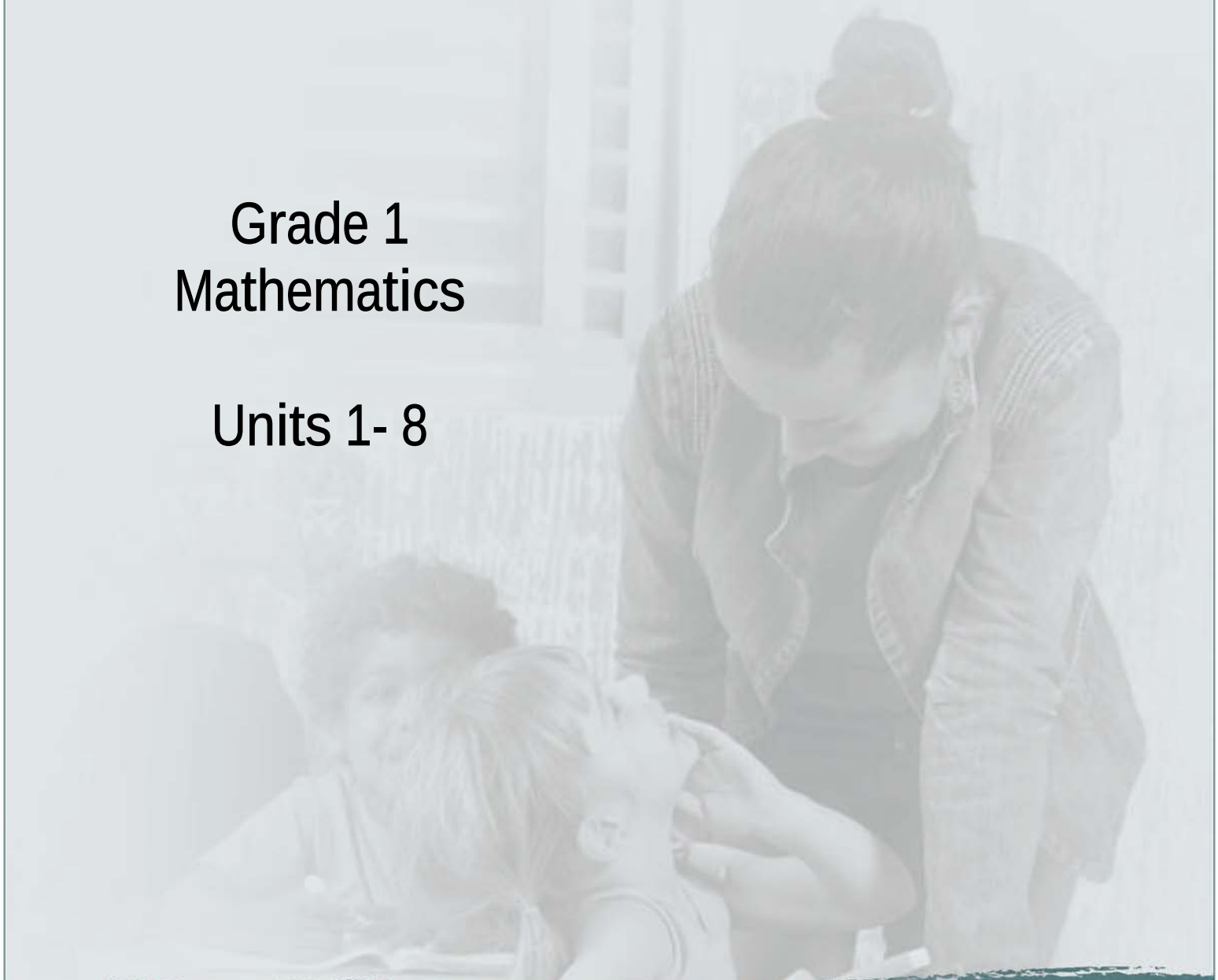
Louisiana Believes.

COMMON CORE
STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER



# Grade 1
# Mathematics

## Units 1- 8

# Comprehensive Curriculum
REVISED 2012

LOUISIANA DEPARTMENT OF EDUCATION

# Grade 1
# Mathematics

## Table of Contents

# *2012 Louisiana Comprehensive Curriculum*
# Course Introduction

The Louisiana Department of Education issued the first version of the *Comprehensive Curriculum* in 2005. The *2012 Louisiana Comprehensive Curriculum for Grade 1 Mathematics* is aligned with the Common Core State Standards (CCSS) for Mathematics, the Standards for Mathematical Practice, and, where appropriate, the ELA CCSS. The curriculum is organized into coherent, time-bound units with sample activities and classroom assessments to guide teaching and learning.

## Implementation of Activities in the Classroom

*Incorporation of activities into lesson plans is critical to the successful implementation of the Louisiana Comprehensive Curriculum*. Lesson plans should be designed to introduce students to one or more of the activities, to provide background information and follow-up, and to prepare students for success in mastering the CCSS associated with the activities. Lesson plans should address individual needs of students and should include processes for re-teaching concepts or skills for students who need additional instruction. Appropriate accommodations must be made for students with disabilities.

## Features

*Content Area Literacy Strategies* are an integral part of approximately one-third of the activities. Strategy names are italicized. The link (view literacy strategy descriptions) opens a document containing detailed descriptions and examples of the literacy strategies. This document can also be accessed directly at http://www.louisianaschools.net/lde/uploads/11056.doc.

*Underlined standard numbers* on the title line of an activity indicate that the content of the standards is a focus in the activity. Other standards listed are included, but not the primary content emphasis.

A *Materials List* is provided for each activity and *Blackline Masters (BLMs)* are provided to assist in the delivery of activities or to assess student learning. A separate Blackline Master document is provided for the course.

The *Access Guide to the Comprehensive Curriculum* is an online database of suggested strategies, accommodations, assistive technology, and assessment options that may provide greater access to the curriculum activities**.** This guide is currently being updated to align with the CCSS. Click on the *Access Guide* icon found on the first page of each unit or access the guide directly at http://sda.doe.louisiana.gov/AccessGuide.

# Grade 1
# Mathematics
# Unit 1: Extending the Counting Sequence


**Time Frame:** Approximately three weeks

*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit focuses on the numbers 0 to 120. Students will orally count, write, and read numbers within this range. They will represent a number of objects with a written numeral. Students will be introduced to the idea of making tens in order to count larger groups of items. The term digit will be introduced.

## Student Understandings

Students will be able to extend the counting sequence to 120 starting at any number less than 120. Students will count by 1s, 5s, and 10s. Students will relate counting on to addition and counting back to subtraction. Students will read and write numerals in the range of 1 – 120 and build number sense by developing an understanding of the order of the counting numbers. Students will be able to represent a number of objects with a written numeral. Students will understand that the two digits of a two-digit number represent amounts of tens and ones.

## Guiding Questions

1. Can students count in sequence to 120 starting at any number less than 120?
2. Can students count by 5s and 10s?
3. Can students read and write numerals in the range of 1-120?
4. Can students represent a number of objects with a written numeral?
5. Can students explain a number in terms of groups of ten and ones?
6. Can students make groups of tens to count larger sets of objects?

**Unit 1 Common Core State Standards (CCSS)**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Operations and Algebraic Thinking** | |
| 1.OA.5 | Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). |
| **Number and Operations in Base Ten** | |
| 1.NBT.1 | Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. |
| 1.NBT.2 | Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:<br>a. 10 can be thought of as a bundle of ten ones – called a "ten."<br>b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.<br>c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones). |
| **Standards for Mathematical Practice (MP)** | |
| MP.1 | Make sense and persevere in solving problems. |
| MP.2 | Reason abstractly and quantitatively. |
| MP.7 | Look for and make use of structure. |
| MP.8 | Look for and express regularity in repeated reasoning. |
| **CCSS for ELA Content** | |
| **Reading Standards for Informational Text** | |
| RI.1.10 | With prompting and support, read informational texts appropriately complex for grade 1. |
| **Writing** | |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question |
| **Speaking and Listening** | |
| SL.1.1 | Participate in collaborative conversation with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>c. Ask questions to clear up any confusion about the topics and texts under discussion. |

**Sample Activities**

Blackline masters that include numbers and are to be distributed to students were created using the *School Text* font. *School Text* font displays numerals in a format that is most frequently used in classrooms as shown in the graphic to the right. 1234567890 Although an embedding process was used to try to ensure that the font can be read on any computer, it will be necessary to install the font set from http://www.fonts101.com/fonts/view/Uncategorized/29268/SchoolText.aspx if the numerals on the BLMs do not print as shown in the example.

## Daily Routines

The first 3 activities, Straw Count, Number Path Math, and Counting Activities, should be part of the daily routine in every unit and should be used each day that students are in school.

## Online Programs for Practice

http://www.ixl.com/math/standards/common-core/grade-1 - activities aligned to each of the Grade 1 CCSS.

http://www.ixl.com/math/grade-1/count-tens-and-ones-up-to-30 - counting 10s and ones to 30 using ten frames. Student writes the number of tens and then number of ones shown, then writes the numeral for the number represented.

### Activity 1: Straw Count - Days in School (CCSS: 1.NBT.1, 1.NBT.2a, 1.NBT.2b, 1.NBT.2c, MP.2, MP.8)

Materials List: dry erase board or large chart paper; markers; containers (to be used for housing the straws) labeled Hundreds, Tens, and Ones; straws or popsicle sticks; rubber bands

This activity is written based on the use of straws, but popsicle sticks also work and don't bend easily after a lot of use.

Do this activity each day that students are in school. Have one student place a straw in a container. Have this student count the number of straws and record the numeral on the dry erase board or chart paper.

On day 10, when a group of 10 straws has been counted, wrap the 10 straws with a rubber band and place them in the Tens container. Emphasize that 10 ones is called a "ten." Tell students that they have given other groups a different name. When they make a group of two they call it a pair. Tell the students that they now have a group of ten, and no leftover straws. Make sure that students understand that this amount is still 10 straws. Have a student recount the straws and write the numeral on the board or chart paper. On the next day, have a student add a straw to the container. Ask the student how many straws he/she has (1 ten and 1 one). Have the student take the rubber band off the group of ten and count the straws. He/she should get 11. Have the student write the numeral 11 on the board. Emphasize that this numeral shows 11 straws or 1 group of 10 straws and 1 leftover. Continue emphasizing that the teen numbers can be thought of as 1 ten plus leftover ones.

Discuss with students that numerals used to write a number are called digits. Draw a comparison with using letters to write words. Explain that digits are used to write numbers just like letters are used to write words. Single digit numbers are written using a single numeral just like the words "a" and "I" are written using a single letter. Two-digit numerals use two single digits. Each day, continue to have the students count by tens and ones to see how many straws are in the

container (e.g., on the 52nd day of school, there are 5 groups of 10 and 2 singles or ones). On some days, have the students take the groups of ten apart and count the straws to verify the amount. Lead a discussion indicating which numeral indicates the tens place and which one indicates the ones place (e.g., in 52, the 5 represents the number of 10s and the 2 represents the number of ones).

This activity can also be used to ask students, "How many straws do we add each day? How does our written number change each day?" (Expected response " It goes up or grows by one each day.")

