Further investigations:

Fist full of Cereal! Give your child a small handful of multicolored cereal loops. Help him sort and organize the different colored cereal. Let him first represent each color with a tally mark to show the amounts of each color. Next, have him use the tallies to create a picture graph showing the different amounts (quantity) of the colored cereal. Last, have your child represent the same information (data) as a bar graph. Ask your child: Which color of cereal occurs the most in your sample? Which color occurs the least? Compare the amount of green cereal with the amount of red cereal; use greater than, less than or equal to. Repeat with the other colors. Which color(s) of cereal have less than/more than the orange?

Routines and Data

Students will:
- Represent a number by the appropriate numeral
- Use counters and pictures to represent numbers in terms of tens and ones
- Compare objects using greater than, less than, and equal to
- Understand number relationships by using strategies of counting on and counting back
- Pose questions, collect data, create graphs, and interpret graphs

Classroom Cases:

1. Dante’s class took a vote to see if they would spend their recess time inside the classroom or outside on the playground. The result of the class vote are in the tally chart. Where did Dante’s class spend their recess?

Case Closed - Evidence:
They spent recess outside.

2. The graph below indicates how many candies Kim has by color.

Kim’s Colored Candies

<table>
<thead>
<tr>
<th>Color of Candies</th>
<th>Amount of Candies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>2</td>
</tr>
<tr>
<td>Green</td>
<td>5</td>
</tr>
<tr>
<td>Yellow</td>
<td>4</td>
</tr>
<tr>
<td>Brown</td>
<td>1</td>
</tr>
<tr>
<td>Blue</td>
<td>3</td>
</tr>
</tbody>
</table>

Amount of Candies

a. How many more green candies than brown candies does Kim have?
b. Kim has fewer orange candies than yellow candies. How many orange candies could Kim have?
c. Kim ate five candies and now only has three colors left. What two candy colors did Kim eat that left her with only three remaining colors?

Case Closed - Evidence:
a. 5    b. 3, 2, or 1    c. Yellow and brown

Clues:
Children at this age will sometimes choose an answer based on the size of the item instead of the quantity. Spend extra time at home comparing items of different sizes and amounts. To help your student begin organizing his information use small items such as beans or cereal in an empty ice tray or egg carton. Each space can hold one item. Because containers are uniform, it is easy to see the different amounts represented.

Book ‘em:
Minnies’ Diner: A Multiplying Menu by Dayle Ann Dodds
Ask Mia by Iris Hudson
Grandma’s Button Box and Who’s Got Spots by Linda Williams Aber
Further investigations:

Hide-n-Seek Coins. Take a few of the same type of coin and place some of them facing up and some of them facing down under a piece of paper. Let your child gently rub over the coins with a pencil until the outline of the coins can be seen. Ask him to identify the type of coin and then to tell you the amount that was under the paper. Extend this activity by asking your child to identify a fair trade for what is under the paper i.e. if your child rubbed 2 nickels under the paper the trade could be 10 pennies or a dime.

Rub-a-Dub, 10 in a Tub. To help your child understand place value, practice making tens. Place 18 beans, buttons, or any small objects in a container. Use a clean Popsicle stick or tongue depressor to represent a boat. Place the small items in a pile and let your child grab a small amount (over ½) of the items. Have your child estimate (guess) how many are in his hand without counting. Next, place items on the stick until it is filled up with 10 items. This is called a “10 stick” or “a ten”. Place the remaining items next to the stick. When the boat is full, let your child count the remaining items that could not be placed on the boat. Finally, you and your child can chant, “Rub-a-Dub, ten in the tub and 6 were left behind”. The boat can then sail away and the game can start over again. Challenge: increase the number of items up to 30 and provide additional “boats.”

Terminology:

Counting strategy: a plan that uses the counting sequence by counting on from an initial quantity.

Doubles plus one: a strategy using a known fact that is close to what is needed to determine the exact fact that is needed. For example, to add 6 and 7 without remembering the fact, a child might say, “The answer is 13 because 6 and 6 is 12, and 7 is one more than 6, so I need to add one more to 12.”

Place value: the place that the digit has in a number determines its value. For example, 23 has the digit 2 in the tens place and the digit 3 in the ones place which is 2 tens and 3 ones. The value of the 2 is 20 and the value of the 3 is 3.

