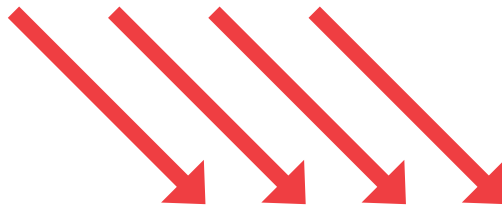# GRADE K-2 ACTIVITIES

# TEACHING MATH

# THROUGH LITERACY

Grade Level Activities Aligned to Common Core State Standards

**Lerner**Classroom™

# LESSON 1: COUNTING TO FIND A TOTAL

## LEARNING OBJECTIVE:
We are learning different ways to count in order to find the total number of objects in a group.

## INTRODUCTION:
Students learn how to skip count and use place value concepts in order to determine a total. They learn that items can be grouped and counted by the number within each group. Students also apply this understanding to recognizing number patterns and making predictions. In the final story, they extend their understanding of groups and skip counting to the base-ten number system and see patterns in the place value system.

## MATERIALS
- Collection of 30 items such as linking cubes for each student
- Wipe-off boards or one piece of drawing paper per student
- Chart paper

## BEFORE READING
Opening Activity
Tell students that they will be reading a book or a series of books in which the characters use what they know about number relationships to count and see patterns. Before reading the first book, they are going to organize and count items in a group.

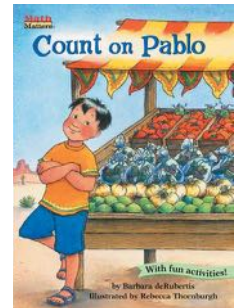Working with Groups: Understanding Skip Counting
Provide each student with 30 linking blocks or objects that can be grouped and a wipe-off board or paper.
1. Have students connect or group their items into groups of two. Be sure to reinforce the term *pair*.
2. Have students point to each pair and skip count by twos to find the total. Write the sentence "15 groups of 2 blocks equals 30 blocks." You may also choose to write an equation showing repeated addition and have students write the equation on their wipe-off boards.
3. Repeat the second step by having students put the blocks into groups of 3, 5, and 10.
4. Have students divide their wipe-off boards into three columns labeled H, T, and O to create place-value charts.
5. Discuss how we have a numbering system that is based on groups of 10. Have students place ones onto the board as they count out the group of 30 blocks. Ring a bell and signal when students reach 10. Discuss that they now have a group of 10. Have them move the group to the tens column and say, "One group of 10 equals 10." Have students continue counting by saying, "One ten, one, one ten, two…" as they place the blocks.
6. Have students group and move tens until they reach 30.
7. If time permits move beyond 30 to create groups of 10 up to 100.
8. Summarize by reinforcing that each digit in a number represents 10 times the value of the digit to the right. Provide an example such as 22 and say, "The 2 in the tens column is ten times the value of the 2 in the ones column. The 2 in the ones column represents 2 ones, or 2, while the 2 in the tens column represents 2 groups of 10, or 20."
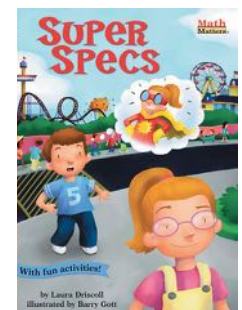
Guiding Questions
1. Is skip counting more efficient than counting by ones? Why or why not?
2. Why is it we keep getting a total of 30 blocks each time we skip count?
3. When might we need to skip count?
4. How many would we have if we added one more group?
5. How is counting a large number by grouping into tens efficient?
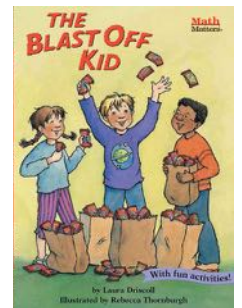6. What do you think happens when we have 10 groups of 10 in the tens place?


Counting and skip counting


Recognizing number patterns


Place value and counting

**Lerner**Classroom™

# READ ALOUD

Ask the following questions after reading the corresponding pages in each book to guide discussion about math concepts during reading.

Count on Pablo
Be sure to point to each numeral and count together when the counting sequences are displayed.
4:   How many limes do you think is *about* 20? What makes you think that?
5:   Point at Pablo. What is he doing? Why do you think we say this is counting by ones?
7:   Who can say why Pablo counted by twos and not by ones?
9:   Do you agree or disagree that Pablo is counting by groups of five? (Use thumbs up and down to poll the class). What makes you say that?
11:  Why didn't Pablo count by fives to find out the total number of tomatoes?
29:  How many bunches of onions did they sell if each bunch holds two onions? How do you know?
29:  How many bunches of peppers did they sell if each bag holds five peppers?
29:  How many boxes of tomatoes did they sell if each box holds ten tomatoes? How do you know?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

Super Specs
5:   How does Molly know there are four more exits until they get to Super Funland?
7:   What exit will be next? How do you know?
19:  What does Molly notice when she looks at the parking signs?
26:  What is the pattern? Who can show how skip counting can help us find the next five numbers in the pattern?
31:  Is there a pattern to the prices of the ice creams? What makes you say that?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

Blast Off Kid
11:  Why do you think Jim put the wrappers into groups of ten? Do you agree with his strategy? Why?
15:  How many bundles of 10 do you think are in each bag? What makes you think that? How can we be sure?
16:  What is the value of the 4 in 425? What is the value of the 2? (400, 20.) Why?
20:  How can we use skip counting to find out the total of 10 bags of 100?
20:  What is the value of the 6 in 6,354? (Repeat for the other digits.)
26:  What happened when Jim put his one wrapper with the other nine wrappers?
31:  Do you agree or disagree that grouping by tens can help with counting? Who can give an example from the story of how Jim grouped by tens?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

# AFTER READING: REFLECT AND EXTEND

1. Have students organize items in the classroom into groups and count the groups to find a total.
2. Have students identify things that come in pairs and can be counted by twos. Repeat with items that come in threes, fives, and tens. Students can create posters of items organized in groups.
3. Have students estimate and then count the total number of eyes, fingers, shoes, etc. that make up their class. Students can stand and count off using skip counting.

Also consider using one or more of the Apply Math Concepts activities outlined on the Activities That Matter page of the selected book. As this section is written for parents, the activities can also be follow-up practice done at home.

Differentiation strategies
Scaffold
• Provide number cards as prompts for skip counting
• Provide each student with four hundreds charts, and have them highlight the numbers as they skip count by 2, 4, 6, 8. They also can use clear plastic counters instead of highlighters to see the patterns.

- Provide students with manipulatives to use during the story to solidify counting and the base ten concept of grouping by 10.
- Provide a number chart as a cue for counting backward.
- Have students select one card from a group containing the numbers 1–20 and count on from that number. Extend to skip counting and to numbers beyond 20.

Extend
- Have students use base ten blocks to recreate the numbers displayed in *The Blast Off Kid*, replacing the bags and bunches with the blocks.
- Provide students with a collection of objects to sort into groups of various amounts. Students then count and write the number representing the total. Students can also represent the total using repeated addition and/or multiplication equations. For example, a group of 15 would be represented by the following: 5, 10, 15 or 3 x 5 = 15, 5 + 5 + 5 = 15.

## MATHEMATICS STANDARDS

### Kindergarten
K.CC.A.1: Count to 100 by ones and by tens.
K.CC.A.2: Count forward beginning from a given number within the known sequence.
K.CC.B.4.b: Understand that the last number name said tells the number of objects counted.
K.CC.B.4.c: Understand that each successive number name refers to a quantity that is one larger.
K.NBT.A.1: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

### Grade 1
1.NBT.B.2: Understand that the two digits of a two-digit number represent amounts of tens and ones.
Understand the following as special cases:
B.2.a: 10 can be thought of as a bundle of ten ones — called a "ten."
B.2.b: The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
B.2.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).

### Grade 2
2.NBT.A.1: Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
A.1.a: 100 can be thought of as a bundle of ten tens — called a "hundred."
A.1.b: The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
A.2: Count within 1000; skip-count by 5s, 10s, and 100s.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

### Kindergarten
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
RL.K.10: Actively engage in group reading activities with purpose and understanding.