**Activity 2: Number Path Math - Days in School (CCSS: 1.NBT.1, 1.NBT.2c, MP.8)**

Materials List: adding machine tape attached to the wall, markers

*Teacher Note: The term number path is being used rather than number line. A number line is a length model and a number path is a count model. In a number path, numbers are put in squares (or other shapes) and students count as they move along the path.*

Attach adding machine tape to the walls making a number path around the classroom. After completing the Straw Count for the day, with the help of the students, record the number of days in school on adding machine tape. Write the numeral for the day in black unless the day in school is a multiple of ten. Be sure to add a separating line after each number on the newly created number path. This will make it easier for students to find and read each number. It will also avoid confusion when two-digit numbers are introduced. For example:

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | |

Multiples of ten should be written in red and circled. When a numeral is written in red, ask students to explain why the numeral is red and what is special about it. The red highlights should help students to remember that those numerals represent a specific number of 10s and no ones. The numbers in black have bundles of ten, but also have some ones. Tell students that the numbers 10, 20, 30, etc. are also known as "decade" numbers because they are made of groups of 10, and a decade is a group of 10 years.

Numerals should be written on a daily basis during school days in session - on day 1, write 1; on day 15, write 15; on day 20, write 20, etc. Remember to write 20 in red, circle it and emphasize that 20 is the same as 2 tens. After a numeral is added to the tape, use that number as the starting point to practice counting. On day 1 begin counting at one, on day 15 begin at fifteen, on day 25 begin counting at 25. Orally count to 120. On day 120 and after, choose any of the numbers to start counting from or start at 120 and count back. This number path can later in the year be used for addition, using the counting on method, or subtraction, using the counting back/down method.

**Activity 3: Counting Activities (CCSS: 1.NBT.1)**

Materials List: completed number path from Activity 2, classroom 100s chart, dry erase board

The following activities should be used on a daily basis to practice counting orally. Students should count orally starting at any number between 1 and 120. Students should count orally by 1s, 5s, and 10s. If you have students count by 5s, make the starting point a multiple of 5. If you have students count by 10s, make the starting point a multiple of 10. Students should count on and back. The following activities can be used for any counting sequence and counting pattern. To keep these counting activities from becoming mundane, vary the counting sequence daily and move along at a brisk pace.

Choral Counting – Have students count aloud as a whole class. Choose a starting point and a number sequence, (1s, 5s, or 10s). Example: say "Today you are going to start at 23 and count on by ones." Have students count as a whole group. Use the number path that is being created in Activity 2 or a classroom hundreds chart as a visual to support students who are struggling.

Circle Counting – Have students form a circle. Choose a starting point and a number sequence, (1s, 5s, or 10s). Have students take turns counting. For example, if the starting point is 25 and the sequence is to count on by fives, the first student would say 25, the second student would say 30, and so on until each student has had a turn or until 120 is reached. As students count, create a number path for visual support and to draw attention to the patterns being created by the number sequence. Write only the numbers counted on the path 25, 30, 35 …

Counting On and Back - This activity practices counting on and back using a chosen starting number and number sequence (1s, 5s, or 10s) while using hand movements. Have students reach up as they count on and reach down as they count back. Tell students the starting number, the number sequence, and the stopping number. As students count on toward the stopping number, have them reach their hands upward. Once students reach the stopping number, have them begin to count back using the same number sequence while reaching their hands downward. Example: "Today you are going to count by tens. You will start at 30 and count on by tens until you reach 100." Reach up and say 30. Reach up and say 40. Reach up and say 50. Continue until the count of 100 is reached. Then say, "Stop. Now you are going to count back from 100 by tens until you reach zero." Reach down and say "90." Reach down and say "80." Continue until the count reaches zero.

**Activity 4: Calculator Lesson (CCSS: 1.OA.5, 1.NBT.1, MP.2, MP.8)**

Materials List: calculator for each student, Blank 100s Chart BLM, Completed 100s Chart BLM (at least 3 copies), counters, crayons

Ask students to tell what they know about calculators. Hand out a calculator to each student. Give them a few minutes to explore the calculators. Teach students about the different keys on the calculator, especially the clear key. Have them clear their calculators. Have students key in the numbers you call out. An example might be: "Key in 5. Key in 7. What number did you

make?" An alternate version could be to call out a single number such as 36 and have students make that number on their calculators. They have to enter the tens digit first. Be cautious of the numbers 11 & 12 which follow no established counting pattern and the teen numbers which follow a pattern that doesn't continue into any other 2-digit numbers. Students may be drawn into entering the 5 and then the 1 because of hearing "fif" ( as 5) and "teen" ( as 10, or in this case 1).

Distribute the Blank 100s Chart BLM. After allowing students to make numbers on the calculator, use the calculator to practice counting on. Tell students to enter "0 + 1 =" on the calculator. Ask "What number do you see on the calculator?" The students should answer "1." Have the students write "1" in the first box on their blank hundreds chart. Have the students enter in + 1 again and press the equal key. Ask what number they see. (2) Have the students write "2" in the second box on the hundreds chart. Continue this process stopping to ask students if there are any patterns forming as they complete the hundreds chart and allowing students to make predictions about the next number before entering + 1 into the calculator. Have students explain the reasoning behind their predictions. Have students continue to use the calculator until they have completed their hundreds chart. Guide students to the realization that counting by 1s is the same as adding 1 to a number.

*Teacher Note: Some students may benefit from the actual input of 0 + 1 = 1 1 + 1 = 2 2 + 1 = 3 to understand (and trust) that the calculator is using the previous total to add the +1 input to increase by one each time and to prove that a calculator is not magic.*

Distribute a copy of the Completed Hundreds Chart BLM and a counter to each student. Have the student place the counter on 100 on the BLM. Have students enter 100 – 1 into their calculators. Ask students to predict what number the calculator will display and explain their reasoning. Have students press equal and ask what number is displayed on the calculator (99). Have students move their chip to the number 99. Have students continue to press – 1 and the equal key. Guide students to the realization that counting back by 1s is the same as subtracting 1 from a number.

See the note for addition above. Some students will need to see a similar sequence as above for subtracting.

Distribute 2 copies of the Completed Hundreds Chart BLM and a crayon to each student. Expand the lesson to include counting by 5s using "0 + 5 =" and counting by 10s using "0 + 10 =" on the calculator. Have students create a "counting by fives" reference chart using one of the Completed Hundreds Chart BLM. As students count by five using the calculator, have them color in the boxes that show the numbers displayed on the calculator (5, 10, 15, …). Have students practice counting orally as the calculator counts. Label the chart as "Counting by fives."

Have students follow the same procedure to create a "Counting by tens" reference chart using the other Completed Hundreds Chart BLM. Have students save these charts to be used as references throughout the year.

**Activity 5: Tens and Some More (CCSS: 1.NBT.1, 1.NBT.2a, 1.NBT.2b, MP.8, W.1.8)**

Materials List: Blank 10 Frame BLM, beans or other small counters, learning logs

This activity requires students to write and draw in their math *learning logs* (view literacy strategy descriptions). A math *learning log* is a notebook or journal that students keep to record ideas, questions, reactions, and new understandings. Use of the *learning log* requires students to explain what they have learned in their own words. This process serves as a formative assessment for the teacher and offers a reflection of understanding that can lead to further study and alternative learning paths. It combines writing and reading with content learning. The math *learning log* will be used as a reference to guide further study and to formatively assess progress and understanding.

*Teacher Note: To make effective use of a tens frame and to promote visualization by the students, always fill a tens frame beginning in the upper left hand corner and across the row to fill five. Then proceed to the next row, beginning in the left corner and then across to complete the ten.*

Give students the Blank 10 Frame BLM. Ask students what they notice about the frame (it has 10 squares, there are 5 on top and 5 on bottom, etc). Give students some beans. Review the numbers 0-10. Display a 10 frame. Put one bean in the 10 frame and ask students to do the same in theirs. Ask them how many beans are in the 10 frame and to write the numeral that shows that amount (1). Ask them how many more beans it would take to have all of the boxes have one bean (9). Continue reviewing the numbers 0-10, by displaying different amounts and asking the same questions.

Tell the students to fill the 10 frame by placing one bean in each box beginning at the upper left, moving across to fill 5 and beginning 6 in the lower left corner and on to fill 10. Ask how many beans it took to fill the 10 frame and to write that numeral. Tell them that they have one completed 10 frame of 10 beans. Relate this to the straw count in activity 1, where they bundled 10 straws.

Have students count out 11 beans. Tell them to place the 11 beans on their 10 frame, but remind them that each square can hold only one bean. Ask students to tell what happened when they tried to put 11 beans into a 10 frame. Discuss with students how the number 11 is made of a group of ten and a single bean. Ask students to tell what would happen with the number 12, the number 13, etc? Allow students to explore with the numbers 12 to 19. Have students share their findings about teen numbers. Students should see that teen numbers are made of a group of ten and some more ones.

Have students draw a 10 frame in their math *learning log* and explain how to use a 10 frame in their own words. Student writing should convey "how to fill a 10 frame" as in the notes above. This will also help parents who may have access to their student's writing. In general, parents should be aware of how to use a 10 frame and double, triple 10 frames as the year goes on. Their 10 frames can become references for later study of numbers and place value.

**Activity 6: Friendly Tens (CCSS: 1.NBT.1, 1.NBT.2a, 1.NBT.2c, MP.8)**

Materials List: Blank 10 Frame BLM, Completed 10 Frames BLM, beans or other small counting objects, zipper bags

Prior to this activity, make each student a zipper bag with 10 completed 10 frames in it.

Show students a completed 10 frame. Ask students the number of dots on the ten frame. Remind students that ten is a "friendly number." It can be used to make larger numbers.

Have students take out 2 completed ten frames from their zipper bag. Ask students to find the number of dots on the two ten frames together. Observe students to see how they determine the number of dots (counting by ones, counting by fives, counting by tens). Have students explain their strategies. Have students practice using each strategy to count to the number 20. Remind students that 10 is a friendly number and ask which strategy uses this friendly 10 (counting by tens). Have students take out 3 completed ten frames. Have them count by tens to determine the amount. Ask students to predict how many dots would be on 4 completed ten frames. Continue to take out ten frames until the number 100 is reached.

Practice with ten frames:
Call out a number and have students count out enough ten frames to reach that number. "My number is 30. How many completed 10 frames do I need?"
Call out a number of completed 10 frames and have students tell the value. "I have 6 completed 10 frames. How many dots do I have?"

This may also be a good time to practice or extend counting by tens in a different format from the 100s chart. Take out 5 tens frames and show them consecutively while counting 10, 20, 30, 40, 50. Repeat for other "tens" numbers. Challenge students by showing more than one 10 frame to begin counting from 20 or 30 and, by adding additional tens frames one at a time, counting on to 100 (or more).

**Activity 7: Big Numbers Book (CCSS: 1.NBT.1)**

Materials List: children's literature that depicts counting objects, Big Numbers Book BLM (5 pages), number cards 21 to 99, counters

The following books depict counting amounts larger than 10:

*Best Counting Book Ever* by Richard Scarry - counts to 20 by ones, counts by tens to 100
*Bears at the Beach* by Niki Yektai – counting 10 to 20
*26 Letters and 99 Cents* by Tana Hoben – counts to 30 by ones, counts to 50 by 5s, counts to 90 by tens (be aware that some coins are used. Don't get sidetracked into spending time on the value of coins, etc.)
*From One to One Hundred* by Teri Sloat – counts to 10 by ones, counts to 100 by tens
*One Big Building* by Michael Dahl – counts to 12, shows the numbers depicted as numerals, number words, dot configurations, and pictures.