Understanding Operations

Students will:

- Understand and use addition and subtraction in everyday situations
- Compose and decompose numbers up to 10
- Understand base ten as a foundation for place value
- Use informal strategies for sharing quantities fairly between two to five people
- Use money (coins and bills) as a context for collecting, exchanging, and operating on quantities less than 30

Classroom Cases:

Teacher will read questions to all non-readers.

1. Decompose 8 in several ways.

Case Closed - Evidence:

2+6, 5+2+1, 4+4, 5+3

2. There are 12 cookies in a pack and Jose ate some of the cookies. Now only 7 cookies are left. How many cookies did Jose eat? Model how you could solve this problem.

Case Closed - Evidence:

Possible solutions to show that Jose ate 5 cookies:

- missing number (balancing)
- take away
- separating (decomposing)
- counting on

3. Chimère wants to buy an eraser that costs $0.20 (20 cents). Does she have enough money to buy an eraser? Why or why not?

Case Closed - Evidence:

No, Chimère only has 17 cents; she is 3 cents short.

Clues:

One of the best ways to help your child with this unit is to guide his understanding of how numbers are created. When your child is composing numbers, he is building or combining values to create the number. In other words, he starts with the parts and ends up with the whole. For example, 3+3, 1+5, and 3+2+1 are all representations of 6.

When your child is decomposing numbers, she is breaking apart or separating the values to create the different number combinations or sets that can be formed from the original number. In other words, she starts with the whole and ends up with the parts. For example, 9 can be represented as 6+3, 4+5, and 3+2+4.

Book ‘em:

A Fair Bear Share by Stuart J. Murphy
One More Bunny: Adding from One to Ten by Rick Walton
Once Upon a Dime: A Math Adventure by Nancy Allen
12 Ways to Get to 11 by Eve Merriam
One Moose, Twenty Mice by Clare Beaton

Related Files:

www.ceismc.gatech.edu/csi
Further investigations:
Take your child on a geometry hunt. Begin by locating plane shapes in and around your home. Then move to solid figures. Be sure to point out the difference between a plane shape and a solid. For example, a door has a face of a rectangle but it is a rectangular prism made up of many plane (flat or 2 dimensional) shapes.

Draw and then build shapes and solids with items from home. Use sand, flour, or shaving cream to draw or create different plane shapes. While creating the shapes, divide them into fractional parts. See if your child can divide a triangle into 2 equal parts 1/2 (yes) or 4 equal parts 1/4 (no). Use items such as yarn, toothpicks, coffee stirrers, or straws to build shapes and solids. For the corners, use mini-marshmallows, raisins, or gumdrops. Help your child begin by making plane shapes. Next, see what your child can do to expand the shapes into solids.

Practice creating halves (1/2) and fourths (1/4) with everyday sets of objects such as silverware, buttons, beans, cereal, etc. The concept of “one for me and one for you” is great to help with halves. Make sure your child understands that you have to share (divide) items equally among all the people. Start out with easy amounts such as 4, 8, or 12.

Terminology:
Pentagon: a closed figure with five straight sides
Hexagon: a closed figure with six straight sides
Cylinder: a hollow or solid object shaped like a round pole or tube
Cone: a solid object that has a flat, round base and narrows to a point at the top
Rectangular prism: a solid object with six faces, all of which are rectangles
Sphere: a solid round object like a ball
Cube: a solid object with six square faces
Fraction: equal shares or equal-sized portions of a whole; a way to describe a part of a whole or a group. For example, thirds require three parts to make a whole.
Whole: having all its parts
Part: each of several quantities into which a whole may be divided
Halves: the parts you get when you divide something into two equal parts
Fourths: the parts you get when you divide something into four equal parts.

Fun with Shapes

Students will:
• Compare shapes based on attributes
• Find and name shapes in the environment and use shapes to create representations of items in the environment
• Compose and decompose shapes
• Create shapes, both 2- and 3-dimensional
• Divide wholes or sets of objects into equal parts (halves, fourths)

Classroom Cases:
1. Which figure does not belong?
   Case Closed - Evidence:
   Sphere, because all of the figures are plane shapes and the sphere is a solid.

2. Austin is making a shape that has fewer than five straight sides. What shape could he be making?
   Case Closed - Evidence:
   Triangle, because the triangle has only three sides; a square or rectangle, because they only have four straight sides. It cannot be a circle because a circle does not have any straight sides.