### Grade 1
RL.1.3: Describe characters, settings, and major events in a story, using key details.

### Grade 2
RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

**Lerner**Classroom™

# LESSON 2: ESTIMATING WEIGHT

## LEARNING OBJECTIVE:

We are learning how to estimate weights and to compare amounts to determine if one amount is more, less, or the same as another.

## INTRODUCTION:

Students develop an understanding of estimating as it relates to measurement, specifically weight. They will describe comparisons using the adjectives less, same, and more.

## MATERIALS

- A collection of items of various weights (be sure to find some items that look big but do not weigh much: for example, a bag of cotton balls or a large feather)
- An item that is labeled and weighs a pound, such as a pound of butter or dried pasta
- A balance



Estimating Weight

## BEFORE READING

Opening Activity

Tell students that they will be reading a book in which the character is solving a problem that requires him to estimate how much items weigh. Before we read we are going to explore how we describe weight.

Vocabulary

Write the word *pounds* under the label measuring weight. Ask students to identify something that weighs a pound.
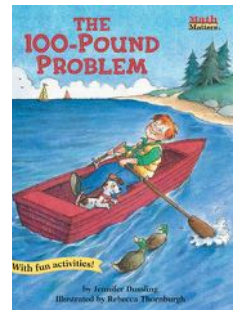
Activity: Which is heavier?

Below the title on the chart paper, create a chart that is divided into three sections. Label the left side *weighs less than a pound*, the center *weighs a pound*, and the right side *weighs more than a pound*.

- Tell students that they are going to determine which items weigh more than a pound of butter and which weigh less. Explain that a pound is a common unit of measurement that tells how heavy things are.
- Pass around the pound of butter and ask students if they weigh more or less than a pound. Ask if they think they weigh a lot more or a little more than a pound. Explain that pounds are often used to measure items that are heavy.
- Each student randomly selects one item from a large bag or from the classroom to compare. Have students hold the items in their hands to determine whether the items weigh more or less than a pound. Then compare using a balance scale to confirm each estimation. NOTE: A balance scale can also be created with a shoebox cover and a cylinder such as a piece of PVC pipe.
- Record the items on the chart.

Guiding Questions

- Do items that are larger than the pound of butter always weigh more? Why or why not?
- Do smaller items always weigh less than the pound of butter?
- How does using the balance scale help determine if items weigh more, less, or the same as the pound of butter?
- Do you weigh more or less than a pound? Do you know about how much you weigh?

## READ ALOUD

Ask the following questions after reading the corresponding pages in the book to guide discussion about math concepts during reading. Explain that in this story the boy must consider if items weigh about 100 pounds. If we estimate that one student in our class weighs about 50 to 60 pounds, then we can estimate that 100 pounds is about the amount that two students weigh.

The 100-Pound Problem
7:   How much more weight can Walt put into the boat to reach 100 pounds?
11:  Who can explain how Walt's scale works? What makes you think that?
13:  Can we say that Walt's scale tells the exact weight of objects? Why or why not?
14:  Do you agree with Walt that the fishing gear plus the backpack weigh 20 pounds? What makes you think that?
22:  How does Walt know that the backpack and the lunch will not go over the 100 pounds?
28:  If Walt, Patch, and the fish weigh more than 100 pounds, how much do you think the fish weighed?

## AFTER READING: REFLECT AND EXTEND

- After reading *The 100-Pound Problem*, have students make their own balance similar to the one in the story using a shoebox lid (or other lightweight flat lid) and a cylinder. Have students locate items that weigh about the same as another item, such as a pencil, and record their findings. NOTE: Duct tape can be used on the bottom of the cylinder to provide more stability. Do not tape the cylinder to the box top as this will inhibit movement required for the scale to be effective.

Also consider using one or more of the Connect with Math and Apply Math Concepts activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. As this section is written for parents, the activities can also be follow-up practice done at home.

Differentiation strategies
Scaffold
- Provide cards with pictures or words for the items being weighed. The student tapes or pastes the cards onto the comparison board, reducing the need to handwrite and spell.

Extend
- Have students determine the number of cubes certain items weigh and record the value.
- Order items according to weight and label each one heavy, heavier, or heaviest.
- Bring in a scale to weigh heavier items. Have students attempt to find one item or a group of items that weigh 100 pounds. Create a 100-pound poster.

## MATHEMATICS STANDARDS

Kindergarten
K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.
K.OA.A.1: Represent addition and subtraction with objects, fingers, mental images, drawings.

K.MD.A.2: Directly compare two objects with a measurable attribute in common to see which object has "more of" / "less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

Grade 1
1.OA.C.5: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
1.OA.A.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.

Grade 2

2.OA.A.1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

Kindergarten

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

L.K.4.b: Use the most frequently occurring inflections and affixes (e.g., *-ed, -s, re-, un-, pre-, -ful, -less*) as a clue to the meaning of an unknown word.

L.K.5.c: Identify real-life connections between words and their use (e.g., note places at school that are colorful).

Grade 1

RL.1.3: Describe characters, settings, and major events in a story, using key details.

SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

L.1.1.f: Use frequently occurring adjectives.

Grade 2

RL.2.1: Ask and answer such questions as *who, what, where, when, why*, and *how* to demonstrate understanding of key details in a text.

SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

L.2.4.b: Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., *happy/unhappy, tell/retell*).

**Lerner**Classroom™

ISBN: 978-1-57565-837-7

**TEACHING GUIDE** | 7

# LESSON 3: ESTIMATING CAPACITY

## LEARNING OBJECTIVE:

We are learning how to estimate amount and measure the amount of liquid a container holds and to compare amounts to determine if one container holds more, less, or the same amount as another.

## INTRODUCTION:

Students develop an understanding of estimating as it relates to measurement, specifically measuring liquid capacity. They learn that capacity is used to describe how much of a pourable substance fits inside a container. They learn that you can compare the capacity of two containers by filling one with pourable materials and then pouring these materials into the other.

Students will describe the comparisons using the adjectives less, same, and more.

## MATERIALS

- A collection of three or four containers
- Pourable substance such as water, rice, or sand
- Measuring cup
- Chart paper

## BEFORE READING

### Opening Activity

Tell students that they will be reading a book in which the characters make lemonade by filling up a container. Explain that before reading, students will learn a little bit about capacity. Write "Measuring Capacity" on chart paper.
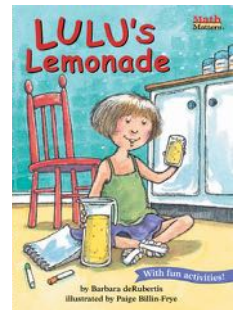
### Understanding Capacity

Display a set of empty containers of various sizes.
1. Discuss the meaning of the word *empty* and write a definition on the chart paper. Tell students you want to fill the containers with enough of the pourable substance so that they will be full.
2. Discuss the word *full* and write a definition on the chart paper. Ask students which container they think will hold the *least* amount of the pourable substance. Use a non-standard measure to count out and measure the capacity and record.
3. Select another container and ask students: "If I pour the substance from the first container into this one, will there be space for more liquid? Will it hold the same amount, or will it hold less?" Pour. If needed, add more using the same non-standard measure.
4. Continue to fill each container and record how much each holds.

### Understanding Standard Tools

Hold up a ruler and a measuring cup. Ask students to tell what is the same and what is different about the objects. Be sure to clarify that a ruler is used to measure length and a measuring cup is used to measure substances you can pour. Discuss occasions when students have used a measuring cup and why using a standard measurement rather then "any cup" is important.



Liquid Measurement

**Lerner**Classroom™

## READ ALOUD

Ask the following questions after reading the corresponding pages in the book to guide discussion about math concepts during reading.

Lulu's Lemonade
9:    Do you agree or disagree with Lulu that the pitchers hold different amounts? Why?
10:   How can it be possible that the two pitchers hold the same amount? What does this tell us about volume?
14:   What can we say about how full the pitcher is with one-half gallon and one quart? Does this help us to determine how much a quart of liquid is compared to a gallon? How much more liquid do you think they need to fill the pitcher so they have a full gallon of lemonade?
15:   Look at the picture. How does the amount of liquid in a quart compare to the amount in one-half gallon? How do two cups compare to one quart? What does this tell us?
21:   Did Lulu put more vanilla or more mint into the lemonade? How do you know?
23:   How much liquid do you think is in the ice tray?
27:   Do you think Lulu's drawing will help anyone follow the lemonade recipe? Why or why not?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

## AFTER READING: REFLECT AND EXTEND

1. Have students work with liquid measurements and create a chart that shows comparisons. For example, a gallon is more than a pint. Students can measure out how many pints are in a gallon and include it on their charts.
2. Have students estimate the amount of liquid that will fit into a large container. Is it between 1–2 cups, 3–4 cups or 4–6 cups? Take a poll and graph the estimates using a bar graph. Fill the container and check the actual amount.
3. Measure the capacity of the liquid in a tray of ice cubes. Allow the cubes to melt, and pour the water into a container. Compare the amount of space the water takes in a container when it is frozen to when it is in a liquid state.