*Out for the Count* by Kathryn Cave – counts to 100

Read a counting book to the students, guiding them to use counters to count along with the counting done in the book. After reading, tell the students that they are going to make their own class counting book. They are going to be the authors and illustrators of a counting book using different big numbers. Give each student one page of the Big Numbers Book BLM and a number card. For each prompt, have students brainstorm different things that might complete the sentence frame. Have students complete the sentence frame with the number on the card and the name of an object. "I would love to have 48 butterflies." Have students illustrate their pictures to match the sentence they created. Prompt students to group their pictures in groups of 10 or 5 so it will be easier for them to keep track of their count and make evaluation a much easier process. Attention needs to be paid to the illustration to be sure it depicts the correct number of objects. Early finishers can be given another page of the BLM with a different sentence starter and a different number card to complete another page for the book. Bind the students' pages together to create a book and place it in the class library for the students to read during free time, center time, or as early finisher work.

**Activity 8: Making Groups of Ten to Count (CCSS: 1.NBT.1, 1.NBT.2a, MP.8, RI.1.10)**

Materials List: pennies, linking cubes (74 cubes for each group), Making 10 BLM, zipper bags

Prior to lesson, fill zipper bags with different amounts/number of pennies ranging from 11 – 30 pennies. Make a zipper bag for each student.

This activity uses a modified *process guide* (view literacy strategy descriptions). A *process guide* scaffolds student's comprehension of text or of a series of steps needed to complete a process. *Process guides* stimulate student thinking during a lesson. Guides help students focus on important steps within the process.

Place students in groups of 3. Give each group a bag of linking cubes. Have the groups work together to count the number of cubes in the bag. Observe each group to determine which method or strategy is being used to count the cubes. After each group has determined the total number of cubes, have groups share their strategies (counting by ones, making groups, making tens). Have each group recount their cubes using each strategy shared. Have students discuss which strategy worked best for them and why. Explain to the students that ten is a friendly number and that making groups of ten is a strategy that can be used to count larger amounts. Tell students they are now going to practice this strategy.

Give each student a zipper bag containing pennies. Tell the students that they will use the *process guide* to count the number of pennies in the bag. Explain that the *process guide* will lead them through the steps needed to make groups of ten as a strategy of counting. Give each student a Making 10 BLM. Lead students through the guide asking questions as the students work each step of the process. After the activity, have students explain the process in their own words to a table partner. Students should also be asked to explain the *process guide* to a person at home.

Early Finishers: Have student switch bags and complete a new *process guide* with a different number of pennies.

**Activity 9: Build a Number City (CCSS: 1.NBT.1, 1.NBT.2a, 1.NBT.2b, MP.1, MP.8)**

Materials List: linking cubes

Put students in groups of 3 or 4. Give each group of students a pile of linking cubes. Tell students that they will be using the make-ten strategy to build a number city. Explain that a number city is built of towers of tens and ones. Towers of ten linking cubes will be the buildings and single cubes will be the cars. Call out a number between 1 and 99. This number will tell students the number of cubes to use in their city. Have students work together to build their number city using the given number of cubes. For example, to build the number 43 the students would count out 43 linking cubes and build 4 buildings and 3 cars. Have students record the number and make a drawing of their city in their notebook. Make sure they realize that 4 buildings and 3 cars use 43 linking cubes. Continue with other numbers. Constantly make the connection between the buildings as the tens digit and cars as the ones digit.

**Activity 10: Counting Around the Class (CCSS: 1.NBT.1)**

Materials List: chart paper, chart markers, Count Around the Class BLM

This activity uses modified *split-page notetaking* (view literacy strategy descriptions). *Split-page notetaking* allows for an organized record of student learning. This form of notetaking is useful during this activity because it allows the students to be able to keep track of their data. It introduces a simple form of organization that can be used throughout the year. Information is organized into two columns. The left column may contain an important fact. The right column may have details about the fact. It may take multiple attempts for students to master this strategy.

Example notetaking page:

| Things to Count | Number |
|---|---|
| math books | 23 |
| crayons in my crayon bag | 18 |
| chairs | 26 |

On a piece of chart paper, make a list of things at school which can be counted (students, chairs, math books, tables in the cafeteria, doors in the building, small objects in a zipper bag, etc). Be sure to include items that have amounts greater than 10. Tell students that they are going to

estimate the number of each item in their classroom or school. Explain that an estimate is a reasonable guess. Connect the concept of estimation to making predictions in reading. Ask students to estimate how many of each item listed is in the class or at school. Record the estimates on the chart paper. Pick 5 items from the list that the students want to count. Have students list the items the class picked on the left side of the notetaking page. Allow students to count the items listed on their paper. Students record their count on the right side of the page.

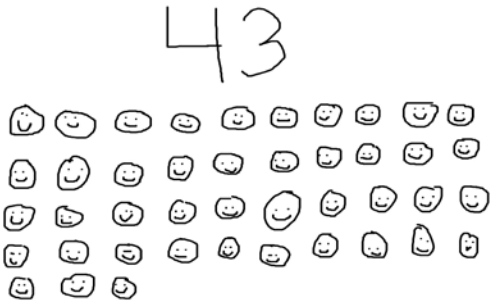
After the items have been counted, use the students' notes and compare the original estimates to the actual count. Discuss discrepancies in student counts. Tell students to use their notes to write sentences about the items in the classroom.

**Activity 11: Guess My Number (CCSS: 1.NBT.1, 1.NBT.2a, 1.NBT.2b, MP.2, MP.8, SL.1.1c)**

Materials List: poster board, art supplies

This activity uses a modified *professor-know-it-all* (view literacy strategy descriptions). This strategy can be used to share information with the class. It is an effective review strategy because the students become the "experts" on the topic being studied. The class audience will question the "expert" about the topic being reviewed.

Assign each student a number from 20 to 99. Tell the students to keep their number a secret from their classmates. They are going to play *professor-know-it-all* and try to get their classmates to guess the number. Each student will create a poster representing their number. Students should include the numeral and pictures representing the value of the number. Have students organize their pictures in groups of tens and ones.




After the number posters are complete, each student will take a turn as the know-it-all expert. The class will ask the expert questions about his/her number. The expert will answer each question and allow the class a chance to guess his/her number. Once the number has been correctly identified, the student will reveal the poster.
Examples of questions for the expert:

- How many groups of ten are in your number?
- How many ones are in your number?

**Activity 12: Telephone (CCSS: 1.NBT.1, MP.2, MP.7, MP.8)**

Materials List: Telephone BLM, two different colors of counters

Give each student a copy of the Telephone BLM and two different color counters (one red and one blue). Tell students to place the red counter on the number 2 and the blue counter on the number 5. Have students write the red number first and the blue number second in their math notebook. Ask students what number they wrote (25). Have students move the red counter to the number 7 and the blue counter to the number 3. Have students write the red number first and the blue number second in their math notebook and ask what number they wrote (73). Continue the activity by having students give directions to each other (or to the entire class) to keep getting different numbers.

It may be fun (and helpful) to keep a chart of all the numbers created. This activity could be extended to another day.

Independent practice – Have students drop their counters on the BLM. Have them record the numbers they create in a notebook. Monitor student independent work, correcting misconceptions, and providing interventions if needed.

**Activity 13: I Have, Who Has (CCSS: 1.NBT.1)**

Materials List: I Have, Who Has BLM (2 pages), Classroom 100s chart

Run the I Have, Who Has BLM on cardstock and cut out the cards. Give each student one of the cards. Choose a student to start the game. Have the first student read his/her card, "I have 32. Who has the number 48?" The student with the card that says "I have 48," would continue the activity. The students continue reading their cards until the first student is able to answer a question. Students needing more support can be given a 100s chart to use during this activity.

NOTE: You may want to create a similar set with fewer cards and pass out the cards to pairs of students – that way they can help each other. This smaller set could then also be put in a math center for small groups of students to play – each person holding more than one card.

In either case, use the sets of cards for several days in a row (perhaps to begin the math lesson of the day). As more students become familiar with the set of cards, it could be fun to see how quickly students can work through the entire set – keep track of the time daily. For many students this "race against the clock" is a reason to be a better listener and become better at number recognition.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records as well as student-generated products may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

Personal Interviews:

In order to plan math instruction that meets the needs of students, many teachers rely on a personal interview. While the other students are busy with a task, one student can be interviewed to assess what the student knows and/or what he/she needs to know. An example of an interview that will yield much helpful information at the beginning of the year is provided in the Blackline Masters. An example of a rubric to score the interview is also given.

*Teacher note: These interviews are not to be used to derive a grade for the student, but rather to use the information to plan instruction for individuals or groups of students with the same needs. If a student masters all the questions at the first interview, it is an indication that this student needs further evaluation to determine at what level s/he needs to proceed.*

In a folder or portfolio the teacher may collect

- Personal interviews accompanied by a scored rubric
- Anecdotal notes recorded by the teacher
- Samples of math projects completed alone and in a group
- Photographs taken of a student with his/her math project
- Teacher-made and standardized tests

Teacher Observation:

- Anecdotal Records:

  With small children, teacher observation is often one of the most effective ways of assessing understanding. As teachers observe the students, many teachers write their anecdotal records on post-it notes and place them in the student's portfolio at a later time.

- Understanding/Misunderstanding Recording Sheet (found in the BLMs)

  This sheet, or one that is teacher created, is used to record students who are having trouble with a concept or lesson. Write the math topic at the top of the page along

with the date and draw a line down the center of the page. Write the word Understandings on one side and Misunderstandings on the other side. Record the names of students who are having difficulty on the misunderstandings side, and target these students for extra help later. This recording sheet is useful anytime during observation of students at work.

- Modified Math Learning Log:

  On large chart paper, record new understandings, explain math processes, pose and solve problems, make and check predictions, and reflect on what has been learned. Make sure that students are participating in what is written. For example, after doing Activity 5, Tens and Some More, the teacher and students might draw a 10 Frame and write:
  "A 10 frame can be used to quickly count how many objects we have by placing them in the 10 frame. If only the top row is used, we have only 5 objects. If objects are put in the bottom row too, we have more than 5 objects. If we have more objects than fit in our 10 frame, we can start counting with 10 and count on."

  After practice with writing Class Math Logs, many first graders will be ready to record in Math Learning Logs.

**Activity-Specific Assessments**

- Activity 7: Assess each student's illustration from the class book to see if the number of items were depicted correctly.

- Activity 8: Give each student a different number and have him/her follow the steps of the process guide individually.

- Activity 9: Have each student draw a number city for a different number.

- Activity 11: Give each student a different number. Have the student depict his/her number in groups of ten and ones.

## Resources

**Bibliography of Counting Books**
Check with your school librarian for additional resources for this Unit 1.

Beeler, Selby. *How many Elephants?*
Burris, Pricilla. *Five Green and Speckled Frogs*
Chwast, Seymour. *The 12 Circus Rings*
Curry, Don L. *How Many Birds?*
Curry, Don L. *My Counting Book*
Ehlert, Lois. *Fish Eyes: A Book You Can Count On*

Gunzi, Christine. *My Very First Look at Numbers*
Hartmann, Wendy. *One Sun Rises*
Hill, Eric. *Spot Can Count*
Krebs, Laurie. *We All Went on Safari*
Leuck, Laura. *One Witch*
Lewin, Betsy. *Cat Count*
Miller, Virginia. *Ten Red Apples*
Oborne, Martine. *One Beautiful Baby*
Raffi. *Five Little Ducks*
Reiser, Lynn. *Ten Puppies*
Schaefer, Lola. *Homes 123*
Schaefer, Lola. *Musty-Crusty Animals 123*
Schuette, Sarah. *3, 2, 1 Go*
Slaughter, Tom. *1 2 3*
Spurr, Elizabeth. *Farm Life*

# Grade 1
# Mathematics
# Unit 2: Adding and Subtracting to 10


**Time Frame:** Approximately six weeks

*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit focuses on the operations of addition and subtraction within 10, including the development of the part and whole relationships. The link between addition and subtraction is developed in this unit. Various strategies for addition and subtraction are used to develop fact fluency for addition and subtraction within 10.