3. What shapes are needed to create this house?
   Case Closed - Evidence:
   Letter A because the house is composed (a combination) of a triangle and a rectangle.

4. Juan wanted to share his sandwich with three of his friends. He decided to create a shape sandwich that could be cut into parts that are equal in shape and size. Show some of the shapes Juan may use to create his shape sandwich.
   Case Closed - Evidence:

Clues:
Composing shapes is combining one or more shapes to make a new figure. Start with the parts and make a whole. For example, you compose shapes by placing a triangle above a square to create a house, a circle above a triangle to create an ice-cream cone. For decomposing or breaking-apart shapes, start with the whole and arrive at the parts.

Distinguishing between 2- and 3-dimensional objects can sometimes be challenging for children. In the world of mathematics, 2-dimensional objects are plane shapes and 3-dimensional objects are solid figures. Help your child to distinguish between the two types of figures. Show him an empty cereal box and explain that this is a rectangular prism. Then together, cut along the edges of the box and lay flat the pieces. Help your child recognize that the cereal box (rectangular prism) is made up of 2-dimensional figures or plane shapes such as rectangles.

Book ‘em:
Cubes, Cones, Cylinders and Spheres by Tana Hoban
The Greedy Triangle by Marilyn Burns
The Shape of Things by Julie Lacome
Give Me Half! by Stuart J. Murphy
Apple Fractions by Jerry Pallotta

Related Files:
www.ceismc.gatech.edu/csi
Further investigations:

Take your child on a measurement hunt in your home. Find different objects that are used for measuring: clocks, watches, measuring tapes, cups, spoons, scales, and so on. Have discussions with your child about each object, what it measures, and the use of the objects in everyday life.

With your child, measure objects around the house using different “tools” such as a book, a spice can, a stick of gum or a toothpaste box. Before actually measuring the different objects in your home, ask your child to estimate the measurement.

Compare the different weights of items when you go to the grocery store. Let your child hold different fruits or vegetables in his hands and compare the weights. He should be able to tell you which is heavier and which is lighter. Afterwards, put each item in the scale and see which is heavier. You can extend this activity by choosing one item and, after experiencing how heavy it is, ask your child to name five things he thinks would be heavier or lighter than the object in his hand.

Fill different containers up with rice or beans to discuss capacity. Start small and then move to different size objects. For example, have your child take a spoonful of beans and estimate how many spoonfuls it will take to fill a small cup. Then allow him to fill the cup, counting the spoonfuls as he goes. How close was the estimate?

Use shaving cream, whipped cream, or sand to draw clocks. Name different hour times and have your child draw the time with his finger. After several practices telling time by the hour, try telling time by the half hour.

Terminology:

Length: The distance along a line or a figure from one point to another
Weight: A measure of how heavy an object is
Capacity: The amount a container can hold
Estimate: A number close to an exact amount; telling about how much
Minute: A unit of time that is equal to 60 seconds. 60 minutes is equal to one hour
Hour: Unit of time that is equal to 60 minutes. Twenty-four hours is equal to 1 day

How Can I Measure and Compare?

Students will:
- Estimate and compare objects by measuring length, weight, and capacity
- Use measurement tools to measure objects
- Tell time to the nearest hour and half hour
- Understand the measurement of time as it relates to a calendar and daily schedule

Classroom Cases:

1. Mark is too big for his black belt and needs a new one. He found a gray belt but is not sure if he should get it. Looking at the belts below, should Mark get the gray belt?

   Case Closed - Evidence:
   No. When comparing the two belts, they are the same size, and Mark needs a bigger belt.

2. Which container below will hold the least amount of water?
   Which container would you use to wash your bicycle?
   Which container would you need more than one of to fill a tall glass of water?

   Case Closed - Evidence:
   The teacup will hold the least because it is the smallest. I would use the bucket because it would be the only container large enough to hold the amount of water needed to wash a bicycle. I would need more than one teacup to fill a large glass of water and the other two containers hold too much.

3. Sophia is beginning her school day.
   a. What time does the clock show?
   b. When would Sophia go to school: in the morning, afternoon, or evening?

   Case Closed - Evidence:
   a. 8:00
   b. Morning

4. Isaiah follows the same daily routine when he goes to school. He prepares for school, rides the bus, and attends class at school. What do you think comes next in Isaiah’s day?