Also consider using one or more of the *Apply Math Concepts* activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. As this section is written for parents, the activities can also be follow-up practice done at home.

Differentiation strategies
Scaffold
- Provide a chart with liquid measures for students to use when they double or halve the lemonade recipe.
- Provide students with many opportunities to work with non-standard measurement.
- Have students round the capacity of containers to the nearest cup and not use any fractional amounts.

Extend
- Have students compare the capacity of a variety of containers using either non-standard or standard measures. They can record their findings on a chart with columns: holds more, holds the same, and holds less.
- Have students create posters of drawings or pictures of containers that hold more than a cup or more than a gallon.
- Have students write addition equations for each step in the lemonade recipe.
- Have students create and write their own drink recipes.

LernerClassroom™

## MATHEMATICS STANDARDS

<u>Kindergarten</u>

K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

K.OA.A.1: Represent addition and subtraction with objects, fingers, mental images, and drawings.

K.MD.A.2: Directly compare two objects with a measurable attribute in common to see which object has "more of" / "less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

<u>Grade 1</u>

1.OA.C.5: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

1.OA.A.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.

<u>Grade 2</u>

2.OA.A.1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

<u>Kindergarten</u>

RL.K.1: With prompting and support, ask and answer questions about key details in a text.

RL.K.10: Actively engage in group reading activities with purpose and understanding.

L.K.5.c: Identify real-life connections between words and their use (e.g., note places at school that are colorful).

<u>Grade 1</u>

RL.1.3: Describe characters, settings, and major events in a story, using key details.

SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

<u>Grade 2</u>

RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.

SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

L.2.4.b: Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., *happy/unhappy, tell/retell*).

# LESSON 4: MAKING COMPARISONS

## LEARNING OBJECTIVE:
We are learning how adjectives can help us describe comparisons between amounts, sizes, and distances between two or more items.

## INTRODUCTION:
Students develop an understanding and communicate the relationship between objects. They measure, order, and compare items and describe the comparisons using the adjectives *fewer, same,* and *more.* They extend that understanding and use comparative and superlative adjectives, such as *taller* and *tallest,* to describe comparisons between two or more objects and attributes.

## MATERIALS
- Comparison Chart which is created by folding a piece of drawing paper into three columns
- Snap cubes
- Items for counting and comparing
- Chart paper

## BEFORE READING

### Opening Activity
Tell students that they will be reading books in which the characters make comparisons. Write the following title on the chart paper: *Words That Describe Comparisons.* Write the word *compare* on the chart paper somewhere under the title. Lead a discussion to generate a definition by which students understand that to compare means to say how two or more items are the same and how they are different.

Tell students that the characters in both stories use adjectives to describe the comparisons. Lead a discussion in which you note that adjectives are words that describe nouns. You may want to review that a noun <u>names</u> a person, place, or thing and an adjective <u>describes</u> a person, place, or thing.
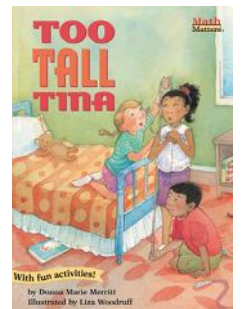
### Ordering and comparing lengths
Tell students that they will compare objects and use adjectives to describe how the objects compare with one another.
1. Each student is given a sheet of drawing paper that they fold into three columns.
2. Ask students to link together five blocks of the same color and place the row of linked blocks in the middle column. Then ask students to create a row of three blocks and place it in the column to the left. Ask students to create a row of seven blocks and place it in the column to the right.
3. Have students describe the relationship between the rows of blocks. For example, the row of three blocks is less than the row of five blocks. Write the comparisons on the chart and discuss which word in each sentence is the adjective. Have students label the columns on their charts with the words *less*, *same*, and *more* to identify the comparisons.
4. Have students create another row of five blocks using a different color. Have them place the blocks in the correct column, turn to their partners, and describe the comparison. Repeat by asking students to link blocks together to create rows that are less and more when compared to the five blocks. Discuss and record the relationships.
5. Write the words *less*, *same*, and *more* on the chart under the definition for adjective.
6. Tell students you will now compare two of the rows using different adjectives. Have them select the row of seven blocks. Ask them to find a row that is shorter. Then ask them to find the shortest. Have students order the blocks from short to shortest. Record the describing words *short*, *shorter*, and *shortest* on the chart.
7. Have students build a tall tower using no more than 10 cubes. Ask them to build two more towers, one that is taller and one that is the tallest. Discuss and record the adjectives.

Comparing to determine more, fewer, or the same



Comparing size and distance

8. Repeat with other objects or the blocks to create relationships that show relationships such as *long, longer, longest,* or *wide, wider, widest.*

## READ ALOUD

Ask the following questions after reading the corresponding pages in the books to guide discussion about math concepts during reading.

<u>Henry Keeps Score</u>
5:    Is Henry's amount of extra time "sleeping in" less, more, or equal to Harriet's?
6:    Henry is concerned that Harriet has more pancakes; how many more does she have?
8:    What word would you use to compare the number of pets to people?
12:   Who can explain the comparison of pets to people on this page?
20:   Who can explain the comparison of the blue shirts to the purple shirts?
21:   Is Henry's number of items of new clothing fewer than, more than, or equal to Harriet's?
27:   Why doesn't Henry want the same as Harriet?
27:   Is keeping score a way to make comparisons? Why or why not?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

<u>Too-Tall Tina</u>
Record the adjectives on the chart paper as they appear in the story.
5:    What does Tina mean when she says she is the tallest kid?
8:    Do you agree or disagree that Tina would need to add some more inches of rope to get one that is longer? What makes you say this?
16:   When comparing the three levels in Limbo, which word describes the stick that is closest to the ground? Could we also say the sticks are *close, closer,* and *closest*? Why?
22:   Is the highest person the farthest or closest to the ground?
23:   What pattern do you notice in the words that are describing the comparisons?
28:   What word would you use to compare Tina's arms to her friends' arms?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

## AFTER READING: REFLECT AND EXTEND

1. Have students find items in their desk or in the classroom to compare to a given item such as a length of string. For example, ask them to find something that is longer. Have students prove their thinking by measuring each item.
2. Take students on an adjective-identification walk in which they notice and compare items in their environment. Encourage students to work with a peer to record observations or to take photographs of their comparisons.
3. Provide students with a picture of two or more similar objects such as clouds, trees, houses, or animals. Have them write sentences comparing the items. Provide a bank of adjectives such as *wide, high, tall, big, small, low, long, short,* and *thin* to assist them in creating sentences with comparative and superlative adjectives.

Also consider using one or more of the Connect with Math and Apply Math Concepts activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. Creating recording sheets and collections for station work will assist students in the comparing activities in *Henry Keeps Score.* Keeping score in a game or playing Limbo would be ways to integrate the math and language concepts into free time activities. As this section is written for parents, the activities can also be follow-up practice done at home.

**Lerner**Classroom™

Differentiation strategies
Scaffold
- Substitute word cards that contain adjectives so students only need to label the comparisons and not spell out or handwrite the adjectives.
- Provide students with an adjective word card in which they add the -er and -est endings to show comparisons as a way to assist in vocabulary development and focus on the meaning of each suffix.
- Support students with labeling by providing a verbal prompt, for example: "If this one is ____, then this one is ____ ."

Extend
- Have students measure objects using a ruler and/or non-standard measurements such as cubes. Have them record the measurements along with labeling their comparisons.
- Have pairs of students measure and compare their heights, the lengths of their arms, and the widths of their feet. Have them write the comparisons, including the exact measurements.