## Student Understandings

Students will understand the relationship between addition and subtraction. Students will understand the part and whole relationships within numbers. Students will compose and decompose the numbers 1 to 10. Students will solve various types of word problems using objects, drawings, and symbols. Students will develop fact fluency for addition and subtraction within 10.

## Guiding Questions

1. Can students use addition and subtraction within 10 to solve word problems involving situations of adding to, taking from, putting together, and taking apart?
2. Can students use objects, drawings, and equations with a symbol for the unknown number to represent and solve addition and subtraction problems within 10?
3. Can students apply the commutative property of addition?
4. Can students demonstrate fluency for addition and subtraction within 10?
5. Can students use strategies such as counting on and the relationship between addition and subtraction?

**Common Core State Standards (CCSS)**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Operations and Algebraic Thinking** | |
| 1.OA.1 | Use addition and subtraction within 20 to solve word problems involving situations of adding to, take 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.3 | Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 =11 is also known. (Commutative property of addition.) To add 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)* |
| 1.OA.5 | Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). |
| 1.OA.6 | Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making 10 (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 =4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 +1 = 12 + 1 = 13). |
| **Standards for Mathematical Practice (MP)** | |
| MP.1 | Make sense of problems and persevere in solving them. |
| MP.2 | Reason abstractly and quantitatively. |
| MP.6 | Attend to precision. |
| MP.7 | Look for and make use of structure. |
| MP.8 | Look for and express regularity in repeated reasoning. |
| **CCSS for ELA Content** | |
| **Writing** | |
| W.1.2 | Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |
| **Speaking and Listening** | |
| SL.1.1 | Participate in collaborative conversation with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about topics and texts under discussion.)<br>b. Build on others' talk in conversation by responding to the comments of others through multiple exchanges.<br>c. Ask questions to clear up any confusion about the topics and texts under discussion. |

## Daily Routines

The first three Suggested Activities from Unit 1 (Straw Count, Number Path Math, and Counting Activities) should be part of the daily routine in every unit and should be used each day that students are in school.

## Online Programs for Practice

http://www.ixl.com/math/standards/common-core/grade-1 - activities aligned to each of the Grade 1 CCSS.

http://www.ixl.com/math/grade-1/count-tens-and-ones-up-to-30 - counting 10s and ones to 30 using ten frames. Student writes the number of tens and then number of ones shown, then writes the numeral for the number represented.

http://www.math-play.com/addition-games.html - addition of one digit numbers in game format – basketball, soccer, concentration

http://www.learningbox.com/Base10/BaseTen.html - 2 digit number is shown and student moves tens and ones blocks to represent the number

http://www.ictgames.com/dinoplacevalue.html - dinosaur and volcano with numbers on shown on rocks. Number appears on volcano, students clicks the tens rock, then the ones rock to show the given number in a box that appears.

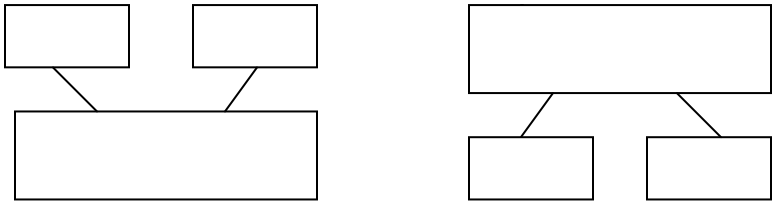
http://illuminations.nctm.org/ActivityDetail.aspx?ID=74 –addition and subtraction, concentration for those needing work on conservation of number

## Sample Activities

### Activity 1: Addition Word Problems I (CCSS: 1.OA.1, MP.1, MP.2)

Materials List: pennies, counters or cubes in 2 colors, Part/Part/Whole Mat BLM, plastic sheet protectors, dry erase markers, Types of Word Problems BLM (teacher reference)

Distribute the Part/Part/Whole Mat BLM. Tell students that they are going to use this mat to help them show some math story problems. The part-part-whole relationship between numbers can be represented using a *graphic organizer* (view literacy strategy descriptions). A *graphic organizer* is a visual display used to organize information in a way that is easier to learn and understand. Throughout this unit, students are going to use two different *graphic organizers.* In this activity they will use a part/part/whole mat.



The first mat is used to show addition. The objects are placed into the two small rectangles and then are combined and moved to the larger rectangle to show the whole. The second mat is used to show subtraction. The objects are placed in the large rectangle; some are moved into one of the smaller rectangles. What is left in the large box is the answer to the subtraction problem.

Give 10 pennies to each student. Explain that they are going to use their pennies to show some story problems. Tell the students the following story.

*You have 3 pennies in one hand and 2 pennies in the other hand.*

Display the sentence, "3 pennies and 2 pennies are the same as____ pennies in all."

Ask, *"How many pennies do you have in all?"*

Have students place the 3 pennies and the 2 pennies on the mat in front of them and then move them together to find the total. When students tell you 5, write 5 in the blank in the sentence.

Give another example of an addition problem.

*You had 5 pennies. Your mom gave you 2 more pennies*.

Have students place the 5 pennies in one of the small rectangles and the 2 pennies in the other small rectangle. Write the sentence, "5 pennies and 2 pennies are ____ pennies altogether."

Ask, *"How many pennies do you have altogether?"*

When students answer 7, write 7 in the blank in the sentence. Continue to give students stories about combinations of pennies. Have students make up stories about the pennies and share their stories with the rest of the class.

Give students counters or cubes in 2 different colors. Tell students this story.

*You have some counters. Four of the counters are red. Two of the counters are yellow*.

Have students use the part/part/whole mat to show the number of counters of each color. Write "4 red counters and 2 yellow counters are _____ counters in all."

Ask, *"How many counters in all?"*

When students respond 6, write the 6 in the blank in the sentence. Continue to give students stories about combinations of counters or cubes. Have students make up stories about the counters and share with the rest of the class.

*Teacher Note: Use the Types of Word Problems BLM (reference sheet) to see the different types of addition problems to model for students. Excerpts from the BLM are printed below. When introducing the concept of addition, model problems in which the result or total is unknown, but in later parts of the unit model the other types of problems. There are two books that can be used as references for the different types of word problems, Teaching with Curriculum Focal Points: Focus in Grade 1 (NCTM) and Children's Mathematics: Cognitively Guided Instruction. Children should not be taught the names for the different types of problems, but should be exposed to all types.*

| | Result Unknown | Change Unknown | Start Unknown |
|---|---|---|---|
| Add to | Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now?<br>2 + 3 = ? | Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two?<br>2 + ? = 5 | Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before?<br>? + 3 = 5 |

| | Total Unknown | Addend Unknown | Both Addends Unknown[1] |
|---|---|---|---|
| Put Together/ Take Apart[2] | Three red apples and two green apples are on the table. How many apples are on the table?<br>3 + 2 = ? | Five apples are on the table. Three are red and the rest are green. How many apples are green?<br>3 + ? = 5, 5 – 3 = ? | Grandma has five flowers. How many can she put in her red vase and how many in her blue vase?<br>5 = 0 + 5, 5 = 5 + 0<br>5 = 1 + 4, 5 = 4 + 1<br>5 = 2 + 3, 5 = 3 + 2 |

When students have mastered moving the counters on the part/part/whole mat, have them transition to drawing pictures in place of their counters and writing the numerals that represent each part of the story problem.

**Activity 2: Transition to Using Equations (CCSS: 1.OA.1, MP.1, MP.2)**

Materials List: pennies, Part/Part/Whole Mat BLM

Once students are comfortable with using sentences to describe the solution to word problems, introduce the words "plus" and "equals."

Have students model the following word problem using the pennies and the mat.

*Mom gave you 4 pennies. Dad gave you 2 pennies. How many pennies do you have altogether?*

Under the answer sentence (4 pennies and 2 pennies is 6 pennies), write 4 plus 2 equals 6. Eventually, write 4 + 2 = 6.

Continue to have students model different word problems using the pennies and the mat. Continue writing the number sentences in these 3 formats.

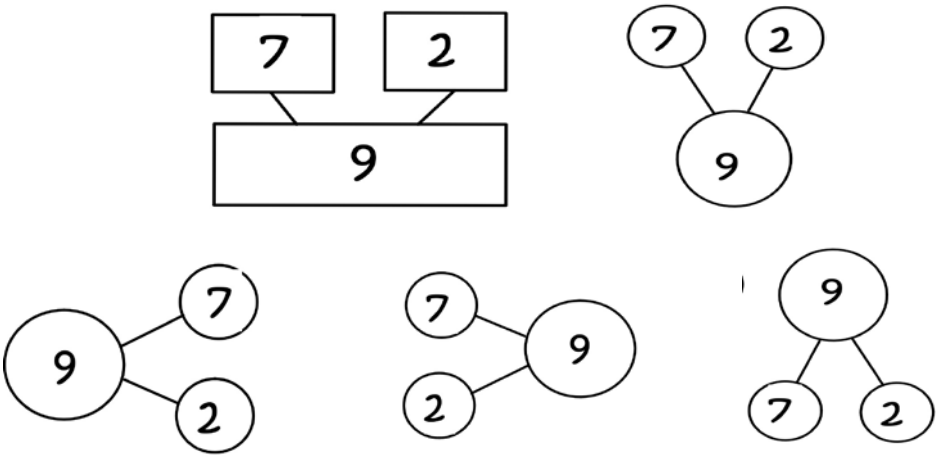
____ and ____ is _____
____ plus _____ equals _____
____ + ____ = _____

**Activity 3: Addition Word Problems II (CCSS: 1.OA.1, MP.1, MP.2)**

Materials List: counters or cubes, Part/Part/Whole Mat BLM, Number Bond BLM, Addition Word Problems BLM

In this activity, students will be introduced to a different *graphic organizer* (view literacy strategy descriptions) called a number bond. A number bond can be used to show the part/part/whole relationship, just as the part/part/whole mat was used. Number bonds are easier

for students to draw. When using a number bond, the whole number is represented by a larger circle, while the parts are in smaller circles that branch off from the whole.




The whole can be shown on the right, the left, the top, or below the parts.

Give 10 counters and a copy of the Part/Part/Whole BLM to each student. Tell the students the following story: *There are 6 shrimp and 3 crabs. How many sea animals are there altogether?* Have students place the correct number of counters on the Part/Part/Whole Mat to show the problem. Write the answer as modeled in Activity 2.
_____ and _____ is _____
_____ plus _____ equals _____
_____ + _____ = _____

Display the Number Bond BLM. Explain that this is a different *graphic organizer* called a number bond and that it can be used in the same way as the part/part/whole mat. Discuss with the students which circles on the number bond represent the parts and which circle represents the whole. Model how to show the previous problem using the number bond by placing the cubes for the shrimp in one circle and the cubes for the crabs in the other. Move all the cubes to the larger circle to find the answer.

Give each student a copy of the Number Bond BLM. Using the story problems from the Addition Word Problems BLM, have students model each addition problem using the Number Bond BLM. Use the Addition Word Problems BLM as a reference. Do not give the BLM to the students. Have them write a number sentence for each problem.