   Case Closed - Evidence:
   Answers may vary: ride the bus home, do homework, play outside

Clues:

The goals of measurement in first grade are 1) to focus on what exactly is being measured, 2) to explore with a variety of non-standard units to discover the “measure” of the object, 3) to appreciate that larger-sized units take fewer units to measure an object and smaller-sized units take more to measure an object, and 4) to realize the importance of standard units to make measurement uniform.

Book ‘em:

How Tall, How Short, How Faraway by David Adler
How Big is a Foot? by Rolf Myller
Measuring Penny by Loreen Leady
Who Sank the Boat? by Pamela Allen
Grouchy Lady Bug by Eric Carle
The Very Hungry Caterpillar by Eric Carle
Seven Blind Mice by Ed Young
Chicken Soup With Rice by Maurice Sendak

Related Files: www.ceismc.gatech.edu/csi

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Further investigations:

Money Grab Game. Choose coins with a value of $1.00 or less. Place the coins in a bag. Each player reaches in and grabs a few coins. One player then places the grabbed amount on the table and estimates the value of the money. Next, she adds the value of the coins. Discuss the differences or similarities between the estimate and the actual amount. The player records the actual value of the money. (If the calculation is incorrect, help her to re-count as she touches the coins.) The player with the largest amount counted correctly at each draw is the winner.

Place Value Challenge. Remove the face cards from a deck of playing cards and divide the remaining cards evenly among all of the players face down. At the same time, each player draws a card from his stack and places it face up. Also at the same time, the players draw a second card. Players arrange the cards to create the greatest value. The player with the largest number gets all of the cards. At the end of five rounds the player with the most cards is the winner.

Subtraction Races. Remove the face cards and deal out all the cards face down. Each player draws two cards from her pile and places them face up. These represent a two-digit number. Each player draws two more cards to represent a second two-digit number. All players subtract their numbers, and the player with the smallest amount after two rounds is the winner.

Terminology:

Base-ten understanding: Evidence of base-ten understanding includes building or breaking apart sticks of 10 interlocking cubes, trading equivalent amounts of base-ten blocks, recognizing groups of tens in spoken number words, (thirty-two is three tens and two ones), skip-counting by tens, decade counting (10, 20, 30, etc.), incrementing by tens (28, 38, 48, etc.), and direct place value explanations (forty plus four is forty-four)

Place Value: The value or meaning of a digit based on its position in a number.

Benchmarks: Easy to use numbers that provide natural or personal points of reference in the base-ten number system, such as ten and its multiples, half of ten (5) and its multiples, etc.

Rounding: A process for approximating a number to the nearest unit, ten, hundred, etc.

Stepping Up To Bigger Numbers

Students will:

- Represent and count quantities in multiple ways, including words, pictures, and numerals.
- Compare quantities using greater than, less than, and equal (> < =)
- Estimate, model, compare, order, and represent whole numbers.
- Model the base-ten number system and place value knowledge in different ways.
- Use the number line and the hundreds chart to represent number sequences and multiples of 5 and 10.
- Use coins and bills for collecting, exchanging, and operating on quantities less than 50.

Classroom Cases:

1. Tina’s mother had four nickels in her pocket. She told Tia if she could count the coins in her pocket correctly, she could keep the coins. Tia started counting, “Five, Ten, Twenty, Thirty”. Did Tina get to keep the coins? Explain why or why not.

   Case Closed - Evidence:
   No, Tina did not get to keep the coins. Tina started counting the coins correctly. However, after Tia counted “Five, Ten”, she then continued to count by tens. The correct response would have been “Five, Ten, Fifteen, Twenty cents”.

2. Cole bought a new eraser at the store for $0.39 cents. He purchased the eraser using three coins. What coins do you think Cole may have used to purchase the eraser and why?

   Case Closed - Evidence:
   Quarter, dime and nickel could be a solution because that is the closest amount, and Cole would only have a penny left for change. Quarter, dime and dime would be another solution and would only leave six cents change.

3. Nivea and Miya were working with their base-ten blocks. Nivea had six tens and four ones. Miya had five tens and fourteen ones. Who had the greater amount and why?

   Case Closed - Evidence:
   Neither girl had the greater amount. Nivea’s six tens equal 60 and her four ones equal 4 and together that makes 64. Miya’s five tens equal 50 and her fourteen ones equal 14 and together that makes 64. Both girls had the same amount, 64. They were just represented differently.

Clues:

An inexpensive way to support your child with mathematics is a deck of cards. A variety of games and activities can be played at home using the face value of the cards. For the number one use the Ace card. Remove the face cards. When using cards for subtraction, children must have a good understanding of place value and regrouping. When working with money problems, using real money and/or play money are great motivators for children.

Book ‘em:

From One to One Hundred by Terri Sloat
The King’s Commissioners by A. Friedman
One Gorilla by Atsuko Morozumi
The Button Box by M. Reid
Even Steven and Odd Todd by Kathryn Cristald

Related Files:

www.ceismc.gatech.edu/csi

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Further investigations:
Practice skip-counting with your child by allowing him to help set the table. As each item is placed on the table, your child should count by 2’s or 3’s or 5’s. For an extra challenge, you skip count the numbers and let your child determine what the next number will be and what the number pattern is (the number you are using to skip-count by). For a great summer challenge, try skip counting backwards.

Repeated addition practice (which is the basis of multiplication) can be represented naturally at the grocery store or in your own home. Have your child tell you how many cookies are in the package based on how they are sorted (such as four rows with four cookies in each row), how many graham crackers are in the box (four packs of 10 graham crackers each) and how many popsicles are in the box (6 packs of 2 popsicles each).

The same items mentioned above for repeated addition can also be used to show how to divide items up equally among friends. The same cookie pack of four rows with fours cookies for a total of 16 cookies could be equally divided among 2, 4, or 8 people. Practice with your child telling stories that use different amounts and scenarios that can be equally divided.

Revisiting Operations

Students will: First Grade 6 of 6

- Cultivate an understanding of how addition and subtraction affect quantities and are related to each other.
- Understand and use addition and subtraction in everyday situations.
- Be introduced to multiplication and division situations and operations.
- Relate the ideas of multiplication and division to the ideas of repeated addition and repeated subtraction in various situations.
- Develop and use informal strategies for sharing quantities fairly between two to five people.

Classroom Cases:
1. Hector went to the store to buy some cookies for his class. He has 28 students in his class. He looked at three different packs of cookies trying to decide which pack he should purchase. Pack A had six rows of four cookies, Pack B had five rows of five cookies and Pack C had four rows of ten cookies. Which pack should Hector buy for his class and why?

Case Closed - Evidence:
Pack C because Hector has 28 students in his class and Pack C contained four rows of ten cookies, which make 40 cookies. Pack A had six rows of four cookies which is 24, and Pack B had five rows of five cookies which is 25. Both Pack A and Pack B would not contain enough cookies for Hector’s class.

2. Monica was asked to make a fact family for the numbers 12, 9, and 3. Which of the four members listed below does not belong?
   A. 9 + 3  B. 12 - 3  C. 3 + 9  D. 3 - 12

Case Closed - Evidence:
D. Because subtracting 12 from 3 does not give you 9.

3. Juan has 12 pieces of gum. How many different ways can Juan share his gum? With how many of his friends will he share?

Case Closed - Evidence:
Two friends can have six pieces each, three friends can have four pieces each, four friends can have three pieces each, six friends can have two pieces each, and 12 friends can each have one piece or Juan could decide to keep all 12 pieces for himself.

4. Mohammed is thinking of a number greater than 50 and less than 100. His number is an even number that you would say if you count by fives. How many possible numbers could Mohammed be thinking of and what are they?

Case Closed - Evidence:
Mohammed could be thinking of four possible numbers. The numbers could be 60, 70, 80, or 90.

Clues:
This unit emphasizes key standards and big ideas taught from specific units throughout the year. While key concepts and ideas may have been covered in previous units, practice and repetition of these new concepts should be done on a continuous basis. It is important that students continue to work on and have ample opportunities to practice topics such as counting, time, money, positional words, patterns and tallying throughout the year.

Book ‘em:
The Doorbell Rang by Pat Hutchins
Two of Everything: A Chinese Folktale by Lily Toy Hong
Ready or Not, Here I Come by Teddy Slater
Stay in Line by Teddy Slater
Each Orange Had 8 Slices by Paul Giganti
One Hundred Hungry Ants by Elinor J. Pinczes

Related Files:
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