## MATHEMATICS STANDARDS

Kindergarten
K.CC.C.6: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.
K.CC.C.7: Compare two numbers between 1 and 10 presented as written numerals.
K.MD.A.2: Directly compare two objects with a measurable attribute in common to see which object has "more of" / "less of" the attribute, and describe the difference. For example, directly compare the heights of two children and describe one child as taller/shorter.

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

Grade 2
2.MD.A.4: Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

Kindergarten
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
RL.K.10: Actively engage in group reading activities with purpose and understanding.
L.K.4.b: Use the most frequently occurring inflections and affixes (e.g., -ed, -s, re-, un-, pre-, -ful, -less) as a clue to the meaning of an unknown word.
L.K.5.c: Identify real-life connections between words and their use (e.g., note places at school that are colorful).

Grade 1
RL.1.3: Describe characters, settings, and major events in a story, using key details.
SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
L.1.1.f: Use frequently occurring adjectives.

Grade 2
RL.2.1: Ask and answer such questions as *who, what, where, when, why*, and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

# LESSON 5: REASONING ABOUT CHANCE

## LEARNING OBJECTIVE:
We are learning that we can use numbers to measure and describe how likely it is that an event will occur.

## INTRODUCTION:
Students learn that sometimes they can make guesses based on past experiences and on how many possibilities there are for an event to occur. They learn that being lucky often depends on the number of opportunities available. They learn words to describe chance, such as *always, sometimes, never, unlikely, likely* or *possible,* and *not possible.* Students then represent the possibility of occurrence using numbers.



Understanding situations that involve chance

## MATERIALS
- Chart paper
- Cubes for extension activities
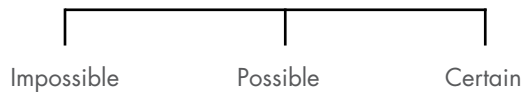
## BEFORE READING
### Opening Activity
Tell students that they will be reading a book in which a character determines if the possible outcomes in different events will be lucky or unlucky. He learns that luck is another way to talk about the chance of something occurring either the way he wants or does not want it to (successfully or unsuccessfully).

Write the word *chance* on chart paper. Lead a discussion to generate a definition and examples of the use of the word. Be sure to record student responses with words and pictures, and make sure they understand that chance is the possibility that something will happen and that taking a chance involves a risk because you often cannot be sure of the outcome.

Be sure students understand that we often cannot be sure what will happen in a given situation, such as whether or not one's parents will serve cereal for breakfast, but we can make guesses.

### Probability Line Activity
Draw a probability line like the one shown below on the chart paper. Write the words *impossible, possible,* and *certain* under the line. Discuss their meanings.

| | | |
|---|---|---|
| Impossible | Possible | Certain |

Ask students to use a "thumbs up, thumbs sideways, or thumbs down" in response to the guided questions. Under the probability line, list other words that represent chance. Refer to the sets of words below. Ask students where each set of words should be placed under the line.
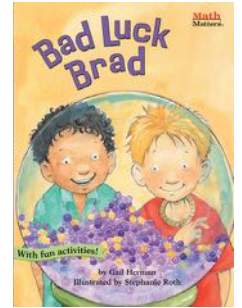- never, sometimes, always
- unlikely, equally likely, very likely,
- not probable, probable, definite

Ask similar questions to those presented in the Guided Questions below for each set of words you add to the probability line.

### Guided Questions
1. What is the chance that a grown-up will be at your home after school today?
2. What is the chance that you will have french fries for dinner?
3. What is the chance that you will have homework tonight?
4. What is the chance that a lion will visit our class today?
5. What is the chance that you will drink water sometime today?

LernerClassroom™

## READ ALOUD

Ask the following questions after reading the corresponding pages in the book to guide discussion about math concepts during reading.

Bad Luck Brad

7:  Who can say a sentence that tells us how many chocolate chip bars there are compared to the total number of bars? (Two out of 10 bars are chocolate chip.)

7:  Who can tell us the relationship of the lemon bars to the total? (Eight out of 10 bars are lemon bars.)

8:  Do you think it will be likely or unlikely that each child will pick a chocolate chip bar? Why?

19:  Do you agree with Brad that it will be more likely for him to end up with a gift brought by a girl than a boy? Why?

25:  Why do you think Pete was able to get a white gumball but Brad was not able to get a red gumball? (Pete was picking from a machine with mostly white gumballs and Brad was picking from a machine with six different colors of gumballs, mostly not red.)

28:  Do you agree with Brad that it is more likely that *Space Flight* will be playing around 4:00 than for *Dinosaurs* to be playing around 4:00?

29:  Ask students what they think we mean when we say luck depends on numbers.

Refer to the Connect with Math section on the Activities That Matter page for additional questions.

## AFTER READING: REFLECT AND EXTEND

- Have students complete equations with unknowns related to the breakfast bars. Provide examples such as:
    - If we have a box of chocolate chip and lemon breakfast bars and we know there are three chocolate chip bars in the box, how many are lemon if there are 20 bars in total? (3 + ___ = 20).
- Have students create their own probability line. Have them label the likelihood of a list of outcomes on the probability line.
- Have students recreate the selection of breakfast bars to determine the likelihood of selecting a chocolate chip bar. Students place eight yellow cubes and two brown cubes in a container. Have them draw out a cube ten times and record their results. Ask students to tell if they would have a good chance or a poor chance of selecting chocolate chip based on their results. NOTE: Be sure they replace the cube drawn each time before drawing again.

Also consider using one or more of the *Apply Math Concepts* activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. As this section is written for parents, the activities can also be used as follow-up practice at home.

Differentiation strategies

Scaffold

- Have students count out 20 items such as colored cubes. Students count and label the collection with sentences such as:
    - There are 20 in total.
    - There are three yellow out of 20.
    - There are more yellow cubes than red cubes.
- Limit the words and events on the probability line to *always* or *never*.

Extend

- Have students generate a list of events that can be explored as they relate to chance.
- Have students write sentences that show relationships such as "Ten out of 20 students are girls."
- Have students reproduce the gumball event from the story by using cubes. Place 25 white cubes and five red cubes in a bag. Have students draw out a cube 10 times and record their results. NOTE: Be sure students replace the cube drawn each time before drawing again. Repeat with a set that contains five of each color: white, yellow, violet, green, black, and red. Represent the data in a bar chart.

## MATHEMATICS STANDARDS

<u>Kindergarten</u>
K.CC.A.3: Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects).
K.CC.B.4.b: Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
K.CC.B.4.c: Understand that each successive number name refers to a quantity that is one larger.
K.CC.B.5: Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.
K.CC.C.6: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

<u>Grade 1</u>
1.OA.C.5: Relate counting to addition and subtraction.
1.OA.D.8: Determine the unknown whole number in an addition or subtraction equation relating three whole numbers.

<u>Grade 2</u>
2.OA.B.2: Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

<u>Kindergarten</u>
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
RL.K.10: Actively engage in group reading activities with purpose and understanding.

<u>Grade 1</u>
RL.1.3: Describe characters, settings, and major events in a story, using key details.

<u>Grade 2</u>
RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

# LESSON 6: REASONING ABOUT NUMBERS

## LEARNING OBJECTIVE:
We are learning that a number can describe an amount of items in a group or the position of one item in relation to others within a group.

## INTRODUCTION:
Students learn about ordinal numbers. They learn that while ordinal numbers describe position, there is a relationship between ordinal numbers and counting (cardinal) numbers. They learn that whether the numbers are counting or ordinal, they are either odd or even. Students transfer this understanding to the calendar and extend their thinking to number patterns found on the calendar.

## MATERIALS
- A set of eight crayons for each student. Typically the small box of crayons holds eight colors (brown, red, yellow, orange, green, blue, violet, and black).
- Chart paper
- Large calendar

## BEFORE READING

Opening Activity
Tell students that they will be learning about ordinal numbers. Write the question, "What makes ordinal numbers different from counting numbers?" Tell students they will work with their crayons and will try and figure out the definition of an ordinal number.
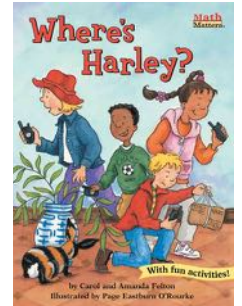
Crayon Activity:
Have each student take out a box of eight crayons. (You can substitute blocks or other items for crayons.)
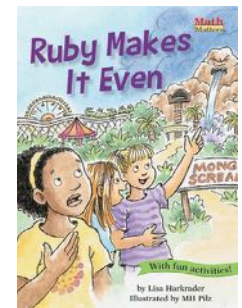1. Ask students to find the total number of crayons in their box. Write "Total Crayons = 8" on the chart paper. Ask students to also generate a sentence to be included on the chart such as: "There are eight crayons in the box."
2. Ask students to put the crayons in the following order: brown, red, yellow, orange, green, blue, violet, and black.
3. Provide students with a number of examples that show a total amount such as: How many crayons are in the set if we take away the brown and the black? Have students remove the colors and point and count to find the total. Record responses on the chart paper using sentences, equations, and/or pictures.
4. Have students once again put the crayons in the following order: brown, red, yellow, orange, green, blue, violet, and black.
5. Using the "I do," "We do," "You do," instructional sequence, point to each crayon and count using ordinal numbers. Be sure to reinforce that the counting in this case is moving from left to right.
6. Ask students to name each color that responds to a given ordinal number. Record on the chart paper. For example, ask students to describe the position of the yellow crayon. Then record that the yellow crayon is third in the set of crayons. NOTE: A scaffolding technique would be to have students use or create a number line under the crayons.

After providing multiple opportunities to practice, lead a discussion to generate a definition of ordinal numbers. Be sure to also note that ordinal numbers are different from counting numbers. Counting numbers describe quantity while ordinal numbers describe position.

Use one or more of the following books in the Math Matters series for this lesson.



Using numbers to show order



Understanding odd and even numbers



Understanding the calendar

**Lerner**Classroom™

<u>Guiding Questions</u>
Who can say which color is in the fifth place?
In what position is the blue crayon?
What color is two more than the color in second place?
Who can tell us what an ordinal number describes?
Does anyone have an example of when we might use ordinal numbers?
Can anyone give another example of the above?

7. Ask students to separate out five crayons and put them into pairs, or groups of two. Let them discover that there will be a left over crayon without a pair.
8. Repeat using six, seven, and eight crayons. Ask students if they notice a pattern. Have students discover that when there is an odd number, all of the items cannot be grouped into pairs.
9. Write on chart paper definitions for both odd and even numbers that are generated by the students: for example, even numbers can be separated into pairs with no items left over, and odd numbers always have something or someone without a partner.

NOTE: If time permits have students reorganize the crayons and identify the crayons from bottom to top.

## READ ALOUD
Ask the following questions after reading the corresponding pages in each book to guide discussion about math concepts during reading.

<u>Where's Harley?</u>
8:   Which friend lives on the highest floor? How do you know?
9:   How many floors will Mandy and Gus check? How do you know? What about Nate and Maria?
11:   Which floor is the highest? Is the answer a counting number or an ordinal number? Why?
13:   How many floors away from his home is Harley? Can we say a number sentence or equation to show our thinking?
17:   How many floors did Harley ride in the elevator? Explain how you know.
17:   Are we using a counting number or an ordinal number when we tell how many floors Harvey rode in the elevator? Explain.
19:   What floor is one less than the tenth floor? Is the answer a counting number or an ordinal number? Why?
21:   How many floors away from his home is Harley now? Is the answer a counting number or an ordinal number? Why?
25:   How many floors did Harley ride in the elevator this time? Who can say a number sentence or equation that tells the answer?

<u>Ruby Makes It Even</u>
9:   Why does Beth's vote determine whether or not the girls go on Mongo Scream?
11:   What does Ruby mean when she says she is the odd kid out?
12:   Would you agree or disagree that when there is an odd number there will always be one person without a partner? Why?
14:   Why do you think that all the rides are meant for even numbers?
16:   Why is Rob an odd kid out when he is by himself?
17:   Do you agree with Ruby that an odd number plus an odd number always results in an even number? Can you find an example to prove your thinking?
20:   What does Ruby discover about even numbers?
26:   How many different even numbers are in a group of 10? How do you know?
30:   Is there any way that an odd number would not leave someone without a partner? What makes you say that?

<u>Play Date</u>
3:   What day of the week does Jessica want to have a play date? What month could it be? How do you know?
7:   What day of the week comes after Tuesday?

LernerClassroom™

7:    If Sunday is the first day of the week, what day of the week is Tuesday? Is that an ordinal number or a counting number? Is it odd or even?

10:   What is unusual about the names of Jessica's cousins?

11:   Now what day of the week is Jessica planning the play date?

15:   What ordinal number can we use to tell the date of the first Sunday of the month in the calendar on this page? Is it an odd number or an even number?

19:   What day of the month is Friday? How many days has Jessica been trying to have a play date? Which answer is a counting number? Why?

22:   Why does Jessica say it has been almost a week?

25:   Jessica's mother says there are four weeks in a month. Can someone use that information to say a number sentence that can tell us about how many days are in a month?

29:   How many days did the girls have to wait in order to have a play date? Explain how you know.

## AFTER READING: REFLECT AND EXTEND

1.  Calendar Activity: Identifying Patterns and Ordinal Numbers
    Display a large calendar. Have students identify patterns on the calendar such as:
    a. You always add 1 when going across the row.
    b. You always add 7 when going down a column.
    c. You add 8 when going left to right on the diagonal.
    d. You add 6 when going right to left on the diagonal.
    e. Each week has 7 days.
    f. Each month has 4 weeks.
    g. Each day can be read as a counting number and an ordinal number.
2.  Provide students with a calendar and have them circle all the odd numbers in red. An extension is to have them draw pictures to prove their thinking.
3.  Use ordinal numbers to identify dates to questions such as:
    a. Say the date that is the third day after Presidents' Day.
4.  Have students identify other situations in which they use ordinal numbers, such as in a race, contest, or in providing directions.
5.  Have students identify their position in line using ordinal numbers.

Also consider using one or more of the Connect with Math and Apply Math Concepts activities outlined on the Activities That Matter page of the selected book. Activities such as ordering index cards for ordinal numbers, matching cards to items in a set, or creating a calendar would work well in learning stations or as pair share activities. As this section is written for parents, the activities can also be used as follow-up practice at home.

Differentiation strategies
Scaffold
- Provide students with number lines to place under sets of objects to assist with counting and naming ordinal numbers.
- Label a calendar with both counting and ordinal numbers to support students in differentiating the two types of numbers. Have students place a block on each day to help with counting. For example, when asked to tell the number of days Thursday is from Sunday, the student places a block on each of the days and then counts the blocks to find the total.
- Build upon students' understanding of more or less. Ask students to identify how many more days it will take to get to a particular date.
- Provide students with opportunities to skip count by twos to identify even numbers.

Extend
- Have students label a calendar using ordinal numbers in addition to counting numbers. Have them highlight odd or even numbers.
- Have students write the date in standard form and then in a sentence using ordinal numbers. For example: May 7, 2015 and "Today is May 7th."
- Have students create a display of a collection and share with their classmates. Have them tell the total number of items in their collections and then model counting using ordinal numbers.

## MATHEMATICS STANDARDS

<u>Kindergarten</u>
K.CC.A.2: Count forward beginning from a given number within the known sequence.
K.CC.B.4.b: Understand that the last number name said tells the number of objects counted.
K.CC.B.4.c: Understand that each successive number name refers to a quantity that is one larger.
K.CC.B.5: Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

<u>Grade 1</u>
1.OA.C.5: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

<u>Grade 2</u>
2.OA.C.3: Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends
2.OA.B.2: Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

<u>Kindergarten</u>
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
RL.K.10: Actively engage in group reading activities with purpose and understanding.
L.K.5.c: Identify real-life connections between words and their use (e.g., note places at school that are colorful).

<u>Grade 1</u>
RL.1.3: Describe characters, settings, and major events in a story, using key details.
SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

<u>Grade 2</u>
RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

**Lerner**Classroom™

# LESSON 7: REASONING ABOUT SIZE AND LOCATION

## LEARNING OBJECTIVE:
We are learning how to use drawings, measurements, and words to describe the shape and location of objects.

## INTRODUCTION:
Students develop an understanding and communicate the spatial relationship between objects. They learn and use vocabulary to describe the shape, size, and location of objects. In the first book, *Where's That Bone?*, students learn that maps can be used to illustrate the location of objects and that position words specify the relationship of one object to another; this assists in describing the location.

In the second book, *Chickens on the Move*, students explore the relationship of a shape to the size of each side of the shape. They learn that changing the shape does not change the perimeter when using the same amount of fencing.

## MATERIALS
- Map handout for each pair of students or each individual student
- Chart paper listing the words *right, left, over, under, on, behind, between, next to, above,* and *in front*

## BEFORE READING
### Opening Activity
Tell students that they will be reading two books in which the characters need to solve a problem. In both of the stories the characters use position words to describe locations.

Explain that before reading, students will learn words that help describe the position of objects. Write the vocabulary words on chart paper. Point to each word and read it aloud with students. Pause after each word and ask students to demonstrate the meaning with their hands. For example, have students place their right hand in front of their left as you underline or highlight the words *in front*. To make the meaning more explicit, the activity can also be done using two different shapes or puppets. To ensure understanding, it is important that students model the meaning themselves and not have it modeled for them.
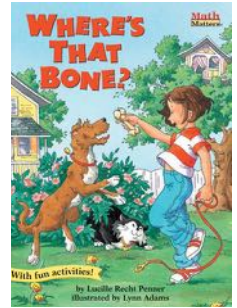
### Mapping Activity: Applying the Language of Location
This activity can be done in pairs, individually, or as a whole group. For a whole group, open *Where's That Bone?*" to page 23 or display one Opening Activity Picture so it can be seen and reached by all students. For pair and individual work, pass out the Opening Activity Picture to students.
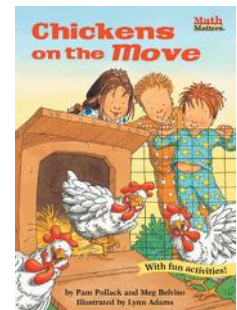1. Have students verbally identify objects to answer the first five questions.
   a. Write the phrase on chart paper and underline or highlight the position word. For example: The tree house is <u>above</u> the ground.
2. Have students point to or place an X on locations according to questions 6 through 10.
3. Discuss how maps usually contain a way to measure the distance and size of objects on the map.
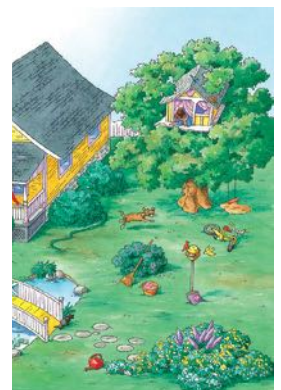
### Guiding Questions
1. Who can find an object that is in front of another in this picture? Are there any others?
2. Can anyone use the word *above* to describe something in this picture?
3. How can we describe the location of the dog?
4. What do you notice about the bird feeder?
5. How can you describe the relationship of the broom to the basket?
6. Point to or put an X under the bridge.
7. Point to or put an X above the tree house.
8. Point to or put an X to the left of the watering can.
9. Point to or put an X below the swing.
10. Point to or put an X beside the cat and the watering can.

Creating maps to show locations


Understanding size through perimeter

## READ ALOUD

Ask the following questions after reading the corresponding pages in each book to guide discussion about math and spatial concepts during reading.

Where's That Bone?
6:     Who can find one of our position words? Can anyone use another position word to describe where Bingo is when Hulk is eating his food?
7:     What word can we use to describe where Bingo is compared to Hulk?
12:    How do you think Jill will use the map to solve Bingo's problem? What do we know about maps?
15:    Who can tell us where Bingo buried his bone?
20:    Which position words help us know where Bingo was going to bury this bone?
22:    There is more than one position word on this page. Which one tells us where Bingo buried this bone?
31:    How did using a map help Jill help Bingo?
32:    Do you have any suggestions that might improve Jill's map?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

Chickens on the Move
6:     What words help describe the position of where Anne and Tom are thinking of building the chicken coop?
9:     What do we know about rectangles?
9:     Can anyone say what the sum of 24 means?
15:    What words tell us the new position of the chicken coop?
16:    What does the drawing at the bottom of the page tell us about the new chicken coop?
20:    What do we know about the new location of the coop?
21:    Who can explain the meaning of the equation?
21:    Why is the coop always 24 feet in total even when the sizes of the sides change?
28:    Do you think the coop is still 24 feet in total?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

## AFTER READING: REFLECT AND EXTEND

1. To link the concepts in the two books, have students create a map that displays the various locations of the chicken coop in *Chickens on the Move*. Provide a listing of the items needed in the map such as the house, the hill, the garden, the garage, and the apple tree. Have students use a symbol such as an X to show the locations. Younger students can describe the locations orally using position words while older students can write sentences.
2. Have students create a map of their classroom. They can measure the length of the sides to determine the perimeter and use symbols to indicate objects in the room. Students can explain the relationship of objects using position words.
3. Play barrier games using shapes from kits such as pattern blocks. Students are placed in pairs with a barrier in between them so that they cannot see each other's materials. One student organizes three or four pattern blocks or shapes into a pattern. The student then uses position words to describe the design to the other student who recreates the pattern without any visual cues. Students remove the barrier and compare the objects. The goal is to have both players' designs look the same at the end of each turn.

Also consider using one or more of the Apply Math Concepts activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. As this section is written for parents, the activities can also be done at home as follow-up practice.

LernerClassroom™

Differentiation strategies
Scaffold
- Have students cover the position words used throughout each book using highlighting tape.
- Provide students with cards that describe locations of items in the classroom. Students place the cards on the correct item. For example, a card might read, "to the right of the computer," and the student places the card on the item that matches the location.

Extend
- Have students create a word bank of position words with corresponding drawings. Encourage students to group words with their opposites.
- Have students locate their homes on a local map or on an Internet map site. Have them write sentences using position words to describe the location of their house in relationship to other places.
- Have students write sentences describing locations of items in their room according the map they create as part of the Apply Math Concepts activity.

## MATHEMATICS STANDARDS

Kindergarten
K.G.A.1: Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind,* and *next to.*
K.MD.A.1: Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.

Grade 1
1.OA.A.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.
1.OA.A.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.

Grade 2
2.OA.A.1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

Kindergarten
K.L.K.1.e: Use the most frequently occurring prepositions (e.g., *to, from, in, out, on, off, for, of, by, with*).
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
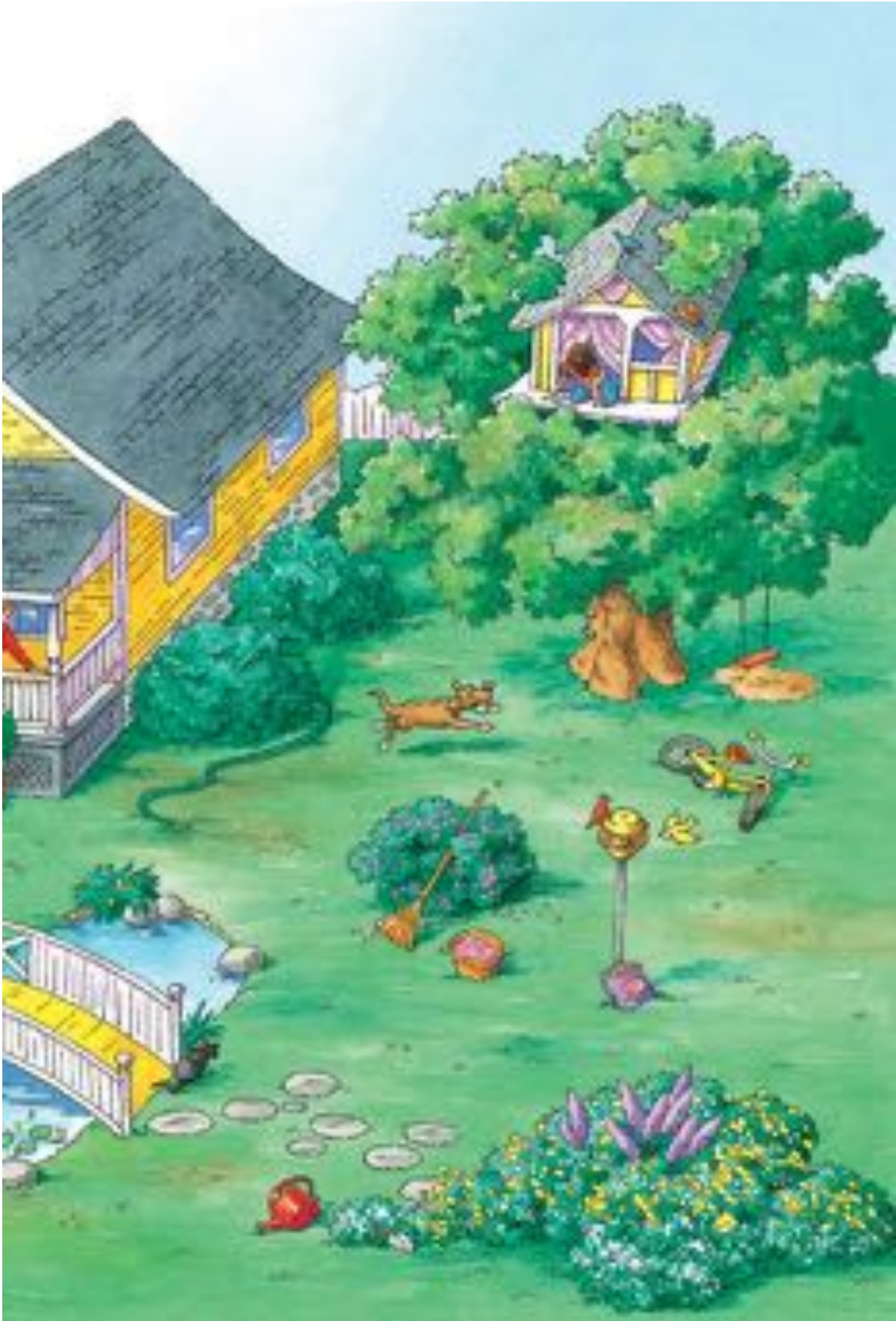RL.K.10: Actively engage in group reading activities with purpose and understanding.

Grade 1
L.1.1.i: Use frequently occurring prepositions (e.g., *during, beyond, toward*).
RL.1.3: Describe characters, settings, and major events in a story, using key details.

Grade 2
RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

# LESSON 8: REASONING ABOUT ADDITION AND SUBTRACTION

## LEARNING OBJECTIVE:
We are learning that addition is an operation that can be used to find a total when joining two or more groups of items, and subtraction can be used to find the result when removing items from a starting amount.

## INTRODUCTION:
Students learn the conceptual understanding of addition and subtraction as they relate to the base-ten number system. They expand this understanding to adding and to trading coins that represent the same value. These titles are an introduction to the use of operations to track and solve problems that might occur in real-life situations. They are not meant to be an in-depth coverage of the procedures.

## MATERIALS
- Place-value blocks, pennies, dimes, and dollars
(Note: Linking cubes may be used, in which case students should snap the blocks together rather than trade.)
- Place-value board or drawing paper divided into thirds and labeled with hundreds, tens, and ones

## BEFORE READING
Note that the level of depth covered in the launch regarding regrouping is at the discretion of the teacher depending on grade level. Kindergarten and early first grade students do not need to develop a procedural understanding of regrouping or operations with two-digit numbers, just a conceptual understanding of grouping by tens.
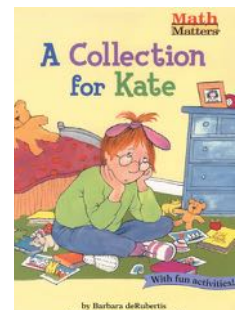
### Opening Activity
Tell students that they will be reading a book or a series of books in which the characters use addition or subtraction to solve problems. The characters solve problems with one- and two-digit numbers. To get ready to read we are first going to model numbers, add, and subtract using place-value blocks. Then we can see how this is similar to and different from the way the characters solved their problems.
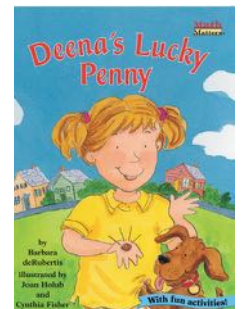
### Place Value Activity
This activity is a modification of an activity created by pioneering teacher Mary Baratta-Lorton. This opening moves from modeling numbers to adding two-digit numbers. The amount of time spent on this launch will vary according to the level of understanding of the class. This launch can also be done multiple times, so it works well prior to reading each book.

- Provide each student with a place-value board and a set of place-value blocks.
- Discuss how our numbering system is based on groups of ten. Tell students you will add ones by placing them into the ones column until they have ten ones in the column. Then they will trade the ones and move the group into the tens column to the left.
- Teacher instructs students to "add one."
- Teacher models with students taking one cube, placing it in the ones place, and then touching each column while stating, "zero tens, one." Record the number so it is visible for all students.
- Teacher instructs students to "add one" and repeats step three stating "zero tens, two."
- When you reach a group of ten, students say "ten," replace the ten with a ten-rod, and place it in the tens place.
- Continue adding one block at a time and counting up to twenty.
- Ask students what they think will happen when they have 10 tens.
- Have students repeat the above format using ten rods instead of ones cubes, counting each time and using the format of "zero hundreds, ten." When they have 10 tens they exchange for a hundred block.
- Tell students that they can use their blocks to model adding more than one. Ask a student to tell the class a number between one and twenty. Students model the number using the blocks.
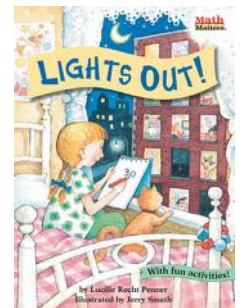
---

Addition of one- and two-digit numbers



Understanding the value of money



Subtraction with one- and two-digit numbers

---

**Lerner**Classroom™

- Have another student tell the class a number between one and twenty. Students add those blocks to their boards, regroup when necessary, and find the total. Record the work as students make models and find sums.
- Examples for subtraction can also be provided.

## READ ALOUD

Ask the following questions after reading the corresponding pages in each book to guide discussion about math concepts during reading. Integrating manipulatives such as place-value blocks and coins during the reading will assist students in developing the conceptual understanding of the procedures used by the characters.

A Collection for Kate
4:      How many items do you think Kate needs to have a collection? What do you think makes a group of items a collection?
10:     How many items does Emma have in her collection? What strategy did you use to figure it out in your head? How would you model Emma's collection with place-value blocks?
15:     What strategies can we use to find the total number of shells in Ben's collection?
20:     How many postcards does Joan have in her collection? How does Kate estimate the sum before she finds the solution?
25:     Can someone show us how to use Kate's estimation strategy to estimate how many pigs are in Rachel's collection?
31:     What does Kate mean when she says, "That just didn't add up"?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

Deena's Lucky Penny
6:      Would it also be correct to say Deena's one penny plus four pennies more equals five cents?
10:     How many pennies would be the same as Deena's two nickels?
13:     How many pennies would be the same as Deena's two dimes? How many nickels? How do you know?
17:     What does Deena mean when she says that others "turned them into" more money? How did that happen?
19:     Who can say how many cents are in a dollar? How do you know?
24:     Who can show us how we can use skip counting and addition to figure out how many nickels Deena would have if she exchanged her dollar for nickels?
24:     Who can show us how we can use skip counting and addition to figure out how many dimes Deena would have if she exchanged her dollar for dimes?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

Lights Out
3:      How much longer will the girl be able to stay up until it is her bedtime? How do you know?
10:     Who can say a number sentence or equation that gives us a solution of 30 lights?
14:     How did the girl determine that there were 25 lights still on without counting?
15:     What number sentence or equation can we use to determine the number of lights that have gone out?
17:     The girl used regrouping to find the solution for twenty-one minus six. Can someone give us another strategy for finding the answer?
21:     Who can say a number sentence or equation for what has happened?

Refer to the Connect with Math section on the Activities That Matter page for additional questions and suggestions.

# AFTER READING: REFLECT AND EXTEND

- Repeat the *Place Value Activity* using pennies, dimes, and dollars.
- Set up a reinforcement system in which students can earn play pennies for activities or behavior. Students can trade their pennies for other coins and once a month use the play money to buy from a prize box or pay for free time activities.
- Have students use subtraction to keep track of how many students in the class complete tasks during the school day. For example: If 12 out of 25 students have completed the science learning center activity, how many more still need to complete the activity?
- Have students write and model word problems for real-life addition and subtraction problems.

Also consider using one or more of the Apply Math Concepts activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. As this section is written for parents, the activities can also be follow-up practice done at home.

Differentiation strategies
Scaffold

- Provide students with blocks and money to use to model each situation in the books. Have them write down the equations with the solutions found by the characteristics.
- Provide students with a list of items that they can purchase for $1.00. Have them find how many different ways they can spend the money.

Extend

- Have students open a class or school store with items that cost up to $1.00.
- Have students participate in collecting money for lunches or school trips. Have them count and use operations to find totals and to give change.
- Provide students with a poster or flyer with items from a dollar store and five dollars. Have them list the items they could purchase and determine how much if any money would be left.

# MATHEMATICS STANDARDS

Kindergarten
K.OA.A.1: Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations, using as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.
K.OA.A.2: Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
K.OA.A.4: For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
K.NBT.A.1: Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (such as 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

Grade 1
1.OA.A.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.
1.OA.C.5: Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
CCSS.Math.Content.1.NBT.B.2: Understand that the two-digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
    CCSS.Math.Content.1.NBT.B.2.a: 10 can be thought of as a bundle of ten ones — called a "ten."
    CCSS.Math.Content.1.NBT.B.2.b: The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

1.NBT.C.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.

<u>Grade 2</u>
2.OA.A.1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
2.MD.C.8: Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

# ENGLISH LANGUAGE ARTS-LITERACY STANDARDS
<u>Kindergarten</u>
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
RL.K.10: Actively engage in group reading activities with purpose and understanding.

<u>Grade 1</u>
RL.1.3: Describe characters, settings, and major events in a story, using key details.
SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

<u>Grade 2</u>
RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

**Lerner**Classroom™

# LESSON 9: REASONING WITH SHAPES

## LEARNING OBJECTIVE:
We are learning about the attributes of shapes and objects and how to use those attributes to describe, sort, and create patterns.

## INTRODUCTION:
Students learn the term *attribute*, give examples of attributes of objects, and learn to use one or more attributes to sort objects. They recognize the attributes of objects and shapes in their environment (size, shape, color, faces) and their properties. Students communicate sorting criteria and patterns by naming the size, shape, color, or properties of the objects.

## MATERIALS
- Collection of objects for sorting, such as attribute blocks, geometric shapes, or felt-board shapes, that allows each student to have two objects
- A set of concept cards for each pair of students

## BEFORE READING

### Opening Activity
Tell students that they will be reading a book or a series of books in which the characters describe and work with objects based on their attributes. Explain that before reading students will explore the meaning of the word *attribute*, the attributes of shapes, and the words used to describe the attributes.

Write the word *attribute* on chart paper. Lead a discussion to generate a definition and examples, making sure to record student responses with words and pictures. If necessary, provide a prompt by writing the word *characteristic* in parentheses under the word *attribute*.

### Guiding Questions
Who can tell us the meaning of the word *attribute*?
Does anyone have a different idea of what the word *attribute* means?
Have you ever heard someone use the word *attribute*?
Talk to your neighbor and think of three examples of attributes. Who would like to share their examples?

### Shape-Sort Activity: Understanding Attributes
Have a collection of attribute blocks, geometric shapes, or felt-board shapes that have a variety of attributes suitable for sorting.
1. Each student randomly selects two shapes from the set.
2. Select a target shape and place it so it can be seen by all students, for example in the center of the carpet, on a projection display, or on felt board.
3. As a group, describe the attributes of the shape and record the responses.
4. Select one or more of the attributes to use to create a collection.
5. Each student compares their shapes to the target shape to determine if either shape has the same attribute(s) and belongs in the collection. Students describe how their shape is the same as the target shape and how it is different.

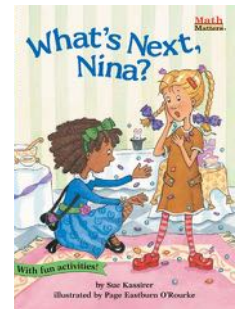### Concept of Sorting: Link Oral Language to Written Language
Have students work with a neighbor. Provide each pair of students with copies of the word cards containing color, size, and shape words. Have students sort the cards into categories.
NOTE: Repeat the Shape-Sort Activity using different attributes and/or manipulatives to activate thinking prior to reading for each book in the series.
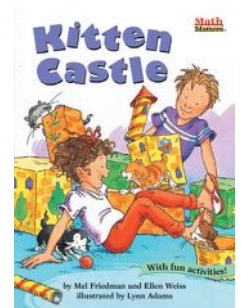
Sorting objects by their attributes



Describing patterns by naming their colors



Describing 3-D shapes by their properties

**Lerner**Classroom™

ISBN: 978-1-57565-837-7

## READ ALOUD

Ask the following questions after reading the corresponding pages in each book to guide discussion about math concepts during reading.

Grandma's Button Box
14:   What does Kelly mean when she says they have to put the buttons in the right compartments? What do you think she will do? What makes you think that?
17:   Why did Kelly decide to sort the buttons by size instead of by shape? Do you agree with her decision? Why or why not?
21:   Why did Kelly decide to sort the buttons by color instead of size?
31:   How was sorting the buttons helpful? Can you think of other times that sorting objects is helpful?

What's Next, Nina?
6:    What do you think Nina means when she says the necklace has sunset colors? What other colors have attributes like a sunset?
18:   Why do you think it is difficult for Nina to remember the pattern of the beads in the necklace? Can you think of a strategy that Nina can use to remember? Does anyone have another strategy?
20:   Who can use color words to describe the first pattern? What color would be next? How do you know? (Repeat for second and third pattern.) Can anyone think of another pattern that can be made from the beads in the third group?

Kitten Castle
8:    What are some places in which you think Fudge would like to curl up? What makes you think that? Do you agree with what ___ said? Why?
10:   How are the three shapes Lovely is playing with similar? How are they different? What is the shape of each toy? How do you know?
28.   Who can describe the shapes in the castle? Are there any other shapes? What makes the boxes good for stacking?

## AFTER READING: REFLECT AND EXTEND

1.  Hold a clothing or can drive. Have students identify the attributes and sort the collected objects.
2.  Have students sort objects found in collections within the classroom.
3.  Have students organize themselves into groups according to the colors, patterns, and types of clothing they are wearing.
4.  Take students on an observation walk in which they identify patterns in and around their school. Photograph and label the identified pattern.

Also consider using one or more of the Connect with Math and Apply Math Concepts activities outlined on the Activities That Matter page of the selected book at learning stations or as a pair share activity. As this section is written for parents, the activities can also be done at home as follow-up practice.

Differentiation strategies
Scaffold
- Substitute matching activities for sorting and pattern creation. For example, copy the castle picture and create corresponding shapes for matching.
- Provide students with patterns to copy rather than having them construct their own patterns.
- Sort 3-D shapes by properties (rolls, stacks) rather than constructing, comparing, or describing uses.
- Substitute magnetic or felt-board shapes for activities that require cutting for students with fine motor difficulty.
- Provide students with multiple sorted sets and ask them to define and/or label the attributes instead of sorting.

Extend
- Label and sort 3-D shapes by the number of sides, faces, corners, or edges.
- Provide a pattern in which one object is incorrectly placed. Have the students locate the error and correct the pattern.

**Lerner**Classroom™

- Students draw shapes from given oral or written attributes such as number of sides, color, or number of angles.

## MATHEMATICS STANDARDS

<u>Kindergarten</u>
K.G.A.1: Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above, below, beside, in front of, behind,* and *next to.*
K.G.A.2: Correctly name shapes regardless of their orientations or overall size.
K.G.A.3: Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

<u>Grade 1</u>
1.G.A.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.A.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.

<u>Grade 2</u>
2.G.A.1: Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

## ENGLISH LANGUAGE ARTS-LITERACY STANDARDS

<u>Kindergarten</u>
L.K.5.a: Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent.
RL.K.1: With prompting and support, ask and answer questions about key details in a text.
RL.K.10: Actively engage in group reading activities with purpose and understanding.

<u>Grade 1</u>
L.1.1.i: Use frequently occurring prepositions (e.g., *during, beyond, toward*).
L.1.5.a: Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent.
RL.1.3: Describe characters, settings, and major events in a story, using key details.
SL.1.2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

<u>Grade 2</u>
RL.2.1: Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text.
SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

| large | square | triangle |
|---|---|---|
| ball | box | funnel |
| can | cube | yellow |

| cube | red | medium |
|---|---|---|
| teeny | cone | green |
| huge | jumbo | humongous |

LernerClassroom™