When students have mastered moving the counters on the number bonds, have them transition to drawing pictures in place of their counters and writing the numbers that represent each part of the story problem.

**Activity 4: Subtraction Word Problems I (CCSS: 1.OA.1, MP.1, MP.2)**

Materials List: pennies, counters or cubes, Part/Part/Whole Mat BLM, Types of Word Problems BLM (teacher reference)

In this activity students are going to use the part/part/whole mat to solve subtraction word problems.

*Teacher Note: Use the Types of Word Problems BLM (reference sheet) to see the different types of subtraction problems to model. When introducing the concepts of subtraction, model problems in which the result or in which one addend is unknown, but in later parts of the unit model the other types of problems. There are two books that can be used as references for the different types of word problems, Teaching with Curriculum Focal Points: Focus in Grade 1 and Children's Mathematics: Cognitively Guided Instruction. Children should not be taught the names for the different types of problems, but should be exposed to all types.*

| | Total Unknown | Addend Unknown | Both Addends Unknown[1] |
|---|---|---|---|
| Put Together/ Take Apart[2] | Three red apples and two green apples are on the table. How many apples are on the table?<br>3 + 2 = ? | Five apples are on the table. Three are red and the rest are green. How many apples are green?<br>3 + ? = 5, 5 – 3 = ? | Grandma has five flowers. How many can she put in her red vase and how many in her blue vase?<br>5 = 0 + 5, 5 = 5 + 0<br>5 = 1 + 4, 5 = 4 + 1<br>5 = 2 + 3, 5 = 3 + 2 |
| Take from | Five apples were on the table. I ate two apples. How many apples are on the table now?<br>5 – 2 = ? | Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat?<br>5 – ? = 3 | Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before?<br>? – 2 = 3 |

Distribute the Part/Part/Whole Mat BLM. Tell students that they can use this mat to show subtraction problems as well as addition problems by turning it upside down. The larger rectangle will be on the top and the two smaller rectangles will be on the bottom.

Give each student 10 pennies. Explain that they are going to use their pennies to show some story problems. Tell the students the following story.

*You have 7 pennies. You give 3 pennies to your friend.*

Display the number sentence, 7 pennies take away 3 pennies is ____ pennies left.

Ask, "*How many pennies do you have left?*"

Have students place 7 pennies in the larger rectangle. Have them move 3 pennies to one of the smaller rectangles. The number of pennies in the larger rectangle is what is left.

Tell another story using the pennies.

*You had 9 pennies. You spent 4 pennies.*

Have students place the original 9 pennies in the large rectangle. Have students move the 4 pennies that were spent into one of the smaller rectangles. Write the sentence, "9 pennies take away 4 pennies is ____ pennies left."

Ask, "*How many pennies do you have left?"*

When students answer 5, write the 5 in the blank in the sentence.

Once students are comfortable with the type of sentence shown above, introduce the word "minus." Under the sentence, write "9 minus 4 equals 5. Eventually, write 9 – 4 = 5." Continue to give students stories about taking away pennies. Have students make up stories about the pennies and share the stories with the rest of the class.

Begin working with "take apart" types of problems. Tell students this story.

*They have 5 cookies. Three of the cookies are chocolate chip and the rest are sugar cookies.*

Have students place 5 counters for cookies in the larger rectangle on the mat.

Ask, "*How many cookies are chocolate chip*?"

Have them move 3 cookies to one of the smaller rectangles. Write "5 cookies minus 3 chocolate chip equals _____ sugar cookies."

Ask, *"How many are sugar cookies?"*

When students reply 2, write 2 in the blank in the sentence. Write the number sentence 5 – 3 = 2.

When students have mastered moving the cubes on the part/part/whole mat, have them transition to drawing pictures in place of their counters and writing the number that represents each part of the story problem.

**Activity 5: Subtraction Word Problems II (CCSS: <u>1.OA.1</u>, MP.1, MP.2)**

Materials List: counters or cubes, Part/Part/Whole Mat BLM, Number Bond BLM, Subtraction Word Problems BLM

Give 10 counters and a copy of the Part/Part/Whole BLM to each student. Tell the students the following story:

*There were 8 mice in a cage. One day, 2 of them ran away. How many mice were left?*

Have students place the correct number of counters on the Part/Part/Whole Mat to show the problem. Write the problem using the structure below.

_____ take away _____ is _____
_____ minus _____ equals _____
_____ – _____ = _____

Display the Number Bond BLM. Review with the students which circles on the number bond represent the parts and which circle represents the whole. Model how to show the previous problem in the number bond by placing 8 cubes for the total number of mice in the whole. Move 2 cubes into one of the parts to show the mice that ran away. Move the remaining 6 cubes into the other circle to show the mice that are left. Remove all of the cubes. Write 8, 2, and 6 in the number bond and then write 8 – 2 = 6.

Give each student a copy of the Number Bond BLM. Using the story problems from the Subtraction Word Problems BLM, have students model each subtraction problem using the

Number Bond BLM. Use the Subtraction Word Problems BLM as a reference. Do not give the BLM to the students. Have them write a number sentence for each problem.

When students have mastered moving the counters on the number bonds, have them transition to drawing pictures in place of their counters and writing the numbers that represent each piece of the story problem.

**Activity 6: Number Stories: Make Your Own (CCSS: 1.OA.1, MP.1, W.1.2)**

Materials List: Number Stories Chain BLM

This activity has students create a modified *text chain* (view literacy strategy descriptions) while writing a number story. A *text chain* gives students the opportunity to apply what they have learned in a written format. A *text chain* can be used by students in math to describe the steps in a procedure or to write story problems.

Place students into groups of 4. Hand out a Number Stories Chain BLM to each student. Explain to the students that they are going to work together to write different number stories and then have students write number stories using a modified *text chain*. Work on the stories will be broken into rounds.

- In round 1, all students will draw a picture to begin a number story. Each student will draw a picture that includes two parts, for example, 3 dogs and 2 cats, 4 apples and 2 oranges, etc.
- In round 2, students will pass their paper to the person on their right in their group. Every person should get a paper. Students will write the first sentence of the number story shown in the picture on the paper they received.
- In round 3, students pass their papers again. Students will write the next sentence in the story on the paper they received.
- In round 4, students pass their papers again. Students will write a question based on the story they received.
- In round 5, papers are passed back to the original author who completes the number bond, writes a number sentence and solves the problem.

Round 1 – picture of 4 dogs and 2 cats
Round 2 – "There are 4 dogs."
Round 3 – "There are 2 cats."
Round 4 – "How many animals are there?"
Round 5 – Complete a number bond, a number sentence, and solve the problem.

By having each student start a number story with a picture, every student will be working on a different story each round. Have students share their number stories with the class, while students check for accuracy.

*Teacher Note: The following activities can be used to develop the part-whole relationship for the numbers 1 to 10. Developing this relationship allows students to focus on how a number can*

*be decomposed into parts when subtracting and how parts come together to form the whole in addition. While working on the part-whole relationships within numbers, focus on the relationship between the parts combining to make the whole. The parts are "partners" that work together to form the whole. The activities should be repeated for each number being studied. As students work with the part-whole relationship for a given number, begin to have them practice the addition and subtraction facts. Students will need written practice with the addition and subtraction facts. The websites listed in the resource at the end of the unit allow for customizable addition and subtraction fact practice.*

**Activity 7: Shake, Shake, Shake! (CCSS: 1.OA.1, 1.OA.3, 1.OA.6, MP.2, MP.7, MP.8, W.1.8 )**

Materials List: Shake BLM, lunch bag for each student, linking cubes (20 for each student, 10 red and 10 blue), chart paper, math learning log, blue and red markers

Give each student a lunch-sized paper bag with 20 loose linking cubes, ten red and ten blue. Have students fold the top over on the bag and shake the bag seven times as they count together, 1-2-3-4-5-6-7. Invite each student to reach into the bag (without looking) and pull out seven cubes.

Draw a chart similar to the Shake BLM. Hand out a Shake BLM to each student.

Ask students, "Would someone tell one way that you can show seven with two colors of linking cubes?" Have the students, with the help of the teacher, use modified *split-page notetaking* (view literacy strategy descriptions) to discover all the partners (using two numbers) for seven. The use of numbers rather than words is a modification of *split-page notetaking*. Complete the Shake BLM together. Using blue and red markers, record student answers by writing the number of blue cubes first and next writing the number of red cubes.

| | |
|---|---|
| 7 | 3 + 4 |
| | 4 + 3 |
| | 0 + 7 |
| | 2 + 5 |
| | 7 + 0 |
| | 1 + 6 |
| | 5 + 2 |
| | 6 + 1 |

Have students replace the cubes, shake, and draw seven again. Continue this activity until all the combinations of seven have been written. Don't forget about zero. Discuss the chart with the students. Examples of questions to ask are:

- How many combinations of seven could you make?
- Do you see any pairs or sets of partners that use the same numbers? (2 blue + 5 red, 5 blue + 2 red)
- Can someone think of a way these facts could be put in order? Another way?

- Can you think of a real life example of one of the problems? Example: Three boys got on the monkey bars. Four more boys got on the monkey bars. How many boys are on the monkey bars?

Add a third column to the chart. Ask, "What would happen to each of these facts if you wrote the number of red cubes first?"

| | | |
|---|---|---|
| **7** | 3 + 4 | 4 + 3 |
| | 4 + 3 | 3 + 4 |
| | 0 + 7 | 7 + 0 |
| | 2 + 5 | 5 + 2 |
| | 7 + 0 | 0 + 7 |
| | 1 + 6 | 6 + 1 |
| | 5 + 2 | 2 + 5 |
| | 6 + 1 | 6 + 1 |

Ask students to tell the sum of each of the partners in the third column. (7) Ask students if switching the order of the partners changed the whole. As a class, come up with a student-friendly statement explaining the commutative property. (The order of the partners does not matter when adding. The whole remains the same.)

Note: The commutative property becomes very important when students are learning and memorizing their facts. It will allow students to start with the larger number to add on.

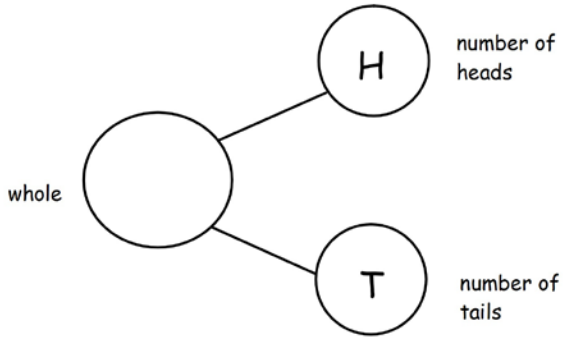
Allow time for students to review individually and with partners what they learned about the number 7 using their modified notes. This kind of review can be done in preparation for other class activities or quizzes. Encourage students to write the meaning of the commutative property and the combinations that they made in their-math *learning log* (view literacy strategy descriptions).

Repeat the activity using other numbers for the whole. (Note: More rows will need to be added to the BLM for larger numbers.)

**Activity 8: Coin Flip (CCSS: 1.OA.1, 1.OA.3, MP.1, MP.2, MP.8)**

Materials List: pennies, Coin Flip BLM

Give a penny to each student. Ask students what they see on each side of the penny. Discuss the terms, heads and tails. Be sure that students are able to identify the head and tail of the penny. Give students 4 more pennies and the Coin Flip BLM. Tell students to drop their coins onto their papers. Have them count how many pennies landed heads up and how many pennies landed tails up. Ask one student to tell the number of heads and the number of tails that they see. Have students write the numbers as parts in one of the number bonds on the BLM.




Ask other students to share different combinations of heads and tails with the class. As students report new combinations, have students write the numbers in the other number bonds on the BLM. Emphasize the part/part/whole relationship. Ask students how they will know when they have all of the combinations of heads and tails that make 5.

Ask students to tell a number story for each number bond they create.

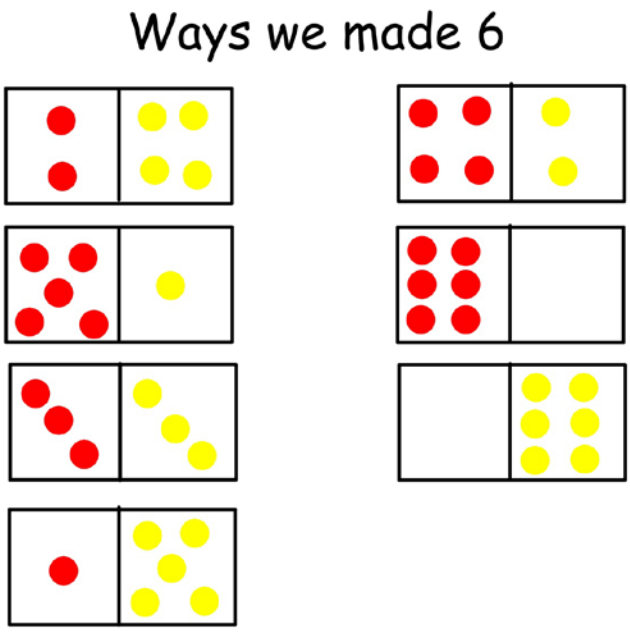
Repeat the activity using other numbers for the whole. (Note: More number bonds will be needed for larger numbers.)

**Activity 9: Dominoes (CCSS: 1.OA.1, 1.OA.3, 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: Dominoes BLM, chart paper, two-sided colored chips, real dominoes

Determine the number of dominoes needed for the number being studied and on chart paper draw enough blank dominoes so that all combinations of the sum can be represented. Run off the blank dominoes on cardstock and cut them out ahead of time.

For the number six:
Hand out 6 chips to each student. Tell them that they are going to use the chips to figure out all the ways to make the number six. Tell students to drop their chips on their table. Ask for volunteers to tell how they made six (4 yellow and 2 red, 3 yellow and 3 red, 5 yellow and 1 red). As each combination is reported, have a student record the combination by drawing red and yellow dots on the dominoes in the chart paper. Record the red chips first and the yellow chips second. The students' recorded numbers on the chart may not be in any order. After recording the chips in random order, have students put the combinations into ascending or descending order. It will reinforce the commutative property.




Show students the real dominoes that have a sum of 6 dots. Have students count the number of real dominoes (4) and the number of dominoes they created with their chips. Ask students why there are only 4 real dominoes that show the ways to make 6 when they came up with seven (7) ways to make 6. Guide students to the realization that some of the dominoes they recorded have the same parts, only the dominoes are turned around. Both sides of the real dominoes are the same color, so it does not matter which number is shown first. So 2 + 4 and 4 + 2 are the same domino. 2 dots and 4 dots become 4 dots and 2 dots when turned around.

Ask students how many blank dominoes they will need to make their own set of dominoes for all the ways to make 6 (4). Hand out 4 blank dominoes to each student. Tell students to choose their favorite color crayon to use to make the dots. Students are only using one color to make their dominoes look more like the real dominoes. Guide students in creating their dominoes, making sure that they have the correct pairs (6 and 0, 1 and 5, 2 and 4, 3 and 3).

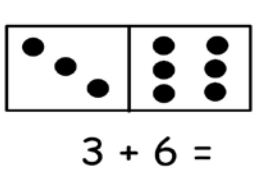
Use the dominoes to practice the facts for 6.

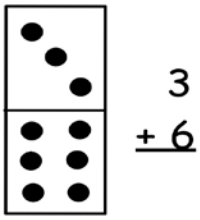
- Missing part: Have students work in pairs. Have Student 1 hold up a domino with one side covered. Have Student 1 tell Student 2 the whole. Have Student 2 name the missing part.

  Student 1: "My domino shows 6. You can see 4 dots. What is the missing part?" (covering the side with 2 dots) Have students write the number sentence, 6 – 4 = ? or 4 + ? = 6.

  Student 2: "The missing part is 2. 4 and 2 make 6."
- Practice by reading the dominoes. Have students add the parts: 2 + 4 = 6, 3 + 3 = 6, etc. Have students subtract one part from the sum: 6 – 2 = 4, 6 – 5 = 1. Have students write number sentences for each fact: 2 + 4 = 6, 4 + 2 = 6, 6 – 4 = 2, 6 – 2 = 4.
- Draw a number bond that goes with each domino.

*Teacher Note: Dominoes are excellent manipulatives because they can be used in a number sentence structure (horizontally) and later in the algorithm format (vertically):*



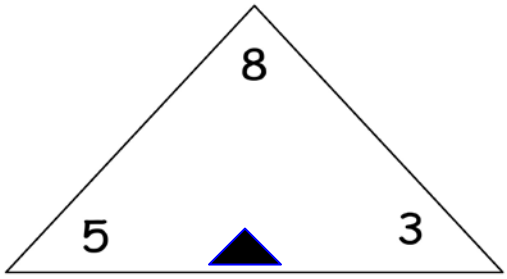




Repeat this activity by creating dominoes for other numbers.

**Activity 10: Triangles (CCSS: 1.OA.3, 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: Triangles BLM, triangle flashcards, baggies

*Teacher Note: Triangle flashcards show the parts of a number without including the symbols for addition and subtraction. These types of flash cards are very helpful in learning fact families and in showing the relationship between addition and subtraction. It is very important to prepare parents how best to use them with youngsters at home. Sets of these can be bought at teachers' stores. Parents can also make them very easily.*




*Suggestion: If a notch is cut out opposite the largest number, it will be easier to sort the cards in the proper direction for later use.*

Determine the number of triangles students will need to make their own set of triangles for the number being studied. For the number 8, students will need 5 triangles. Guide students in creating their own triangles.

Use the flashcards to practice the ways to make 8.

- For many children, it may be better to focus on the quantities represented by the numerals than just focusing on the numerals themselves. Have students make up a simple story problem for each card.
- Practice by reading the flashcards:
    - 2 and 6 make 8, 4 and 4 make 8, etc.

- 8 is made with 4 and 4, 8 is made with 3 and 5, etc.

- Missing part: Have students work in pairs. Have Student 1 hold up a triangle with one corner (addend) covered. Have Student 2 name the missing number. Have students write number sentences to go with each problem.
- Practice missing whole: Have Student 1 cover the top number (the whole) and ask, "6 and 2 make what number?" Have Student 2 find the whole.
- Practice missing part: Have Student 1 cover one of the bottom corner and ask, "4 and what number make 8?" or "8 is made of 4 and what number?"
- Have students write the two addition facts that go with each triangle to illustrate the commutative property.
- Draw the number bond that goes with each triangle.

Have the students store their triangles in baggies for later use. Repeat this activity, creating triangles for other numbers.

**Activity 11: Breaking Numbers into Parts (CCSS: 1.OA.1, 1.OA.3, MP.2, MP.7, MP.8)**

Materials List: chart paper and pens, linking cubes, Cats and Dogs BLM

Give students the Cats and Dogs BLM and nine linking cubes of the same color. Read the story problem to them and discuss how they could use the cubes to help their thinking. On the BLM, have students draw pictures to illustrate the problem. Assure them that this is not art class. If they can't draw dogs and cats, just make circles or boxes. The pictures are not important; the thinking is. Tell them that they must write a number sentence to match their picture. Collect the BLMs.

After all the papers are collected, construct a chart using modified s*plit-page notetaking* (view literacy strategy descriptions) to show the different ways to show the two partners that make nine.

| | |
|---|---|
| 9 | 7 dogs and 2 cats |
| | 8 dogs and 1 cat |
| | 3 dogs and 6 cats |
| | 2 dogs and 7 cats |
| | 1 dog and 8 cats |
| | 4 dogs and 5 cats |
| | 5 dogs and 4 cats |
| | 6 dogs and 3 cats |
| | 0 dogs and 9 cats |
| | 9 dogs and 0 cats |

Because the statement said, "Some of them are cats and some of them are dogs," students will not say the combinations of 0 + 9 or 9 + 0. Guide the students to the idea that there could be 9 dogs and no cats or 9 cats and no dogs.

With the help of the students, organize the number partners in some order; for example, starting with dogs first. It could be from zero (as the first digit) to nine, or nine to zero. Ask students how the facts would change if the number of cats were listed first.

Allow time for students to review individually, and with partners, what they learned about the numbers using the modified notes. This kind of review for the various number combinations can be done in preparation for other class activities or quizzes.

Repeat this activity using other numbers as the whole.

NOTE: An excellent resource for this kind of activity are two books (at this grade level) entitled *Read It! Draw It! Solve It! Grade 1 and Grade K-3,* which have animals as their theme and which work well for differentiation. See Resources section for more information.

**Activity 12: Partners of Ten (CCSS: 1.OA.1, 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: 10 Frame BLM, two different color linking cubes, chart paper

Hand out a 10 frame to each student. Give students a few minutes to study the 10 frame. Have students discuss with partners what they observed about the 10 frame and how they think it can be used to show numbers. Have students share their thoughts with the class. Draw student attention to the number of boxes on the 10 frame. Give students two different color linking cubes (10 of each color). Ask students to predict how many cubes they will need to fill in the 10 frame. Have students fill in all the boxes on the 10 frame. Ask how many cubes were used. Explain that the class is going to use the 10 frame to find all the partners that work together to make the number ten. (This is a good place to review how to fill a Ten Frame – begin in the upper left, move across to fill 5, and then begin again in the lower left to move across and fill the ten.)

Begin with 10 red cubes and no blue cubes. Ask students to describe the partners that make the number 10. *Student: There are 0 blue cubes and 10 red cubes so I know that 0 + 10 = 10.*

Have students place 1 blue cube on their 10 frame. Have students fill in the rest of the 10 frame using red cubes. Ask students to describe the partners that make the number 10. *Student: There is 1 blue cube and 9 red cubes so I know that 1 + 9 = 10.*

Have students place 2 blue cubes on their 10 frame. Have students fill in the rest of the 10 frame using red cubes. Ask students to describe the partners that they see that make the number 10. *Student: There are 2 blue cubes and 8 red cubes so I know that 2 + 8 = 10.*

Have students tie the "turn around" facts together by having students describe facts such as 1 blue + 9 red and 9 red and 1 blue. Continue to increase the number of blue cubes on the 10 frame, having students describe the partners that make the number 10.

Create a class chart to be used as a reference on the ways to make 10.

| Ways to Make 10 |
|---|
| 0 + 10 = 10 |
| 1 + 9 = 10 |
| 2 + 8 = 10 |
| 3 + 7 = 10 |
| 4 + 6 = 10 |
| 5 + 5 = 10 |
| 6 + 4 = 10 |
| 7 + 3 = 10 |
| 8 + 2 = 10 |
| 9 + 1 = 10 |
| 10 + 0 = 10 |

**Activity 13: Ways to Make 10 Practice (CCSS: 1.OA.1, 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: 10 Frame Concentration, 10 Frame Flash Cards (3 pages)

The activities listed can be used during centers, small group time, or whole class. Each activity reinforces the number partners that make 10.

- 10 Frame Concentration – Cut apart the cards on the 10 Frame Concentration BLM. Have students play a concentration type game where they choose the two 10 frames that make 10. For example, a 10 frame that shows 3 and a 10 frame that shows 7 would go together.

*Teacher Note: It would be best to run off these Ten Frame concentration and flash cards on tag-board to make them more permanent. Laminating them before cutting the cards apart would be even better. Consider using different colors of tag-board. It will save much time when putting the like pieces of a set together. If not, code each set on the back with a different symbol, e.g.* ○ ▭ △*, etc.*

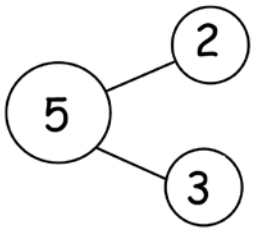
- 10 Frame Flash – Cut apart the 10 Frame Flash Cards BLM. Flash a 10 frame on the overhead or document camera. Ask students how many more make 10. Example: Show a 10 frame that shows 6. Ask, "How many more would make 10?" Continue with other 10 frames.

- 10 Frame Partner Find – Pass out one card of the set of 10 Frame Flash Cards to each student and then have them find their partner to make ten.

**Activity 14: Fact Families with Number Bonds (CCSS: 1.OA.3, 1.OA.6, MP.2, MP.7)**

Materials List: Fact Family BLM, plastic sheet protectors, dry erase markers, triangle flash cards created in Activity 10, erasers

Display the number bond for 5-2-3. Ask the students to tell what each number in the number bond means. *5 is the whole and 2 and 3 are the parts or partners that make 5.* Tell students that number bonds can be used to write addition and subtraction facts. Ask students, "What is the meaning of addition?" Have them discuss this question with partners. Have students share their thoughts with the class. *Adding is when you put or join two parts together.* Ask students which numbers in the bond can be put together to make the third number. *The 2 and 3 make 5.* Write the addition sentences 2 + 3 = 5 and 3 + 2 = 5 under the number bond. Connect the idea of turnaround facts to the turnaround partners discussed previously. Ask students, "What is the meaning of subtraction?" Have them discuss the question with partners. Have students share their thoughts with the class. *Subtracting is when you take the whole and break it into parts.* Discuss with students which number they should use to start a subtraction fact. *Start with the 5 because it is the whole.* Write the subtraction sentences 5 – 2 = 3 and 5 – 3 = 2. Explain that together these four number sentences are called a fact family.




2 + 3 = 5
3 + 2 = 5

5 - 2 = 3
5 - 3 = 2

The Fact Family BLM can be used for different bonds by placing the sheet in a plastic page protector and using a dry erase marker on it. Have students fill in the number bond and write the fact family. Display the number bond 6-4-2. Have students fill in the number bond and write the fact family for the bond. Continue to practice with other number bonds. Use this activity throughout the year in centers and in small group work. When children have mastered this, they are on the way to understanding computation!

Have students use the triangles created in Activity 10. Have students work with partners and write the fact family for a given triangle flash cards using the Fact Family BLM. The variety of models will allow students to develop an understanding that there are several different models that can be used for Fact Families.

**Activity 15: Fact Family Concentration (CCSS: 1.OA.3, 1.OA.6, MP.2, MP.7)**

Materials List: Fact Family Concentration BLM

Cut apart the Fact Family Concentration BLM. Have students play a concentration type game. For this game, have the first student choose one card. This will be the fact family the players are looking for. Have the next player turn over a different card. If the new card matches the fact family of the first card, both cards stay face up, if not the student turns the card face down again. Students continue to choose cards until all four facts in the fact family are found. Once the four facts are found, the cards are removed and the next player chooses a new card to identify the fact family being built.

**Activity 16: Strategy: Counting On Strategy (CCSS: 1.OA.5, 1.NBT.1, MP.7, MP.8)**

Materials List: one number cube and one dotted number cube for every two students, Number Cube Net BLM, Dot Cube Net BLM

*Teacher Note: If number cubes and dotted number cubes are not available, use the BLMs to make the cubes. If regular number cubes and dotted number cubes are used, cover the 6 on both cubes with a blank dot. Otherwise, students may get combinations of 5 + 6, 6 + 5, and 6 + 6. Blank wooden or small foam cubes purchased from teachers' stores are excellent for teachers to make their own sets of dice.*

To teach the counting-on strategy, have students use two cubes, one labeled with numbers 0-5, and the other with only 0–5 dots (no numbers). Have students roll both number cubes. have them say the number on the number cube first and then count on using the dots on the second cube. For example, if a student rolls a 5 on the number cube and a 2 on the dotted cube, he/she would say, 5, then count the dots saying 6, 7. Repeat this activity many times. In whole group, be sure to have students explain the counting-on strategy and how and when they could use it in real life.

Demonstrate using counting on with addition sentences: 5 + 2 = ____
Have students start by saying 5, then counting on 6, 7. Students may use fingers, tally marks, or counters as they begin to master this strategy. Give many examples, allowing students to practice the strategy.

Demonstrate using counting on with subtraction sentences. This strategy requires a LOT of practice for these young learners. Don't rush through it too fast and make sure to come back to it several more times. Example: 5 – 3 = _____

Have students start with the known part and count on (sometimes called count up) until the whole is reached.

Have students say 3 and then count on 4, 5, keeping track of how many they counted. They can use fingers, tally marks or counters. They counted up 2 to get to 5 so 5 – 3 = 2.

**Activity 17: Strategy: Adding/Subtracting One or Two to a Number (CCSS: 1.OA.5, 1.OA.6, MP.6, MP.7, MP.8, W.1.2)**

Materials List: dry-erase or chalkboard, markers or chalk, letter writing paper, Adding One BLM, Adding Two BLM, Subtracting One BLM, Subtracting Two BLM, counters, Adding One Answer Sheet BLM, Adding Two Answer Sheet BLM, Subtracting One Answer Sheet BLM, Subtracting Two Answer Sheet BLM

Say: "I'm going to say a number from 0 to 9. You say the next number as quickly as you can." Set a quick pace for this game so students begin to say the next counting number reflexively." Call out 5 (Students answer 6.). Call out 2 (3). Call out 8 (9). Continue calling out numbers. *Repeat this activity often as a quick warm-up.*

Display the first row of the problems on the Adding One BLM. Ask, "What do you notice about all of these problems?" Students should notice that all of the facts have the number 1 as one of the parts. Have students hold ___ counters in one hand. Ask students to add one more counter. Have them count to find the number of counters they have now. Have a student make a summarizing statement such as, "I had ___ counters then I added one more and got ____ counters." Continue having students place counters in their hands and add one more for the rest of the first row of problems.

Display the next row of problems on the BLM. For this row of problems, have students hold the counters representing the larger addend in a closed fist. Have students tap their fist and count on one more for each problem.

Display the third row of problems on the BLM. Have students circle the larger addend and then count on one to solve the problems.

Have students solve the problems on the final row independently.

Summarize this part of the lesson by asking, "What happens to a number when you add one to it?" Students will explain what happens in many different ways:

The number gets larger.
It goes to the next number.
It's just one more.
The number gets older and older.

*Teacher Note: The BLM practice pages can be turned into a fun challenge for students by using the page as a game board and using the answer sheet BLMs as game pieces. Cut apart the answer cards, shuffle, turn the cards face down and have a student see how quickly he/she can match the answers to the problem. The reverse can also be done. Make the practice page into the cards and place them on the answer sheet which is now used as the game board. Color code or run off each BLM on different colors so when a piece is found on the floor, it can be easily identified as to where it needs to be returned.*

When the students have had practice explaining what happens when one is added to a number, use *RAFT* (view literacy strategy descriptions) writing with them. *RAFT* writing is used after students have acquired new content information and concepts to help them rework, apply, and extend their understandings. RAFT is an acronym that stands for:

R – Role (role of the writer)
A – Audience (to whom the RAFT is being written)
F – Form (the form the writing will take, as in letter, song, etc.)
T – Topic (the subject focus of the writing)

In this RAFT, the students will write a letter to someone (the principal, a parent, or a friend) telling him/her what they have learned about adding one to a number. They will write to this prompt:

Dear _____

Today we studied about adding one to a number. Here is the way I say it.
When you add one to a number, _____

Your friend,
_____

Have students share their letters with the class. For homework, have them explain this strategy to two people in their home. Repeat the process for adding 2, subtracting one, and subtracting two. Use the Adding Two BLM, Subtracting One BLM, and Subtracting Two BLM. Have students complete the RAFT for each, explaining each strategy. Provide math manipulatives for students who need them. Once students understand the strategies of adding and subtracting one or two to a number, provide many opportunities for students to practice.

**Activity 18**: **Doubles (CCSS: 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: Doubles Clue Cards BLM, dominoes

Display the facts 1 + 1, 2 + 2, 3 + 3, 4 + 4, 5 + 5 and the corresponding dominoes. Ask, "What do you notice about all of these facts?" Students should see that all the facts involve partners that are the same. Explain that these facts are called "doubles." Ask students which of the doubles facts they already know. Show a picture clue card from the Doubles Clue Cards BLM. Have students match the picture to the correct doubles fact. Have students explain why they matched the picture clue to the doubles fact. After all picture clues have been matched, talk about how the clues will help them remember their facts. One eye and one eye is two eyes. Two legs and two legs is four legs, like the horse. Have students practice doubles facts using their fingers.

**Activity 19: Story Problems: Flower Vases (CCSS: 1.OA.1, 1.OA.3, 1.OA.6, MP.2, MP.7, MP.8, SL.1.1a,b,c)**

Materials List: poster board, art materials, Flowers BLM, Vases BLM, Flowers Story Problems BLM, Types of Word Problems (teacher reference)

Hand out a Flowers BLM and a Vases BLM to each student. Have students color and cut out the flowers.

*Teacher Note: Use the Types of Word Problems BLM (reference sheet) to see the different types of addition and subtraction problems to model for students. Excerpts from the BLM are printed below. During this lesson model problems that are start unknown, change unknown, addend unknown, and both addends unknown. There are two books that can be used as references for the different types of word problems, Teaching with Curriculum Focal Points: Focus in Grade 1 (NCTM) and Children's Mathematics: Cognitively Guided Instruction. Children should not be taught the names for the different types of problems, but should be exposed to all types.*

The Flowers Story Problems BLM has examples of these types of problems.

| | Result Unknown | Change Unknown | Start Unknown |
|---|---|---|---|
| Add to | Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now?<br>2 + 3 = ? | Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two?<br>2 + ? = 5 | Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before?<br>? + 3 = 5 |
| Take from | Five apples were on the table. I ate two apples. How many apples are on the table now?<br>5 – 2 = ? | Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat?<br>5 – ? = 3 | Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before?<br>? – 2 = 3 |
| | | | |
| | **Total Unknown** | **Addend Unknown** | **Both Addends Unknown[1]** |
| Put Together/ Take Apart[2] | Three red apples and two green apples are on the table. How many apples are on the table?<br>3 + 2 = ? | Five apples are on the table. Three are red and the rest are green. How many apples are green?<br>3 + ? = 5, 5 – 3 = ? | Grandma has five flowers. How many can she put in her red vase and how many in her blue vase?<br>5 = 0 + 5, 5 = 5 + 0<br>5 = 1 + 4, 5 = 4 + 1<br>5 = 2 + 3, 5 = 3 + 2 |

Display the following problem: Mom put 4 flowers in a vase. Then dad put some more flowers in the vase. Now there are 10 flowers in the vase. How many flowers did dad put into the vase? Write the number sentence: "4 flowers plus some more flowers equals 10 flowers."

Beneath the number sentence, write "4 + ☐ = 10," explaining that the box is a symbol that represents the number of flowers dad added to the vase. Have students model the problem using a Vases BLM and the flower shapes. Allow students time to solve for the missing number. Have students share their strategies about how they figured out the missing number. Display other problems from the Flowers Story Problems BLM. Use this BLM as a reference, do not distribute it to the students. Have students model and solve the problem on the Vases BLM. Guide students in writing the number sentence with a ☐ to represent the missing number.

Put students into groups of 2. Post the problem, "Mom has two vases. She has 10 flowers. She wants to put flowers in both vases. How many flowers can mom put in each vase?" Have each group make a poster showing how they solved the problem. Posters should include an illustration and a number sentence.

Have students present their solution using a modified p*rofessor know-it-all* strategy (view literacy strategy descriptions). Tell student pairs they will each take turns being the "professor-know-it-all," so they must be prepared to explain their solutions to the class like an expert. Ask each pair of students to stand or go to the front of the room. Have the student read their problem to the class, explain their illustration, and why they chose the number sentence that they did. When one pair finishes, invite another pair to assume the role of professor know-it-all. Allow other students to ask questions of the know-it-alls professors and check them for accuracy.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records as well as student-generated products may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction on the weaknesses that continue to persist.

- Have the students use math manipulatives to demonstrate an addition or subtraction story.

- Observe a student acting out addition and subtraction stories to see if he/she understands the difference between the 2 operations.

- Have the students solve problems using pictures that involve addition or subtraction. For example, a picture might show four birds sitting in a cage and one bird flying out the door of the cage. Say, "There were five birds in a cage. One bird just flew away. Write the number sentence to show how many birds are left."

- Have the student create a story problem which uses addition (subtraction) and draw a picture. Have the student solve the problem and write the corresponding number sentence.

- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student-generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

- Fluency Assessment – Prior to beginning the unit, assess student fluency (for diagnostic or formative purposes only) in addition and subtraction to 10. Individually assess each student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the amount of time it takes for the student to complete the sheet and the number of errors. Repeat assessments at the end of the unit to show growth – not for a grade.

- Assess that the student is using appropriate mathematical language in speaking and recording an addition or subtraction equation.

**Activity-Specific Assessments**

- Activity 6: Assess the number stories created by each group using the following scoring rubric:
  Scoring Rubric:
  * 2 points---All components of the activity are completed and correctly done.
  * 1 point----The activity was attempted, effort was evident, parts of the project were correct.
  * 0 points---No component of the activity was completed.

- Activity 10: Assess student knowledge of individual fact families by giving the student number triangles with one of the numbers missing. Have the student fill in the missing number.

- Activity 14: Give each student a different number triangle. Have students write the fact family that goes with their triangle.

- Activity 16: Have students demonstrate the counting on strategy during an individual assessment, by having students solve various addition facts using the counting on strategy.

- Activity 17: Assess student explanation of the adding one strategy from their RAFT.
  * 2 points---Student clearly explains the strategy with no errors.
  * 1 points---Student attempts to explain the strategy.
  * 0 points---Student does not explain the strategy.

- Activity 19: Assess each group's poster, checking to see if his/her solution to the problem is accurate.

## Resources

**Books:**

- *Teaching with Curriculum Focal Points: Focus in Grade 1,* National Council of Teachers of Mathematics (NCTM)
- *Children's Mathematics: Cognitively Guided Instruction,* Thomas Carpenter, Heinemann

**Websites:**

- http://oswego.org/ocsd-web/games/mathmagician/cathymath.html - Math Magician – website to practice addition and subtraction, can choose the value of the second addend (+0, +1, +2, etc) and the value to subtract (-0, -1, -2, etc)
- http://www.math-aids.com/Fact_Family/Addition_Subtraction.html - The worksheets found at this site can be used to practice fact families using triangles
- http://www.math-aids.com/Number_Bonds - The worksheets found at this site can be used to practice number bonds. The value of the whole can be set for a specific number.
- http://www.softschools.com – addition and subtraction worksheet generators that can be customized for certain sums, addends, or the value to be subtracted
- http://coolmath-games.com/0-math-lines/index.html - Math Lines is a game where students have to shoot the ball to the partner number to make a certain sum.
- http://coolmath-games.com/0-number-twins/index.html - Number Twins is a game where students have to choose two balls that make a given sum. Students choose balls until the board is cleared. It can be challenging because balls have to be free in order for them to be used. This would be good practice for at home (once the game is learned). It takes quite a bit of time to complete one page.

**Read It! Write It! Draw It! Resources:**

- http://www.etacuisenaire.com/catalog/product?deptId=PROBLEMSOLVING&prodId=7136
- http://isbndb.com/d/publisher/dale_seymour_publications.html?start_item=421

# Grade 1
# Mathematics
# Unit 3: Operations and Algebraic Thinking


**Time Frame:** Approximately six weeks

*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit focuses on using different strategies to add and subtract within 20, on applying properties of operations to addition and subtraction, and on the meaning of the equal sign. The development of fluency for addition and subtraction within 10 continues to be a focus.

## Student Understandings

Students will understand that an equal sign in an equation means that both sides of the equation have the same value. Students will determine if equations are true or false. Students will add and subtract within 20 using various strategies.

## Guiding Questions

1. Can students apply properties of operations (commutative property of addition and associative property of addition) as strategies to add and subtract?
2. Do students understand subtraction as an unknown-addend problem?
3. Can students add and subtract within 20 using strategies such as counting on; making ten; decomposing a number leading to a ten; creating equivalent but easier known sums; and using the relationship between addition and subtraction.
4. Can students demonstrate fluency for addition and subtraction within 10?
5. Can students understand the meaning of the equal sign?
6. Can students determine if equations involving addition and subtraction are true or false?
7. Can students use addition and subtraction within 20 to solve word problems?
8. Can students solve problems for addition of three whole numbers?

**Unit 3 Common Core State Standards (CCSS)**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Operations and Algebraic Thinking** | |
| 1.OA.1 | Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |
| 1.OA.2 | Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |
| 1.OA.3 | Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 =11 is also known. (Commutative property of addition.) To add 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)* |
| 1.OA.4 | Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.* |
| 1.OA.5 | Relate counting to addition and subtraction (e.g., by counting on 2 to add 2). |
| 1.OA.6 | Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making 10 (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 =4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 +1 = 12 + 1 = 13). |
| 1.OA.7 | Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.* |
| 1.OA.8 | Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that make the equation true in each of the equations 8 + ? = 11, 5 = ___ – 3, 6 + 6 = ___* |
| **Standards for Mathematical Practice (MP)** | |
| MP.2 | Reason abstractly and quantitatively. |
| MP.7 | Look for and make use of structure. |
| MP.8 | Look for and express regularity in repeated reasoning. |

| CCSS for ELA Content | |
|---|---|
| **CCSS#** | **CCSS Text** |
| **Writing** | |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |
| **Speaking and Listening** | |
| SL.1.1 | Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussion (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).<br>b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.<br>c. Ask questions to clear up any confusion about the topics and texts under discussion. |

## Sample Activities

*The first three Suggested Activities from Unit 1 (Straw Count, Number Path Math, and Counting Activities) should be part of the daily routine in every unit and should be used each day that students are in school.*

**Activity 1: Count Up/Count Down Warm Up (CCSS: 1.OA.5, MP.8)**

Materials List: no materials needed

Count Up:
Say, "I'm going to say a number from 0 to 19. You say the next number as quickly as you can." Set a quick pace for this game so students begin to say the next counting number reflexively." Call out 15. (Students answer 16.) Call out 2. (3) Call out 18. (19) Continue calling out numbers. *Repeat this activity often as a quick warm-up.*

Count Down:
Say, "I'm going to say a number from 0 to 19. You say the number that is one less as quickly as you can." Set a quick pace for this game so students begin to say the counting number that comes before reflexively." Call out 13. (Students answer 12.) Call out 6. (5) Call out 17. (16) Continue calling out numbers. *Repeat this activity often as a quick warm-up.*

**Activity 2: The Equal Sign (CCSS: 1.OA.7, MP.7, W.1.8, SL.1.1a, SL.1.1b)**

Materials List: chart paper, markers, index cards, pan balance, red and blue linking cubes, learning logs, Equal Sign Anticipation Guide BLM

Hand out the Equal Sign Anticipation Guide BLM. An *anticipation guide* (view literacy strategy descriptions) is a list of statements about a topic that students respond to prior to instruction on a topic. *Anticipation guides* can activate prior knowledge and allow for pre-assessment of student understanding of a topic. *Anticipation guides* are especially useful for struggling and reluctant readers and learners as they increase motivation and help students focus on important information. Have students respond to each statement by circling yes if they agree with the statement and no if they do not. After the lesson is completed, allow the students to revisit their *anticipation guide* to see if they want to change their original answer. Be sure to check that all students' final *anticipation guide* responses are correct.

Continue this activity by using *discussion* (view literacy strategy descriptions) in the form of Think-Pair-Square-Share. When students participate in *discussion* about class topics, their learning and remembering improves. It encourages students to think about specific topics. It gives students the chance to share their own ideas and process ideas from other students. It allows the teacher to identify any misconceptions in students' knowledge about a given topic.

Display the equal sign on the board. Ask the following questions about the equal sign.

- What does this symbol mean?
- Where have you seen this symbol?
- When do you use this symbol?

Have students consider each question separately using Think-Pair-Square-Share**.** First, have each student think of his/her own response to the question. Have students then pair up with partners to share their thoughts. Have each pair then join with another pair to form a square or a group of 4. In this grouping, have students discuss each question. Have the groups of 4 share with the whole class. Record students' ideas on chart paper.

Guide students to the understanding that the equal sign "=" means that both sides of an equation or number sentence have the same value. Clear up the misconception that the equal sign "gives an answer" or is used before the answer.

Use the pan balance to show numbers that are equal and not equal by placing different amounts/numbers of cubes in each side of the balance. For example, put 4 cubes on the right side of the balance and 4 cubes on the other. Discuss what happens to the balance. (The balance stays even, so those amounts are equal.) Then place 4 cubes on one side of the balance and 5 cubes on the other side. Discuss what happens to the balance. (The side with 5 cubes goes down signifying that one side has more.)

Hand out an index card to each student. Have students write a large equal sign on one side of their cards. Call out 2 numbers. Tell students to show their equal sign if the numbers are equal. After students decide if the pair of numbers is equal or not equal, have a student demonstrate using the pan balance.

For example:

| | |
|---|---|
| 2 and 2 | Students show =. |
| 5 and 3 | |
| 24 and 24 | Students show =. |

Use the pan balance to decide if other types of equations are true. On one side of the pan balance, show 4 by putting 4 cubes in the pan. On the other side, show 3 + 1 by putting 3 red cubes and 1 blue cube in the pan. Ask students if 4 equals 3 + 1. (Yes.) Give students another problem. On one side of the pan balance, show 3 + 3 by placing 3 red cubes and 3 blue cubes in the pan. Place 5 cubes in the pan on the other side. Ask students if 3 + 3 equals 5. (No.) Continue to give students problems where 1 side is greater or less than the other side. Include problems with subtraction. Does 4 = 6 – 2? Does 7 – 5 equal 2?

This will be a good opportunity to display various equations, e.g., 2 + 5 = ