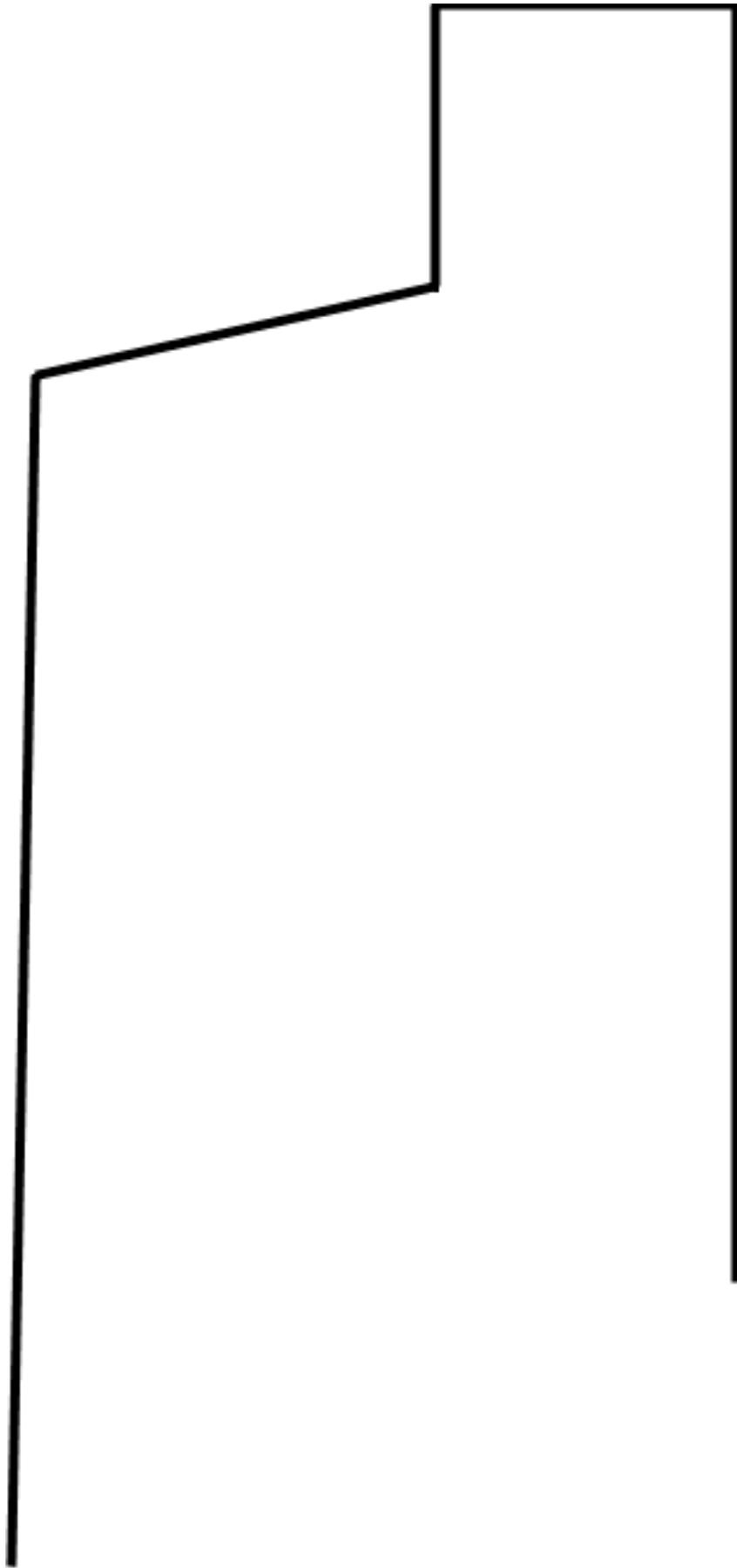


D



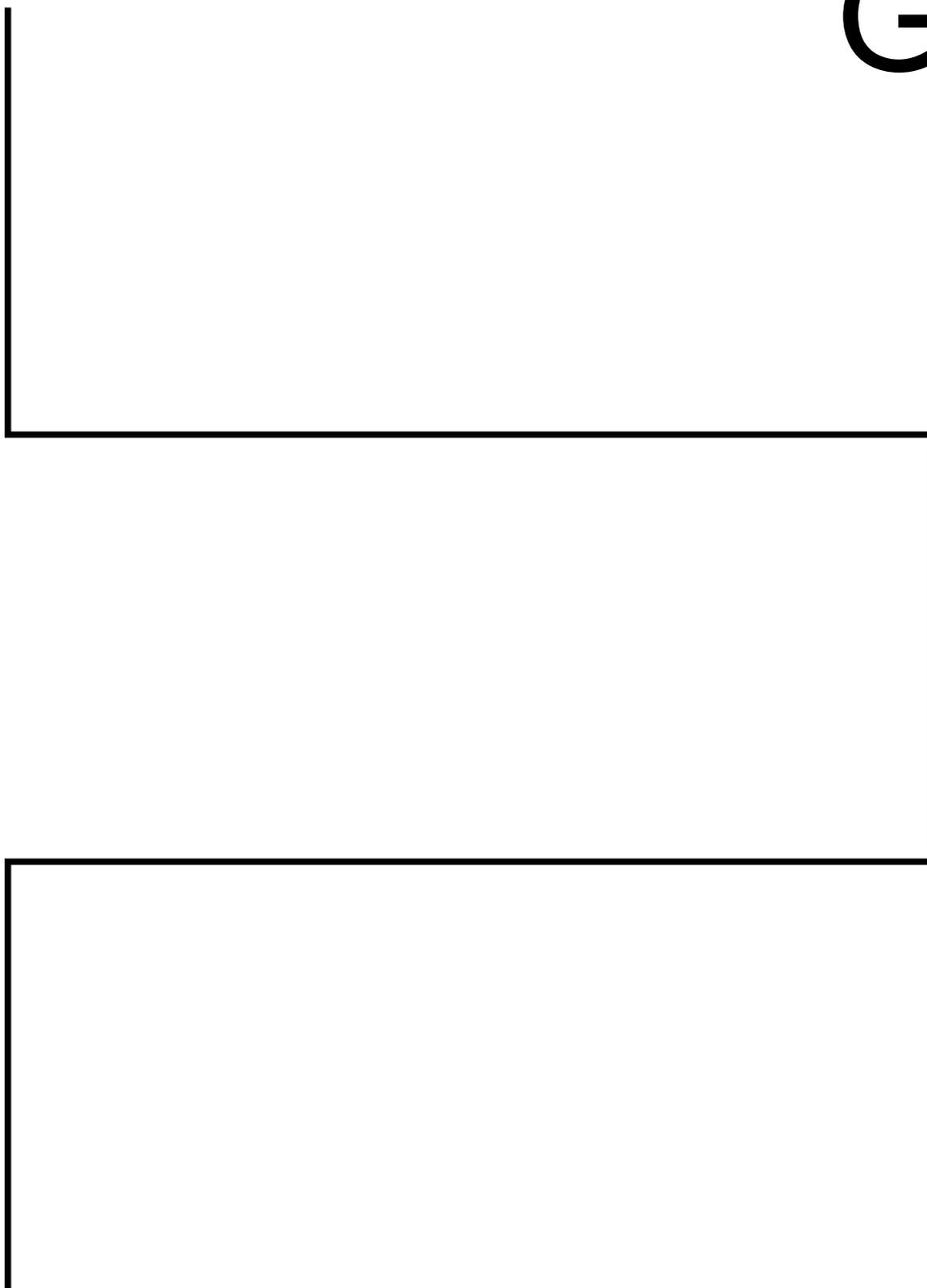
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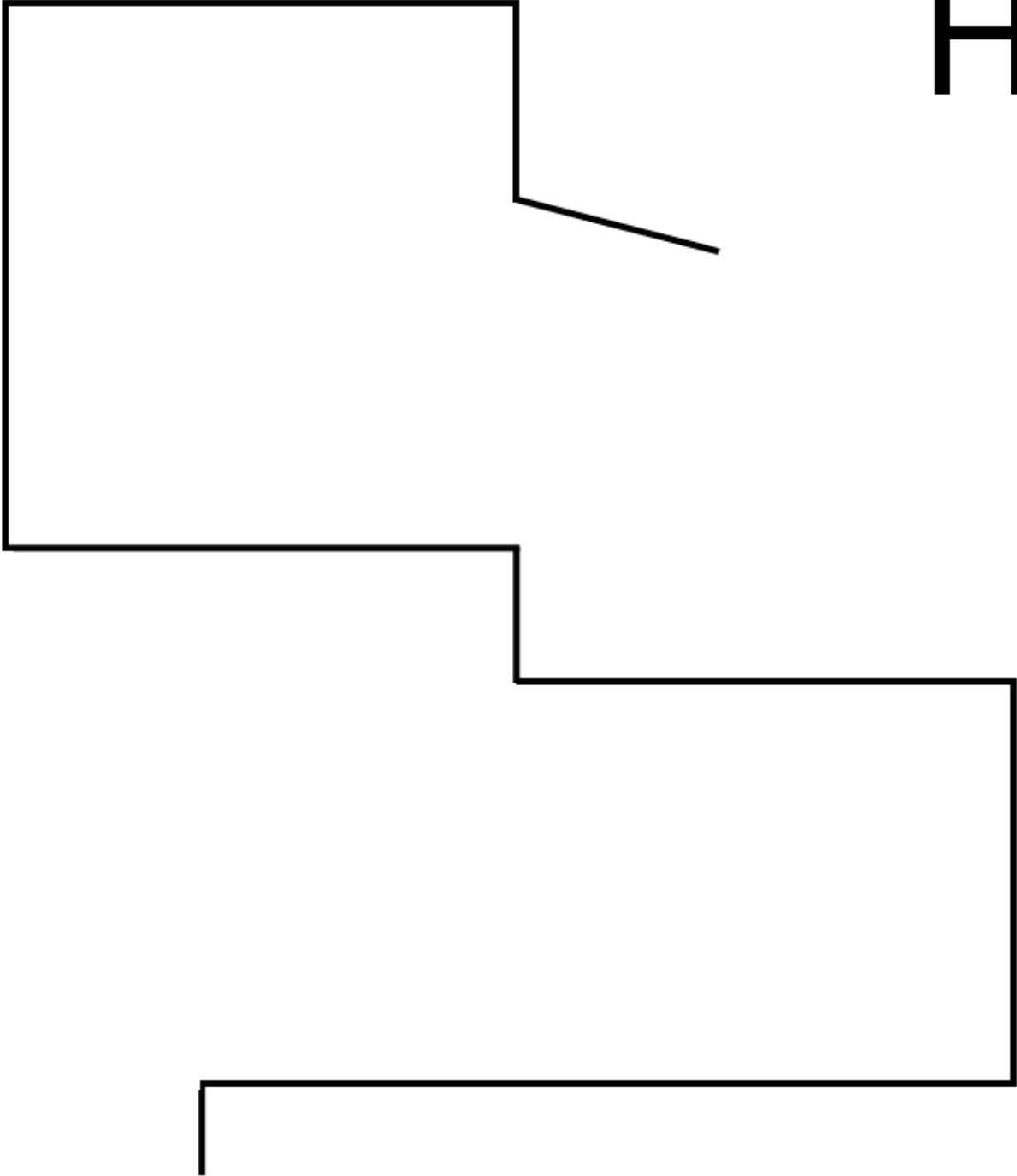




F

G





Pattern Block Graph

Common Core Standard:

Represent and interpret data.

1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Additional/Supporting Standards:

Reason with shapes and their attributes.

1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

1.G.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn formal names such as “right rectangular prism.”)

Standards for Mathematical Practice

2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision

Student Outcomes:

- I can organize and represent data.
- I can analyze and interpret data.
- I can answer questions based upon my collected data.
- I can reason with shapes and their attributes.

Materials:

- An owl book (Owl Moon by Jane Yoolen, This is Owl by Kayleigh O’Mara, Owl Howl by Paul Friester & Philippe Goosens)
- Pattern Blocks
- Blackline Master of Pattern Block Graph
- Pattern block stamps or paper cut-out pattern blocks

Advance Preparation:

- Duplicate the Blackline Master of Pattern Block Graph per student
- If using the paper cut-out pattern blocks, have them ready to use.

Directions:

1. The teacher reads an owl book such as Owl Moon by Jane Yolen, This is Owl by Kayleigh O'Mara, Owl Howl by Paul Friester & Philippe Goosens.
2. During the discussion of the book, the teacher will ask the students to describe the owl in the book.
3. The students will create an owl using pattern blocks. During this time, the teacher will ask students to tell the defining attributes of the pattern block shapes. The following are examples of defining attributes of the green triangle pattern block: a closed shape and a three sided shape.
4. Pattern block stamps or paper cut-out pattern blocks will be used to make a duplicate copy of his/her pattern block owl.
5. The students will pose and write a question on the blackline master of Pattern Block Graph.
6. Each student will organize and represent his/her data onto the blackline master of Pattern Block Graph. This includes labeling the axes of the graph.
7. Students need to analyze their graphs. Analyzing a graph includes the total number of data points, how many in each category, and how many more or less are in one category than in another.
8. Next, each student will interpret his/her graph by reading the posed questions and checking to see if the data answers the question.
9. Students will display their graphs and explain the graphs to the whole group. The sharing student will ask the other students if they agree that the graph shows the answer to the question and if they have any other questions about the data collected.

Questions to Pose:

During designing pattern block owls:

1. What pattern blocks are you using and how do you know that pattern block is a _____?

During graphing:

1. What information will your data show you?
2. How do you know how many green triangles you used?
3. How do you know how many red trapezoids spaces to color?
4. How many pattern blocks did you use and how do you know?
5. Which pattern block shape did you use the most of and how do you know?
6. What data shows the least amount of pattern block shapes that you used?
7. Which pattern block shape was used least and how do you know?

After:

1. What can you tell me about your owl by looking at this pattern block graph?
2. What does the shape of your data tell you?
3. How is Student 1's graph the same and/or different from Student 2's graph?
4. Point to a hexagon, what other shapes could you have used here?
5. Which pattern block shape do you think the class used the most and how could we check to see?
6. Which pattern block shape do you think the class used the least and how could we prove it?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Students cannot transfer the data to the graph.	Have students use the paper pattern blocks onto the graph to represent the data.
Students cannot tell how many more or less are in one category than in another.	Have students use the paper pattern blocks or actual pattern blocks of the two categories and match shapes one-to-one to see how many more or how many less.

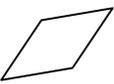
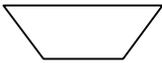
Special Notes:

The blackline master of the pattern block graph may be used for any design. Tasks such as this one can and should be repeated many times during the year. An extension of this task would be for students to create another owl and compare their two owls.

Solutions:

Students' graphs will vary.

Example of the Blackline Master of Pattern Block Graph:

Student's Posed Question will be written here.									
Student will label this axis here.	10								
	9								
	8								
	7								
	6								
	5								
	4								
	3								
	2								
	1								
									
Student will label this axis here.									

Blackline Master of Pattern Block Graph

10									
9									
8									
7									
6									
5									
4									
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2									
1									
									

Handful of Cubes

Common Core Standard:

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- a. 10 can be thought of as a bundle of ten ones — called a “ten.”
- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Additional/Supporting Standard(s):

Extend the counting sequence.

1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Use place value understanding and properties of operations to add and subtract.

1.NBT.5 Given a two-digit number; mentally find 10 more or 10 less than the number without having to count; explain the reasoning used.

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.

Student Outcomes:

- I can understand that the two digits in a two digit number represent the number of ones and tens.
- I can unitize a collection of 10 objects.
- I can count (up to 120) starting at any number less than 120.
- I can represent a numeral with objects in groups of tens and ones.

Materials:

- Copies of multiple ten frames work mats, 1 for each student (blackline master attached)
- Baskets of snap cubes, (between 30-50 cubes per basket), 1 basket for each pair of students
- Recording sheet, 1 per student (These can be laminated or placed in sleeve protectors and used as wipe off sheets), markers

Advance Preparation:

- Review the significant ideas in Critical Area 2 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of whole number relationship and place value, including grouping in tens and ones.
- Prepare baskets of cubes
- Prepare copies of multiple ten frames work mats
- Prepare recording sheets as wipe off cards, 1 per pair of students
- Determine partner pairings and create an assignment list

Directions:

1. Gather students on the floor.
2. Tell students, “Today at your tables you will find baskets of cubes. Your task is for you and your partner to take turns grabbing a handful of the cubes and determining how many cubes you grabbed. Tell your partner how many cubes you have. Next, group your collection of cubes into groups of tens and ones. Tell your partner what you find out. You have tools you may use if you wish. Record the number of cubes and the number of groups of tens and ones you have on the wipe off recording sheet. Then play again for several rounds.
3. Assign partners and send students to the tables to work.
4. As students work, circulate and make notes about how students solve the task.
 - Does the student count the cubes one by one? If so, notice how they group them for counting.
 - Does the student organize the cubes for the count in some kind of order (in a linear arrangement or random)?
 - Do they organize in groups of tens using ten frames?
 - Do students snap cubes together into groups of tens (unitize)?
 - Can students correctly record the number of objects on the recording sheet, recognizing the number of tens and the number of ones in their collections? Do they understand the value of each digit in the number?
5. Ask questions to assess understanding and any misconceptions students may have. (See suggested questions below).
6. After most students complete the task, bring the group back together.
7. Based on your observations, call students to share their strategies. (Remember to call on students with correct but simple solution strategies to share first before calling on students who demonstrated understanding of grouping (unitizing) tens, and the value of the digits.

An explanation might be,
“I have 12 cubes. I know I have 12 because I filled one ten frame and I have 2 more on this frame. I grouped ten cubes into one ten and then I counted 10, 11, 12.”
(As the teacher circulates during student partner time, this part of the task provides information for the teacher about students’ counting understanding. Can the student count on from 10 or 20, when 1 or 2 ten frames have been filled, or does the student have to go back and count all beginning at one?)
8. Allow students to continue this task on other occasions and with larger amounts of cubes in the baskets.

Questions to Pose:

While students are in whole group:

- What do you know about this task?
- Tell me in your own words.
- What are some ways you can show your mathematical thinking when you work on this task?
- What so you know about working with two digit numbers?

As they work on the problem:

- Tell me about your thinking.
- What does this part of your number show? How did you know that?
- What tool did you decide to use to help you solve your problem? Why did you select it?
- Which numeral shows the number of tens in your number? How do you know?
- What would happen if I grabbed 6 more cubes and put them with your 18? How many tens would you have? How many ones? Show me how you know.
- I notice you did not have to count all your cubes. Explain to me how you determined how many you have?
- How can you solve this problem another way?

After solving (whole group):

- Who can restate what we were asked to do with this task?
- Tell the group how you solved it? What did you do first? Why? What did you do next? Why?
- What was your mathematical thinking for this problem?
- Show the group your recording sheet. What does each of the digits represent?
- How can you solve this problem another way?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Student cannot identify the value of the numbers in the tens place.	Have the student use cubes to compose and decompose smaller numbers (10,11,12) to compare the numbers. Have the student use number lines to compare the relationships between the numbers such as 1 and 10.

Special Notes:

To extend this task, after students have had many experiences with task, present this task again, asking partners to add their two handfuls. Note how students determine how to join their sets of cubes by unitizing or by placing cubes on the multiple ten frame mats, or counting all by ones.

Ten Frame Work Mats

Handful of Cubes Recording Sheet

I grabbed _____ cubes.	I can make _____ groups of ten.	I have _____ ones.	If I get ____ more cubes, I can make ____ tens.
I grabbed _____ cubes.	I can make _____ groups of ten.	I have _____ ones.	If I get ____ more cubes, I can make ____ tens.
I grabbed _____ cubes.	I can make _____ groups of ten.	I have _____ ones.	If I get ____ more cubes, I can make ____ tens.
I grabbed _____ cubes.	I can make _____ groups of ten.	I have _____ ones.	If I get ____ more cubes, I can make ____ tens.

Number Bingo

Common Core Standard:

Understand place value.

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, $<$.

Additional/Supporting Standards:

Extend the counting sequence.

1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- 10 can be thought of as a bundle of ten ones — called a “ten.”
- The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.

Student Outcomes:

- I understand the counting sequences of numbers 0-100.
- I understand the position of a numeral within a number changes its value.
- I understand that the two digits of a two-digit number represent amounts of tens and ones.
- I can use mathematical words to compare the values of two numbers.

Materials:

- Number Bingo game board
- Number Cards (0-9) or two 10-Sided Polyhedral Dice
- Hundred Boards

Advance Preparation:

- Reproduce game boards.
- Laminate or place game boards in protected sleeves.
- Reproduce a deck with two sets of cards numbered 0-9.
- The teacher needs to assess the students’ mathematical understanding of the values of two digit numbers.

Directions:

1. Distribute hundred boards to students. Have students find the number 46 and 64 on hundred boards.
2. Ask:
 - What do you notice about these numbers?
 - How many tens does each number have and how do you know that?
 - Which number is greater and how do you know that?
3. Continue with 2 other pairs of numbers such as 57 and 75, then 19 and 91.
4. Help students focus on the idea that changing position of the numbers in the tens and ones place changes the value of the number.
5. Students can play Number Bingo with a small group or whole class with each student given a game board.
6. A student or the teacher will roll two dice or pull two number cards at the same time to generate two digits. For example: a 2 and an 8 could make 28 or 82.
7. Students will decide which of the numbers will be written on their game boards in the appropriate row and the numbers must be written in order from least to greatest in each row. Numbers can only be used once on the game board. Note: Each row of the game board covers 20 numbers (0-19, 20-39, 40-59, 60-79, 80-99). The numbers in red were placed on the game board to help children with the order of the numbers. The red numbers may be removed for children that do not need the assistance.
8. Continue rolling the dice or pulling number cards until a winner is proclaimed. The goal is to get 5 numbers in a row on their Number Bingo game board in the fewest turns as possible.

This game can also be modified so students can only win if they have:

 - 5 in a row vertically
 - 5 in a row horizontally
 - 5 in a row diagonally
9. Bring the class back together for a discussion. Show students a game board that has 4 numbers filled in a row.

Example: 21, 25, 32, 34, blank square
Show the digits 3 and 8.
Ask: What two numbers could we make?
For this game which is the best number to make? Why?
10. Give another situation if time permits.

Questions to Pose:Before:

- What do you notice about these numbers?
- How many tens does each number have and how do you know that?
- Which number is greater and how do you know that?

During:

- Why did you choose to use that number?
- What are the two numbers that you can make with the 2 numbers rolled/pulled?

After:

- What two numbers could we make?
- For this game which is the best number to make? Why?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Students cannot make the two numbers from the 2 numbers rolled or pulled.	Have students to work with partners. Have students to write the numbers on a white wipe-off board. Have students to build the two numbers that can be formed with some type of groupable manipulatives so children can compare the 2 numbers. Have students to locate the 2 numbers on a hundred board.
Students cannot compare numbers up to 100.	Have students use number cards for numbers within the range of their understanding, such as numbers up to 50. Have students draw 1 number card so students will compare numbers 0-9. Have students to use 100 boards so students can visually compare the values of the numbers.

Special Notes:

This game is played after students have an understanding of place value for tens and ones and the sequence of numbers less than 100.

Solutions:

Students' finished game boards will vary.

0	1	2	3	4
5	<u>6</u>	7	8	<u>9</u>
0	1	2	3	4
5	<u>6</u>	7	8	<u>9</u>

	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19																			
0																				19
	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39																			
20																				39
	40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59																			
40																				59
	60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79																			
60																				79
	80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99																			
80																				99

Place Value and Arrow Cards

Common Core Standard:

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- a. 10 can be thought of as a bundle of ten ones – called a “ten.”
- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven eight, or nine tens (and 0 ones).

Additional/Supporting Standards:

Understand place value.

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, $<$.

Standards for Mathematical Practice

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for make use of structure.

Student Outcomes:

- I understand the quantities to 99.
- I understand that the two digits of a two-digit number represent amounts of tens and ones.
- I can unitize a collection of 10 objects.
- I can model the values of tens and ones for a given two digit number.
- I can explain in words the values of two- digit numbers.

Materials:

- Arrow cards
- Place value materials (Unifix cubes, pop cubes, mini-ten frames)
- White wipe-off boards

Advance Preparation:

- This task would be done after many experiences with various place value materials.
- Reproduce Arrow cards.
- Arrow cards are a set of place value cards with an “arrow” on the right side. Students can organize the cards horizontally or vertically to represent numbers in expanded form ($27 = 20 + 7$). The cards can overlap cards and line up the arrows to form multi-digit numbers.
- Prepare a list of names for working pairs of students.

Directions:

1. Assess students’ prior knowledge of place value by asking the questions below in the section, Questions: Before.
2. Pair the students and then have students to explore the various ways to sort the set of arrow cards. Students may sort the Arrow cards based on the numbers without using place value. Some students may sort by the counting order of numbers (0-10). Another way students may sort is counting by 10’s.
3. Next, ask students to show you the numbers 1 and 10. The students work with their partners to show the numbers with the Arrow cards, the place value materials (Unifix cubes, pop cubes, mini-ten frames) and write the numbers on their white wipe-off boards. (See questions below.)
4. As students work, these are questions you may ask to monitor their learning:
How many tens are there in this number and how do you know that?
How many ones are there in this number and how do you know that?
How are the two numbers similar and different and how do you know that?
What is the value of each digit in both numbers?
5. Continue this activity with different numbers such as 2 and 20.

Questions to Pose:

Before:

1. Show me a train of 10. Tell me what you know about the number 10. (If the student says 10 you would want to ask follow-up questions so you will know if the student is counting by ones or recognizing the cubes as a unit of 10.)

During:

1. What is the quantity (value) of the number in the tens place?
2. What is the quantity (value) of the number in the ones place?
3. How are the two numbers similar and different and how do you know that?
4. What is the value of each digit in both numbers?
5. Look at a 2-digit number, how do you know how many ones and tens there are in the number?

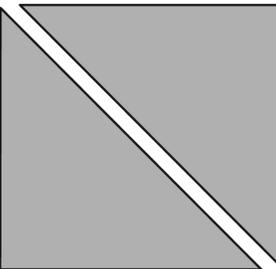
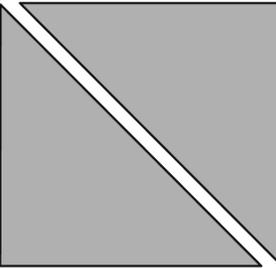
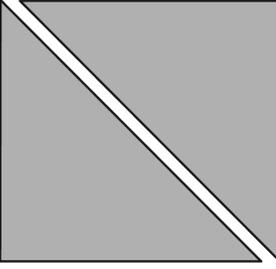
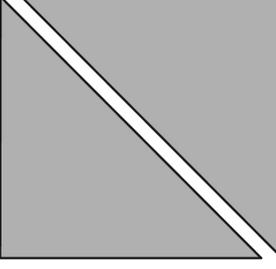
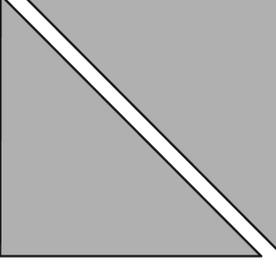
Possible Misconceptions/Suggestions:

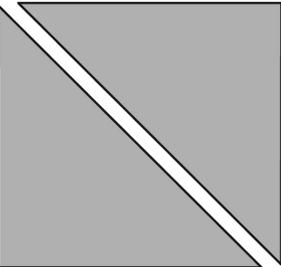
Possible Misconceptions	Suggestions
Students cannot identify the quantity (value) of the numbers in the tens place.	Have students use Unifix cubes or pop cubes to compose and decompose numbers so students can visually see the quantity of the numbers. Have students use number lines to compare the relationships between the numbers such as 1 and 10.

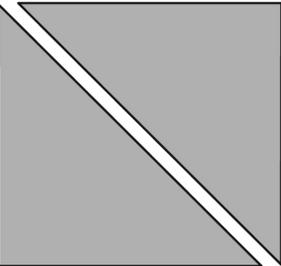
Special Notes:

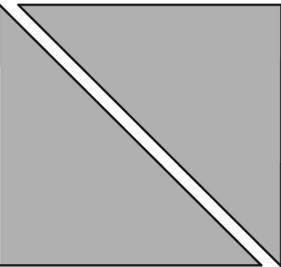
This task needs to be repeated often for students to develop place value understanding.

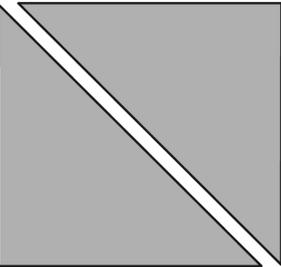
Solutions: NA

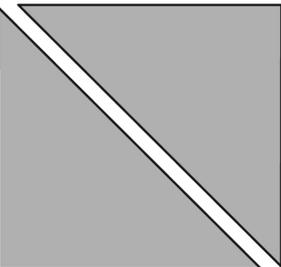
4	4		6	6
3	3		8	8
2	2		7	7
1	1		9	9
0	0		5	5

40	4	0		0	6	06
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30	3	0		0	8	08
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20	2	0		0	4	04
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10	1	0		0	9	09
----	---	---	---	---	---	----

00	0	0		0	5	05
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Place Value Step 2 and Arrow Cards

Common Core Standard:

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- 10 can be thought of as a bundle of ten ones – called a “ten.”
- The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Additional/Supporting Standards:

Understand place value.

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, $<$.

Standards for Mathematical Practice

- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for make use of structure.

Student Outcomes:

- I can understand the quantities to 99.
- I understand that the two digits of a two-digit number represent amounts of tens and ones.
- I can unitize a collection of 10 objects.
- I can model the values of tens and ones for a given two digit number.
- I can explain in words the values of two- digit numbers.

Materials:

- Arrow cards
- Place value materials (Unifix cubes, pop cubes, mini-ten frames)
- White wipe-off boards

Advance Preparation:

- This task would be done after many experiences with various place value materials.
- Reproduce Arrow cards.
- Arrow cards are a set of place value cards with an “arrow” on the right side. Students can organize the cards horizontally or vertically to represent numbers in expanded form ($27 = 20 + 7$). The cards can overlap cards and line up the arrows to form multi-digit numbers.
- Prepare a list of names for working pairs of students.

Directions:

1. Assess students' prior knowledge of place value by asking the questions below in the section, Questions: Before.
 - Show me 30.
 - Tell me what you know about the number 30. (If the student says 30 cubes you would want to ask follow-up questions so you will know if the student is counting by ones or recognizing the cubes as units of 10's.)
2. Ask students to show you the number 46. The students work with their partners to show the number with the Arrow cards, the place value materials (Unifix cubes, pop cubes, mini-ten frames) and write the numbers on their white wipe-off boards. (See questions below.)
3. As students work, these are questions you may ask to monitor their learning:
 - How many tens are there in this number and how do you know that?
 - How many ones are there in this number and how do you know that?
 - What is the value of each digit in both numbers?
4. Next, ask students to show you the number 64. The students work with their partners to show the number with the Arrow cards, the place value materials (Unifix cubes, pop cubes, mini-ten frames) and write the numbers on their white wipe-off boards. (See questions below.)
5. As students work, these are questions you may ask to monitor their learning:
 - How many tens are there in this number and how do you know that?
 - How many ones are there in this number and how do you know that?
 - What is the value of each digit in both numbers?
6. Also ask:
 - What do they notice about the numbers 46 and 64.
 - How are the two numbers similar and different and how do you know that?
7. Continue this activity with different numbers such as 15 and 51.

Questions to Pose:Before:

1. Show me a train of 30.
2. Tell me what you know about the number 30. (If the student says 30 cubes you would want to ask follow-up questions so you will know if the student is counting by ones or recognizing the cubes as units of 10's.)

During:

1. What is the quantity (value) of the number in the tens place?
2. What is the quantity (value) of the number in the ones place?
3. How are the two numbers similar and different and how do you know that?
4. What is the value of each digit in both numbers?
5. Look at a 2-digit number, how do you know how many ones and tens there are in the number?

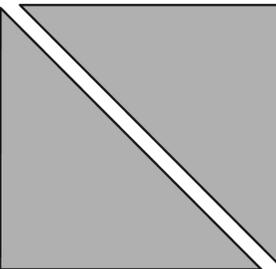
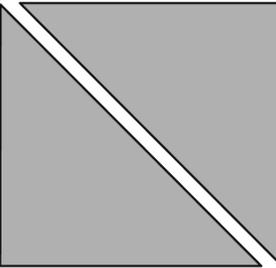
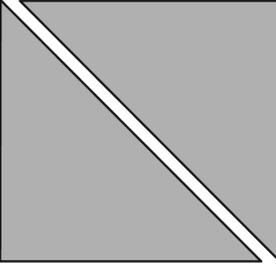
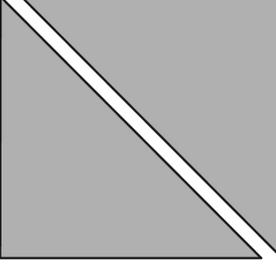
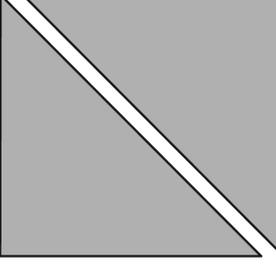
Possible Misconceptions/Suggestions:

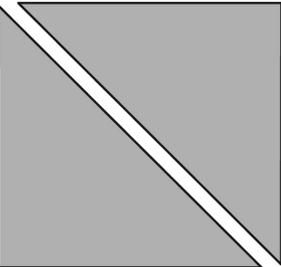
Possible Misconceptions	Suggestions
Students cannot identify the quantity (value) of the numbers in the tens place.	Have students use Unifix cubes or pop cubes to compose and decompose numbers so students can visually see the quantity of the numbers. Have students use number lines to compare the relationships between the numbers such as 15 and 51.

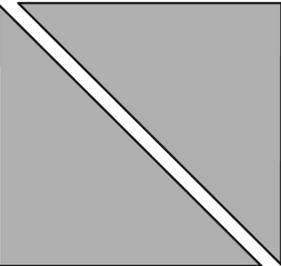
Special Notes:

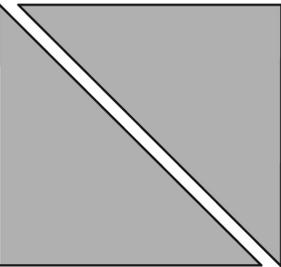
This task needs to be repeated often for students to develop place value understanding.

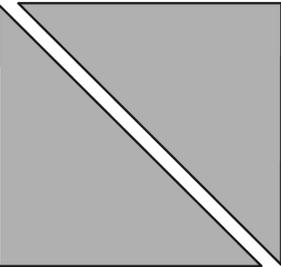
Solutions: NA

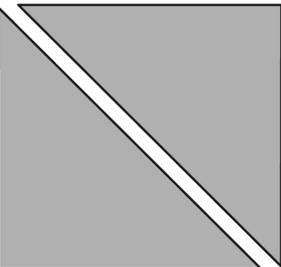
4	4		6	6
3	3		8	8
2	2		L	L
1	1		9	9
0	0		5	5

40	4	0		0	6	06
----	----------	----------	---	----------	----------	----

30	3	0		0	8	08
----	----------	----------	---	----------	----------	----

20	2	0		0	4	04
----	----------	----------	--	----------	----------	----

10	1	0		0	9	09
----	----------	----------	---	----------	----------	----

00	0	0		0	5	05
----	----------	----------	---	----------	----------	----

Tall Towers

Common Core Standard:

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- a. 10 can be thought of as a bundle of ten ones – called a “ten.”
- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven eight, or nine tens (and 0 ones).

Additional/Supporting Standards:

Understand place value.

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, $<$.

Standards for Mathematical Practice:

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for make use of structure.

Student Outcomes:

- I can compare numbers up to 99.
- I can use mathematical words to compare the values of two numbers.
- I can build numbers showing how many 10’s and 1’s compose a given number up to 99.

Materials:

- Tall Towers game board for each pair of players
- A deck with three sets of cards numbered 0-9 for each pair of players
- Connecting cubes (2 sets of 100 per pair of students)
- Markers (20 beans, two-color counters, or cubes per pair of students)

Advance Preparation:

- Reproduce game board for each pair of partners.
- Reproduce a deck with three sets of cards numbered 0-9 for each pair of players.
- The teacher needs to assess the students’ mathematical understanding of the values of two digit numbers.
- Prepare a list of names for working pairs of students.

Directions:

1. The teacher will model with the class how to draw two number cards and make the number that is greater. Example: If 1 and 5 are drawn the student could make a 15 or 51. 51 has 5 tens and 1 ones and 15 has 1 ten and 5 ones. 51 is greater than 15 so 51 is the number used. The two players agree that the greater number has been made.
2. The teacher will discuss with the class the procedures of building numbers with connecting cubes to show 10's and 1's.
3. The teacher will draw two number cards and the students will model the greater number that can be made with the two number cards with the connecting cubes. Repeat again.
4. The teacher will model the "math talk" for comparing the two numbers. The teacher may need to review "math talk" procedures such as watching and listening to each other and showing respect.
5. Organize students in pairs.
6. Each pair of players has a Tall Towers game board, a deck of number cards that has been shuffled and markers (beans, two-color counters, cubes).
7. Player 1 draws two number cards and shows the number that is greater after having a "math talk" with his/her partner.
8. Player 1 uses connecting cubes to represent the number showing 10's and 1's.
9. Player 2 repeats what player 1 has done.
10. The players will prove which number is greater during their "math talk". The player with the greater number places a marker on his/her tower.
Example of a "math talk": Partner 1 says, "I have 61. 61 has 6 tens and 1 one."
Partner 2 says, "I have 67. 67 has 6 tens and 7 ones."
Partner 1 says, "We both have 6 tens."
Partner 2 says, "But I have 7 ones and you have 1 one. So 67 is greater than 61. I get to put a marker on my tower."
11. The first player to earn 10 markers on his/her tower is the winner.

Questions to Pose:

As students play the game:

- How do you know that the number you made with your two number cards is the greater number?
- What mathematical strategy did you and your partner use to determine which number is greater?
- Who won, how did you determine that?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Students cannot make the greater number with the 2 number cards.	Have students locate the 2 numbers that can be formed with the 2 number cards on a number line to compare the relationships between values of the numbers.
Students cannot compare numbers up to 100.	Have students use number cards for numbers within the range of their understanding, such as numbers up to 50. Have students draw 1 number card so students will compare numbers 0-9. Have students to use 100 boards so students can visually compare the values of the numbers.

Special Notes:

This game is played after students have an understanding of place value for tens and ones and numerous experiences verbally comparing two sets of objects using comparison vocabulary.

Solutions:

Students' finished game boards will vary.

Tall Towers



Player 1

Player 2

0	1	2	3	4
5	6	7	8	9
0	1	2	3	4
5	6	7	8	9

Greater Than, Less Than, Equal To

Common Core Standard:

Understand place value.

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.

Additional/Supporting Standards:

Extend the counting sequence.

1.NBT.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

Understand place value.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- 10 can be thought of as a bundle of ten ones — called a “ten.”
- The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Standards for Mathematical Practice

2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
6. Attend to precision.

Student Outcomes:

- I can understand the quantities to 99.
- I can compare numbers up to 99.
- I can use mathematical words to compare two numbers.
- I can use the $<$, $>$, and $=$ symbols appropriately.

Materials:

- Game board (one per pair of students)
- 2 Dice or Place Value Dice for 10's and 1's
- Sentence strips with words and symbols for greater than, less than, and equal to

Advance Preparation:

- Reproduce game board.
- The teacher needs to assess the students' mathematical understanding of the values of two digit numbers.
- Select the mathematical vocabulary such as greater than, less than, and equal to. Create sentence strips with the words and the symbols on them so that students can connect the written words and the symbols with the spoken words.
- Prepare a list of names for working pairs of students.

Directions:

1. The teacher will discuss with the class the procedures for rolling the dice and recording the numbers on the game board.
2. The teacher will model the “math talk” for deciding if the first number is greater than, less than, or equal to the second number. The teacher may need to review “math talk” procedures such as watching and listening to each other and showing respect.
3. The teacher will review and post the sentence strips with the words and symbols so students may make reference to the sentence strips if needed during their “math talks”.
4. Organize students in pairs.
5. Partners have one game board and 2 dice or place value dice for 10’s and 1’s.
6. The first partner rolls the dice and tells the second partner what the number is and then writes the number in the box.
7. The first partner rolls the dice again and tells the second partner what the second number is and writes the number in a box.
8. The first partner compares the two numbers with his/her partner. Then the first partner writes $<$, $>$, or $=$ in the circle between the two numbers.

Examples: 72 has 7 tens and 2 ones.

53 has 5 tens and 3 ones.

72 has more tens than 53.

So, 72 is more than 53.

31 is less than 39.

I know this because when

I count up I say 31 before I say 39.

9. The partners take turns until the game board is filled.

Questions to Pose:

As students play game:

- How do you know that the first number is greater than, less than or equal to the second number?
- What mathematical strategy did you use to determine which number is greater than, less than or equal to the other?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Students cannot compare numbers up to 100.	<p>Have students use dice/number cards for numbers less than 50 while using the game board.</p> <p>Have students use mini-ten frames and/or manipulatives to build numbers to compare so students can visually compare the numbers.</p> <p>Have students use 100 boards so students can visually compare the numbers.</p> <p>Have students use number lines to compare the relationships between the numbers.</p>

Special Notes:

This game is played after students have an understanding of place value for tens and ones and numerous experiences verbally comparing two sets of objects using comparison vocabulary.

Solutions:

Students’ finished game boards will vary.

Greater Than, Less Than, Equal To

>

<

=

Roll 2 dice or place value dice twice and write in the 2 numbers rolled. Talk with your partner about comparing the two numbers. Then write the correct sign in the circle.

Partner 1

Partner 2

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

	○	
--	---	--

Spin to Win

Common Core Standard:

Understand place value.

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.

Additional/Supporting Standard:

Understand place value

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- a. 10 can be thought of as a bundle of ten ones — called a “ten.”
- b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure

Student Outcomes:

- I can build numbers with place value manipulatives (Unifix cubes, pop cubes, mini-ten frames).
- I can figure out which number is larger (or smaller or equals).
- I can read and write numbers using expanded form.
- I can explain how to determine whether a two-digit number is greater than, less than, or equal to another two-digit number.
- I can compare two-digit numbers and record this comparison by using the symbols $>$, $<$, and $=$.

Materials:

- Recording sheet for each pair of students
- Spin to Win spin sheet for each pair of students
- Place value manipulatives (Unifix cubes, pop cubes, mini-ten frames)
- Clear spinners or students can use a pencil with a paper clip to make a spinner

Advance Preparation:

- Before playing this game
 - Students should build 2-digit numbers using a variety of place value materials such as Unifix cubes, pop cubes or mini-ten frames.
 - Students should have used the $>$, $<$, $=$ signs to record the comparison of two numbers.
- Duplicate the Spin to Win spinner sheet for each pair of students.
- Duplicate a recording sheet for each pair of students.

Directions:

1. Before introducing the game have students build numbers with place value manipulatives (Unifix cubes, pop cubes, mini-ten frames). For example, the teacher tells them to build 45. After sharing the model for 45 the teacher has students build additional numbers.
2. The teacher introduces the game, Spin to Win. The game can be introduced to the whole class or to small groups.
3. First, spin the More/Less spinner to determine if the winning strategy for this game is to have more or less than your partner. Circle more or less on the recording sheet.
4. Next Player 1 spins a number spinner. The teacher can spin or have a student spin. After the spin, decide if this spin is for 10's or 1's. Use the place value manipulatives (Unifix cubes, pop cubes, mini-ten frames) and model that value if 10's or 1's. After the spin discuss how to determine if the spin should be 10's or 1's. Talk about how larger numbers should be used for the 10's if you are trying to get the largest number possible. The larger numbers should be used for 1's if you are trying to get the smallest number possible.
5. Spin for the second player and use the place value manipulatives (Unifix cubes, pop cubes, mini-ten frames) to model that value.
6. Continue taking turns until each person has had 2 turns. Once a number is modeled with the place value manipulatives you may not change that number or use that place again.
7. After both players have taken two spins, total the amount of 10's and 1's and record it in standard and expanded form. If the terms standard and expanded form have not been introduced to the class, explain these terms. See the sample recording sheet at the end of this task.
8. Circle the winning score. Discuss how to determine the winning score.
9. Record the comparison of the two numbers with the $<$, $>$, $=$ symbols.
10. Play several games as a whole class. The discussion of why numbers spun should be 10's or 1's is critical to developing student understanding.
11. The teacher may play this game for 2-3 class sessions with the whole class before having partners play the game independently. It is important that the teacher and students justify why numbers are chosen to be 10's or 1's.

Questions to Pose:

- Why did you decide to make this number 10's or 1's?
- If you are trying to get the smallest number and you spin a 2 should you place that number in the 10's or 1's place? Why?
- If I spin a 5 and 1 what is the largest (smallest) number I could make? How did you decide on your answer?
- How do you write (say a number) in expanded form? How do you write it in standard form?
- If you played the round again, would you change your choices? Why?

- How do you know that you won/lost?
- So far we have 5 tens and 4 ones (tell whatever number has been built). We want to spin the largest (or smallest number). Talk with your neighbor about what number would be great to spin and why. After students have talked with a partner have student share what number they are hoping to spin and why.

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Students do not understand that when you spin a large number you should place it in the 10's place (if the goal is making the largest number possible).	Have students spin the spinner and take that many 10s and 1s. For example, if you spin a 5 take five 10's and five 1's. Discuss which is the largest amount. Do this for several spins.
Students do not understand the value of each digit.	Have students build two digit numbers using place value manipulatives (Unifix cubes, pop cubes, mini-ten frames). Talk about what each digit represents.

Special Notes:

Base ten blocks is not an appropriate tool to use with first graders. Place value manipulatives need to be groupable (Unifix cubes) so students can compose and decompose tens.

Solutions:

Student papers will vary.

Spin to Win Recording Sheet

Game 1

Partner 1

Partner 2

more or less

Standard Form

Expanded Form

Use $<$, $>$ or $=$ to compare the numbers

Game 2

Partner 1

Partner 2

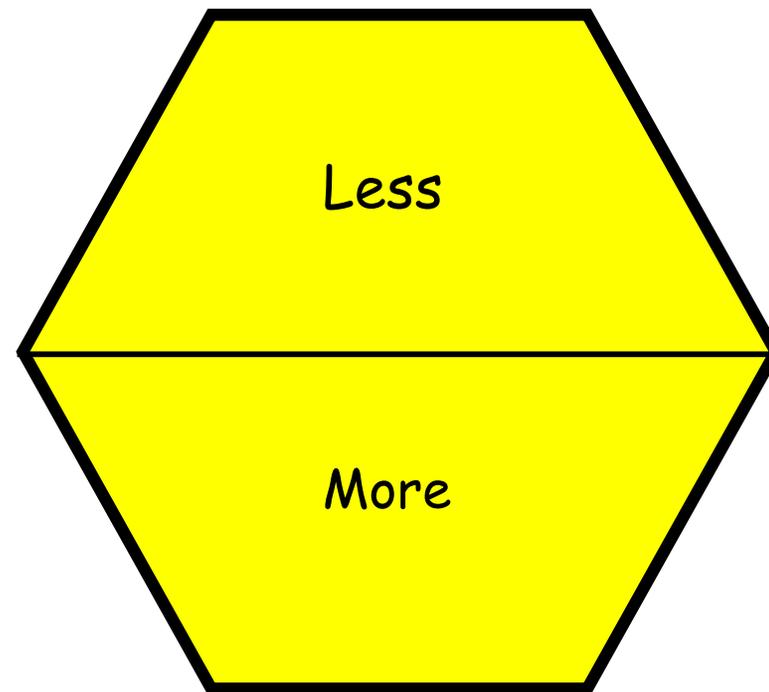
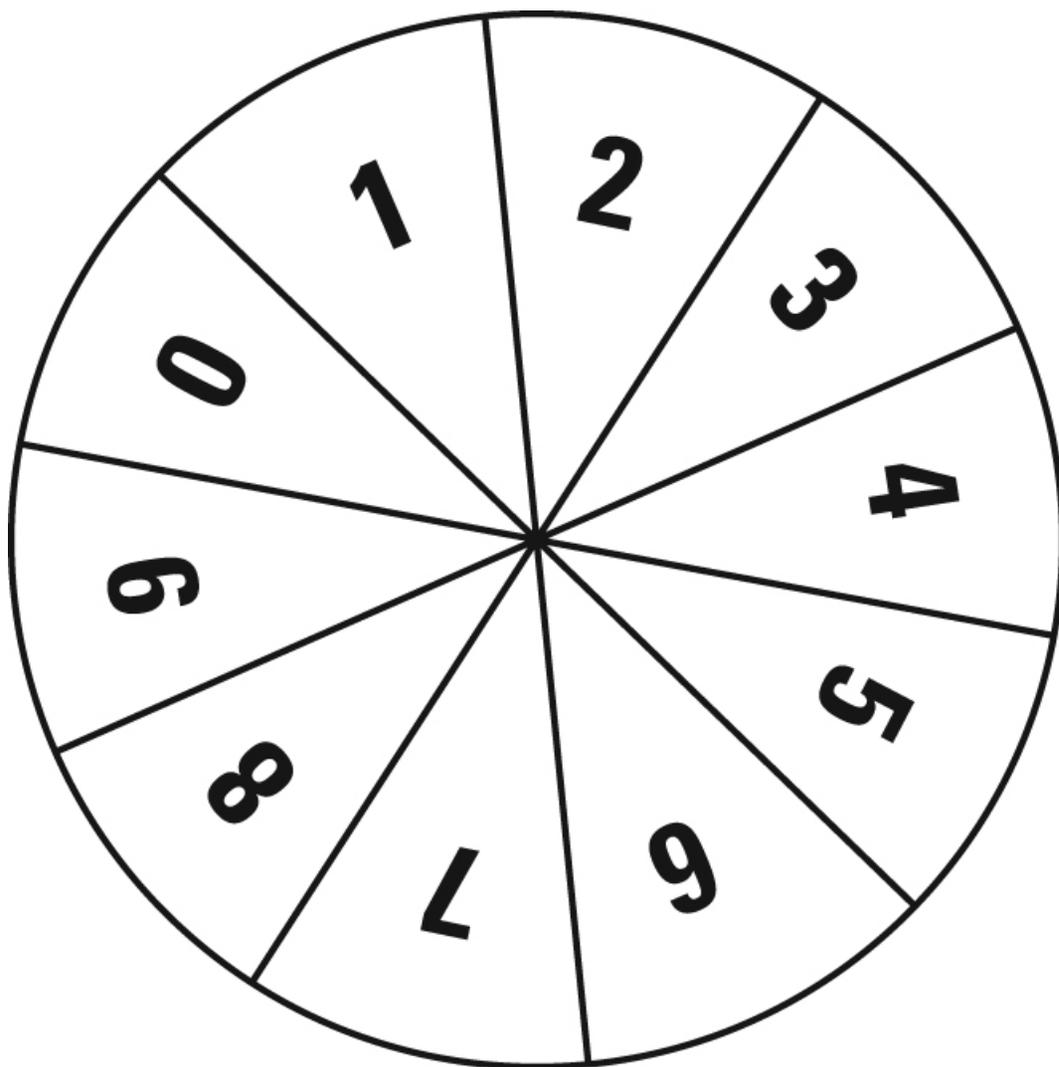
more or less

Standard Form

Expanded Form

Use $<$, $>$ or $=$ to compare the numbers

Spin to Win



Spin to Win Recording Sheet - EXAMPLE

Game 1

Partner 1

Partner 2

more or less

Standard Form

43

82

Expanded Form

$$\underline{40} + 3 = 43$$

$$\underline{80} + 2 = 82$$

Use $<$, $>$ or $=$ to compare the numbers

$$\underline{82} > 43$$

Compare – Difference Unknown

Common Core Standard:

Represent and solve problems involving addition and subtraction.

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Additional/Supporting Standard(s):

Represent and solve problems involving addition and subtraction.

1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8+6=8+2+4=10+4=14$); decomposing a number leading to a ten (e.g., $13-4=13-3-1=10-1=9$); using the relationship between addition and subtraction (e.g., knowing that $8+4=12$, one knows $12-8=4$); and creating equivalent but easier or known sums (e.g., adding $6+7$ by creating the known equivalent $6+6+1=12+1=13$).

Use place value understanding and properties of operations to add and subtract.

1.NBT.5 Given a two-digit number; mentally find 10 more or 10 less than the number without having to count; explain the reasoning used.

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.

Student Outcomes:

- I can use addition and subtraction to solve problems within 20.
- I can decompose a number leading to a 10.
- I can mentally find 10 more and/or 10 less than a number and explain my reasoning.
- I can justify the reasonableness of my answer and explain my strategies.

Materials:

- Word problem on chart paper to use with whole group
- A class set of printed copies of the problem for students to glue in their math journals
- Paper or math journals for recording solutions
- Baskets of tools for each table or for groups of students to share. These should include various problem solving manipulatives such as two colored counters, snap cubes, beans, hundreds boards, or number lines

Advance Preparation:

- Review the significant ideas in Critical Areas 1 and 2 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of addition and subtraction and number relationships.
- Prepare baskets of materials, including only materials which have been introduced and used in previous lessons.
- Prepare a written copy of problem on chart paper.
- Prepare a class set of the problem for individuals.

Directions:

1. Gather students on the floor.
2. Show students the following problem on the chart paper, asking them to read aloud with you. Read again.

Sam has 6 books. Joe has 16 books. How many more does Joe have than Sam?

3. Ask students to restate the problem in their own words. Students “unpack” the problem (give the information they know about the problem from reading it. See the guiding question suggestions in the “before the lesson” question section below).
4. Send students to their work spaces to glue a personal copy of the problem in their journals or on a piece of paper.
5. Have students solve the problem with manipulatives, words, and/or pictures.
6. Students should add an equation to match their solution.
7. Record their solution strategies and equations in their journals.
8. While students work, the teacher observes and asks questions, recording student responses. (The teacher also decides which students will share their solution strategies when the whole group reconvenes.)
9. Bring the students back together as a group for sharing. It is important for the teacher to allow students to do most of the talking and questioning, with teacher offering support and clarification if needed.

Questions to Pose:

While students are in whole group:

- What do you know about this problem?
- Tell me in your own words.
- What are some ways you can show your mathematical thinking when you work on this problem?

As they work on the problem:

- Tell me about your thinking.
- What does this part of your solution show?
- Reread the problem again for me. What is the problem asking you to find?
- What tool did you decide to use for this problem? Why did you select it?
- What would happen if ...? (Pose situations to extend their thinking such as, if you wanted Joe and Sam to have the same number of books, what might you do?)
- How can you show that solution on paper for others to see? How can you solve that problem mentally?
- How can you represent this problem in another way?

After solving (whole group):

- Who can restate what our problem was asking us to find?
- Tell the group how you solved it? What did you do first? Why? What did you do next? Why?
- What was your mathematical thinking for this problem?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Student adds the two known numbers.	Ask the student to reread and “unpack” the problem, noting the problem structure. Have the student represent Joe’s set with cubes and then Sam’s set with cubes. Ask the student to tell what the problem is asking us to find out. Discuss the reasonableness of the student’s original response when comparing the two sets.

Special Notes:

Make notes as you observe students working to determine who will share with the group. Decide the sharing order for selected students beginning with a student who has a simple solution and progressing to students with more complex solution strategies. This allows students to visualize connections and relationships in solution strategies.

This problem is an example of the problem structure, Compare-Difference Unknown. Teachers should be aware that some students may solve this problem using subtraction or addition, but some students will solve mentally finding 10 more /less, or by decomposing numbers. A student who solves this way might respond, “I just knew it in my head! I knew that 16 is ten more than 6 so my answer is 10”, or “I know doubles, so I know that $6+6=12$ and it takes 4 more added to 12 to make 16, so I know $6+4=10$, so my answer is 10.”

To extend this problem ask students how they might change this problem to tell about Sam’s books, making this problem a “How many fewer?” version of a Compare Difference Unknown problem. (See Table 1 Common Addition and Subtraction Situations in CCSS-Mathematics document).

A Day at the Beach

Common Core Standard:

Represent and solve problems involving addition and subtraction.

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Additional/Supporting Standard(s):

Add and subtract within 20.

1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8+6=8+2+4=10+4=14$); decomposing a number leading to a ten (e.g., $13-4=13-3-1=10-1=9$); using the relationship between addition and subtraction (e.g., knowing that $8+4=12$, one knows $12-8=4$); and creating equivalent but easier or known sums (e.g., adding $6+7$ by creating the known equivalent $6+6+1=12+1=13$).

Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3 Apply properties of operations as strategies to add and subtract. (Note: Students need not use formal terms for these properties.) *Examples: If $8+3=11$ is known, then $3+8=11$ is also known. (Commutative property of addition.) To add $2+6+4$, the second two numbers can be added to make a ten, so $2+6+4=2+10=12$. (Associative property of addition.)*

Reason with shapes and their attributes.

1.G.1 Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.

Student Outcomes:

- I can use addition and subtraction to solve problems.
- I can use strategies to solve problems (such as counting on, counting back, making ten).
- I can identify relationships between addition and subtraction when solving problems. (Knowing that if $2+3=5$, I also know that $5-3=2$).
- I can justify the reasonableness of my answer.
- I can explain my strategy and reason for using it with others.

Materials:

- Word problem on chart paper to use with whole group
- A class set of printed copies of the problem for students to glue in their math journals
- Paper or math journals for recording solutions
- Baskets of tools for each table or for groups of students to share. These should include various problem solving manipulatives such as two colored counters, snap cubes, beans, hundreds boards, or number lines

Advance Preparation:

- Review the significant ideas in Critical Area 1 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of addition and subtraction.
- Prepare baskets of materials, including only materials which have been introduced and used in previous lessons.
- Prepare a written copy of problem on chart paper.
- Prepare a class set of the problem for individuals.

Directions:

1. Gather students on the floor.
2. Show students the following problem on the chart paper, asking them to read aloud with you. Read again.
*Gail and Bill found 12 seashells on the beach.
Some of them were shaped like cones. The rest of them were shaped like half circles.
How many were shaped like cones? How many were shaped like half circles?*
3. Ask students to restate the problem in their own words. Students “unpack” the problem (give the information they know about the problem from reading it. See the guiding question suggestions in the “before the lesson” question section below). This is also the time to review the shapes (cones and half circles) used in the problem.
4. Suggest several “possible” answers and ask students to explain the reasonableness of the solution, justifying their responses.
5. Send students to their work spaces to glue a personal copy of the problem in their journals or on a piece of paper.
6. Have students solve the problem with manipulatives, words, or pictures.
7. Students should add an equation to match their solution.
8. Record their solution strategy and equation in their journal.
9. While students work, the teacher observes and asks questions, recording student responses. (The teacher also decides which students will share their solution strategies when the whole group reconvenes.)
10. Bring the students back together as a group for sharing. It is important for the teacher to allow students who have been selected to share to do most of the talking, with teacher offering support and clarification if needed.

Questions to Pose:While students are in whole group:

- What do you know about this problem?
- Tell me in your own words.
- Would “13 cone shaped and 3 half circles =26” (give a solution that would be far out of range of an accurate solution, allowing students to think quantitatively about the numbers) be a reasonable solution to this problem? How do you know?
- What are some ways you can show your mathematical thinking when you work on this problem?

As they work on the problem:

- Tell me about your thinking.
- What does this part of your solution show?
- Reread the problem again for me. What is the problem asking you to find?
- What tool did you decide to use for this problem? Why did you select it?
- What would happen if ...?
- How can you show that solution on paper for others to see?
- How can you represent this problem in another way?

After solving (whole group):

- Who can restate what our problem was asking us to find?
- Tell the group how you solved it? What did you do first? Why? What did you do next? Why?
- What was your mathematical thinking for this problem?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Student may put all 12 shells in one set and shows zero in second set.	Reread the problem so student can see there must be two sets with some in each set.
Student cannot show representations for 12.	Use a number 0-9. A student who struggles may need objects shaped like the shells to solve the problem and may need to sort them and recombine the two collections into one.
Student has a misconception about cones or half circles.	Review properties of cones, half circles.

Special Notes:

Make notes as you observe students working to determine who will share with the group. Decide the sharing order for selected students beginning with a student who has a simple solution and progressing to students with more complex solution strategies. This allows students to visualize connections and relationships in solution strategies.

Look for students whose solutions are commutative to discuss the commutative property with the class. Ask how the two compare (one person shows 7 cones and 5 half circles, $7+5=12$, another shows 5 cones and 7 half circles, $7+5=12$).

As a follow-up/extension, ask students to work together in small groups, creating all the combinations they can find for this same problem. Next have the groups record their solutions with equations on charts. Allow groups to justify and compare their charts.

Students will need prerequisite lessons about the properties of shapes.

Additional opportunities to make combinations for a different numbers will be needed. The book, *Twelve Ways to Get to Eleven*, by Eve Merriam is a resource to use when working on this concept.

Solutions:

$1+11=12$

$2+10=12$

$3+9=12$

$4+8=12$

$5+7=12$

$6+6=12$

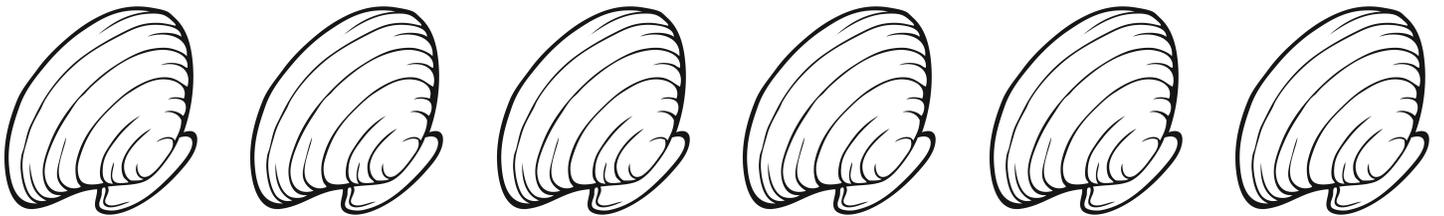
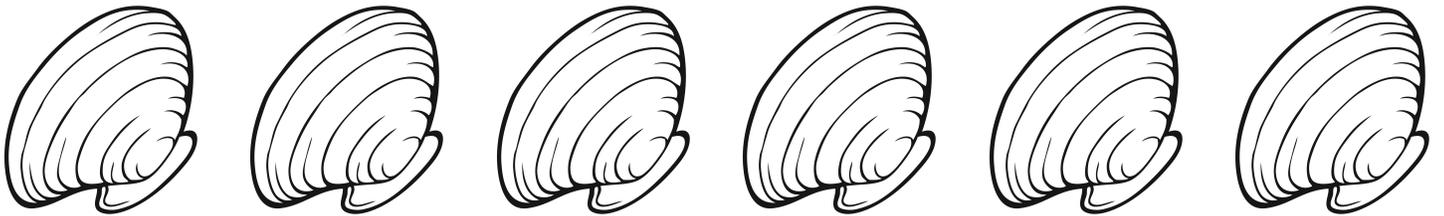
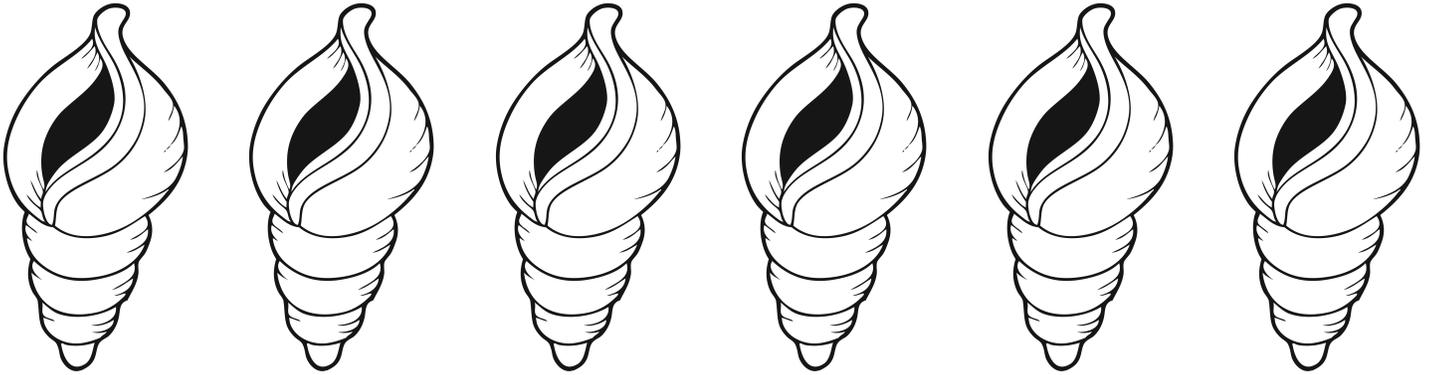
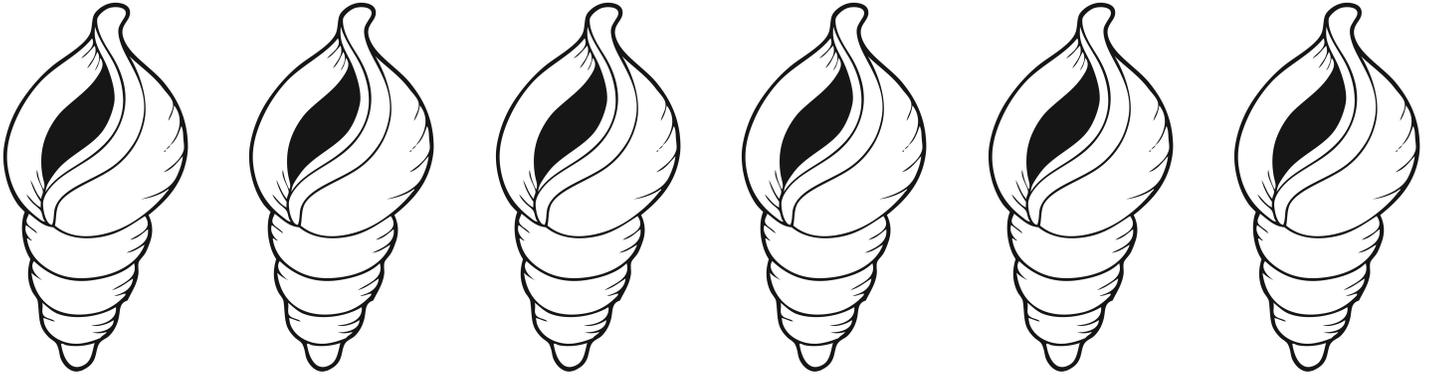
$7+5=12$

$8+4=12$

$9+3=12$

$10+2=12$

$11+1=12$



The Crayon Box

Common Core Standard:

Represent and solve problems involving addition and subtraction.

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Additional/Supporting Standard(s):

Represent and solve problems involving addition and subtraction.

1.OA.2 Solve word problems that call for addition of three whole number whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Work with addition and subtraction equations.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8+?=11$, $5=?-3$, $6+6=?$*

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
8. Look for and express regularity in repeated reasoning.

Student Outcomes:

- I can use addition and subtraction to solve problems within 20.
- I can determine the unknown whole number in addition and subtraction equations relating to three whole numbers ($10-8=2$).
- I can justify the reasonableness of my answer and explain my strategies.

Materials:

- Word problem on chart paper to use with the whole group
- A class set of printed copies of the problem for students to glue in their math journals
- Paper or math journals for recording solutions
- Baskets of tools for each table or for groups of students to share. These should include various problem solving manipulatives such as two colored counters, snap cubes, beans, hundreds boards, ten frames, or number lines

Advance Preparation:

- Review the significant ideas in Critical Area 1 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of addition and subtraction.
- Prepare baskets of materials, including only materials, which have been introduced and used in previous lessons.
- Prepare a written copy of problem on chart paper.
- Prepare a class set of the problem for individuals.

Directions:

1. Gather students on the floor.
2. Show students the following problem (Part 1 only, not the extension at this time) on the chart paper, asking them to read aloud with you. Read the problem a second time.

Maria has eight more crayons than Brian. Maria has 10 crayons. How many crayons does Brian have?

Extension: Ana has 4 crayons. If she puts her crayons with Brian and Maria's crayons, will they have enough crayons to fill a box that holds 16 crayons? How do you know?

3. Ask students to restate the problem in their own words. Students “unpack” the problem (give the information they know about the problem from reading it. See the guiding question suggestions in the “before the lesson” question section below). Avoid encouraging students to use key words as a solution strategy. (In this particular problem, if a child were to pick out the word “more” and the two numbers, they might simply add and respond with the answer, 18.
4. Suggest several “possible” answers and ask students to explain the reasonableness of the solution, justifying their responses.
5. Send students to their work spaces to glue a personal copy of the problem in their journals or on a piece of paper.
6. Have students solve the problem with manipulatives, words, and/or pictures.
7. Students should add an equation to match their solution.
8. Record their solution strategies and equations in their journals.
9. While students work, the teacher observes and asks questions, recording student responses. (The teacher also decides which students will share their solution strategies when the whole group reconvenes.)
10. Students who solve this problem easily can work on the extension part of the problem, perhaps working with a partner to encourage more math talk and sharing of strategies.
11. Bring the students back together as a group for sharing. It is important for the teacher to allow students to do most of the talking and questioning, with teacher offering support and clarification if needed.

Questions to Pose:

While students are in whole group:

- What do you know about this problem?
- Tell me in your own words.
- What are some ways you can show your mathematical thinking when you work on this problem?

As they work on the problem:

- Tell me about your thinking.
- What does this part of your solution show?
- Reread the problem again for me. What is the problem asking you to find?
- What tool did you decide to use for this problem? Why did you select it?
- What would happen if ...?
- How can you show that solution on paper for others to see?
- How can you represent this problem in another way?

After solving (whole group):

- Who can restate what our problem was asking us to find?
- Tell the group how you solved it? What did you do first? Why? What did you do next? Why?
- What was your mathematical thinking for this problem?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Student uses a key word strategy (more, eight and ten) and responds with the answer 18.	Ask the student to reread and “unpack” the problem, noting the problem structure. Use the student’s incorrect answer to discuss the reasonableness of the response.
Student cannot organize the information in order to solve.	Student may use actual crayons and break the problem down into smaller chunks.
Student cannot determine that the response is unreasonable.	Help the student create a picture representation of the problem, using name labels for the students in the problem and crayons. Reread the problem for the student in small chunks allowing the student to “act out” and test each part of the problem with the materials.

Special Notes:

Make notes as you observe students working to determine who will share with the group. Decide the sharing order for selected students beginning with a student who has a simple solution and progressing to students with more complex solution strategies. This allows students to visualize connections and relationships in solution strategies.

This problem is an example of the problem situation, Compare, Smaller Unknown.

Toy Cars

Common Core Standard:

Represent and solve problems involving addition and subtraction.

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

Additional/Supporting Standard(s):

Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3 Apply properties of operations as strategies to add and subtract. (Note: Students need not use formal terms for these properties.) *Examples: If $8+3=11$ is known, then $3+8=11$ is also known. (Commutative property of addition.) To add $2+6+4$, the second two numbers can be added to make a ten, so $2+6+4=2+10=12$. (Associative property of addition.)*

Work with addition and subtraction equations.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8+?=11$, $5=?-3$, $6+6=?$*

Use place value understanding and properties of operations to add and subtract.

1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.

Student Outcomes:

- I can use addition and subtraction to solve problems within 20.
- I can determine the unknown whole number in an addition equation relating to three whole numbers ($16+?=20$).
- I can justify the reasonableness of my answer and explain my strategies.

Materials:

- Word problem on chart paper to use with whole group
- A class set of printed copies of the problem for students to glue in their math journals
- Paper or math journals for recording solutions
- Baskets of tools for each table or for groups of students to share. These should include various problem solving manipulatives such as two colored counters, snap cubes, beans, hundreds boards, or number lines

Advance Preparation:

- Review the significant ideas in Critical Area 1 for First Grade to connect this lesson with key mathematical ideas of developing an understanding of addition and subtraction.
- Prepare baskets of materials, including only materials which have been introduced and used in previous lessons.
- Prepare a written copy of problem on chart paper.
- Prepare a class set of the problem for individuals.

Directions:

1. Gather students on the floor.
2. Show students the following problem on the chart paper, asking them to read aloud with you. Read again.

Sasha had sixteen toy cars. He went to the toy store with his father. His father bought him some more cars. When Sasha got home, he counted his cars and then he had 20. How many cars did his father buy for him?
3. Ask students to restate the problem in their own words. Students “unpack” the problem (give the information they know about the problem from reading it. See the guiding question suggestions in the “before the lesson” question section below).
4. Suggest several “possible” answers and ask students to explain the reasonableness of the solution, justifying their responses.
5. Send students to their work spaces to glue a personal copy of the problem in their journals or on a piece of paper.
6. Have students solve the problem with manipulatives, words, and/or pictures.
7. Students should add an equation to match their solution.
8. Record their solution strategies and equations in their journals.
9. While students work, the teacher observes and asks questions, recording student responses. (The teacher also decides which students will share their solution strategies when the whole group reconvenes.)
10. Bring the students back together as a group for sharing. It is important for the teacher to allow students to do most of the talking and questioning, with teacher offering support and clarification if needed.

Questions to Pose:

While students are in whole group:

- What do you know about this problem?
- Tell me in your own words.
- What are some ways you can show your mathematical thinking when you work on this problem?

As they work on the problem:

- Tell me about your thinking.
- What does this part of your solution show?
- Reread the problem again for me. What is the problem asking you to find?
- What tool did you decide to use for this problem? Why did you select it?
- What would happen if ...?
- How can you show that solution on paper for others to see?
- How can you represent this problem in another way?

After solving (whole group):

- Who can restate what our problem was asking us to find?
- Tell the group how you solved it? What did you do first? Why? What did you do next? Why?
- What was your mathematical thinking for this problem?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Student adds the two known numbers and omits the unknown.	Ask the student to reread and “unpack” the problem, noting the problem structure. Use the student’s incorrect answer to discuss the reasonableness of the response. Student may need to work the problem with numbers 1-10.

Special Notes:

Make notes as you observe students working to determine who will share with the group. Decide the sharing order for selected students beginning with a student who has a simple solution and progressing to students with more complex solution strategies. This allows students to visualize connections and relationships in solution strategies.

This problem is an example of the problem structure, Add To-Change Unknown. Teachers should be aware that some students may solve this problem using subtraction instead of addition. Allow a student with this strategy to share his reasoning and use the opportunity to explore the relationship between addition and subtraction.

Snap

Common Core Standard:

Add and subtract within 20.

1.OA.6 Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$, one knows $12 - 8 = 4$); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$).

Additional /Supporting Standards:

Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.4 Understand subtraction as an unknown addend problem. *For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.*

Work with addition and subtraction equations.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$, $5 = ? - 3$, $6 + 6 = ?$*

Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

Student Outcomes:

- I can add and subtract within 20.
- I can use relationships between addition and subtraction.
- I can determine the unknown whole number in addition and subtraction equations relating to three whole numbers.
- I can justify the reasonableness of my answer and explain my strategies to others.

Materials:

- 1 deck of number cards, 1-20 from Blackline master (1 deck for every group of 3-4 students)
- Snap cubes, 20 per student
- Chips, (such as 2 colored counters), 10-12 per group, to use as markers for “points for game winners”
- Math Journals or paper for recording

Advance Preparation:

- Review the Standards for Mathematical Practices that you will focus on during this lesson.
- Review the significant ideas in Critical Area 1 for First Grade to connect this lesson with key mathematical ideas of developing understanding of the relationship between addition and subtraction.
- Create a list of students who will be grouped into teams of 3 or 4 to work together during this lesson.
- Reproduce copies of number cards, 1 deck for every 3-4 students
- Gather snap cubes for groups
- Gather 10-12 chips for each group
- Place snap cubes, chips, and deck of cards for each group of students in small self-closing bags

Directions:

1. Select 2 students to help you model how to play the game for the class.
2. Organize students in groups of 3-4 per group.
3. Distribute bags with cubes, chips, and a number card deck to each group.
4. Students place the deck of number cards face down where it is accessible to all in the group.
5. Each student in the group counts out 20 snap cubes.
6. Student 1 selects a number card from the deck and tells the number on the card. All students in the group record the number on a page in their math journals and then build a train with that number of cubes.
7. When everyone in the group has built a train, group members holds their trains, either under the desk, or behind their backs. Students break apart their trains into two parts, in any way they choose.
8. Students keep one part hidden, but place the other part of their trains on the table until it is their turn to share them.
9. Student 1 shows one part of their train so others can see it, while keeping the other part hidden. Students in the group count how many they see and try to be the first to name the number of cubes that are still hidden. The first player to answer correctly must also tell what the equation is with the unknown. (For example, the number card is 12. Student 1 broke the train so that 4 cubes are showing. Student 2 is the first to give the correct solution of 8, but then must also state an equation to match the response, “8! I see 4 so, $12-4=8$ ” or the student might say, “8! I see 4 and I know that $12=4+8$.”)
10. The first player to name the hidden number of cubes and make a correct equation gets one point (a chip).
11. Play continues until all group members have shown their trains for 12.
12. Students record each of the equations they make for 12 in their journals.
13. Round 2 begins with Student 2 selecting a number card from the deck and repeating what Student 1 did. Play continues with each student selecting a number card.
14. The player with the most points after several rounds is the winner.

Questions to Pose:

As students play the game:

- How did you decide how many cubes were hiding?
- Tell me how your equation is like your neighbor’s equation. How do they differ?
- What is the best way to model the hidden part?
- Explain to me how you might organize your equations for this number to show a pattern?
- What is the difference between _____ and _____? How do you know?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Student cannot determine the unknown.	Give the student smaller numbers of cubes (10). Have student work with teacher.
Student cannot formulate or write an equation.	Have a student help write and read the equation.

Special Notes:

Students could continue to play this game during workshop time, breaking numbers apart and finding additional equations to add in their math journals.

After students are comfortable with this version of the game, the game can be varied by playing it with students breaking trains into 3 parts. (1.OA.8)

This task gives teachers an opportunity to assess how students compose and decompose numbers. Are students making groups of tens, adding on, counting back, or do they represent all parts? Do they use strategies such as making ten, doubles, doubles + or -1 or 2? Do they use commutative and associative properties to help them solve problems?

Solutions: N/A

Number Deck for Snap

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

Player 1

$$6 - 4 = \square$$

$$3 + \square = 9$$

$$10 - 7 = 3 + \square$$

$$9 - \square = 6$$

$$\square - 3 = 0 + 6$$

Player 2

$$8 - 1 = \square$$

$$5 + 5 = 9 + \square$$

$$\square - 2 = 2 + 0$$

$$4 + 5 = \square + 1$$

$$8 - \square = 3$$

Adapted from <http://www.k-5mathteachingresources.com>

Player 1

$$9 - 8 = \square$$

$$2 + \square = 7$$

$$10 - 4 = 2 + \square$$

$$8 - \square = 2$$

$$\square - 6 = 1 + 2$$

Player 2

$$8 + 0 = \square$$

$$3 + 4 = 9 - \square$$

$$\square - 2 = 7 - 6$$

$$4 + 4 = \square + 1$$

$$8 - \square = 8$$

Adapted from <http://www.k-5mathteachingresources.com>

What is the Missing Number?

Common Core Standard:

Work with addition and subtraction equations.

1.OA.8 Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations $8+?=11$, $5=?-3$, $6+6=?$*

Additional/Supporting Standard(s):

Understand and apply properties of operations and the relationship between addition and subtraction.

1.OA.3 Apply properties of operations as strategies to add and subtract. (Note: Students need not use formal terms for these properties.) *Examples: If $8+3=11$ is known, then $3+8=11$ is also known. (Commutative property of addition.) To add $2+6+4$, the second two numbers can be added to make a ten, so $2+6+4=2+10=12$. (Associative property of addition.)*

Work with addition and subtraction equations.

1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? $6=6$, $7=8-1$, $5+2=2+5$, $4+1=5+2$.*

Standards for Mathematical Practice:

2. Reason abstractly and quantitatively.
6. Attend to precision.
7. Look for and make use of structure.

Student Outcomes:

- I can determine the unknown whole number in addition or subtraction equations.
- I can use mental strategies to add and subtract numbers within 10 with ease.
- I can use the equal sign appropriately.

Materials:

- What is the missing number? game board for each pair of students
- Number cards/tiles (0-9) for each pair of students
- Number balance

Advance Preparation:

- Duplicate “What is the missing number?” game board for each pair of students.
- Students have had instruction in many types of strategies at both conceptual and practice levels before this task is introduced.
- A focus on number relationships is important in building upon this task as students work toward fluency.

Directions:

1. The teacher and the students will use a number balance to work the following number sentences: $7 + 2 = ?$, $? = 4 + 3$, $3 + 3 = ? + 2$, $7 + ? = 1 + 7$
2. Children will explain how they know what the answer is for the unknown.
3. Organize students in pairs.
4. Each pair of students chooses a game board and place the number cards 0-9 facedown in a row above the game board.
5. The first partner selects a number card/tile and checks to see whether he/she can use that number to complete a number sentence on his/her side of the board. This partner will talk aloud to explain why he/she can or cannot use the number.
Examples: $3 + ? = 8$, "I can use 5 because I know that 5 plus 3 is the same as 8 so 3 plus 5 is the same as 8." $7 + 1 = ? - 1$, "I cannot use 5 because 7 plus 1 is the same as 8 and 5 minus 1 is not the same as 8."
6. Partner 2 needs to agree or disagree if the number can be used for one of the number sentences. The two partners need to come to a consensus.
7. If the number can be used the number card is placed in the correct space on his/her game board.
8. If the number cannot be used the number card is placed back facedown above the board.
9. The students will take turns to fill in all the missing numbers.
10. The first partner to complete his/her side of the game board is the winner.

Questions to Pose:Before:

What do we know about the relationship between addition and subtraction fact families?
How does that relationship help us know more facts?

During:

What strategy are you using to recall these facts?
Which strategies are most helpful to you in recalling facts?
What could you tell your classmates that would help them recall facts faster?

After:

How will knowing my facts help me in other areas of math?

Possible Misconceptions/Suggestions:

Possible Misconceptions	Suggestions
Some students may have memory deficits that will cause this task to be very frustrating for them.	Provide tools (number balance and/or Unifix cubes) for the students to solve the unknowns in the number sentences. This will help them have a visual of the facts they have been introduced to and the ones they know. Encourage the students to use strategies even though they may not be able to memorize the facts.
Some students may not realize the relationship between facts such as $4 + 3$ and $3 + 4$ have the same sum (Commutative Property).	Have these students use counters and a mat to see that $4 + 3$ is the same as $3 + 4$. By flipping the chart upside down, they can visually see that it is the same fact.

Special Notes:

It is very important that strategy instruction be paced over the course of the year. Integration of these strategies with problem solving tasks will help students see the importance of being fluent with number.

Solutions: The unknown for each number sentence is shown in **large, BOLD** print.

First game board:

$6 - 4 = \mathbf{2}$	$8 - 1 = \mathbf{7}$
$3 + \mathbf{6} = 9$	$5 + 5 = 9 + \mathbf{1}$
$10 - 7 = 3 + \mathbf{0}$	$\mathbf{4} - 2 = 2 + 0$
$9 - \mathbf{3} = 6$	$4 + 5 = \mathbf{8} + 1$
$\mathbf{9} - 3 = 0 + 6$	$8 - \mathbf{5} = 3$

Second game board:

$9 - 8 = \mathbf{1}$	$8 + 0 = \mathbf{8}$
$2 + \mathbf{5} = 7$	$3 + 4 = 9 - \mathbf{2}$
$10 - 4 = 2 + \mathbf{4}$	$\mathbf{3} - 2 = 7 - 6$
$8 - \mathbf{6} = 2$	$4 + 4 = \mathbf{7} + 1$
$\mathbf{9} - 6 = 1 + 2$	$8 - \mathbf{0} = 8$

Adapted from <http://www.k-5mathteachingresources.com>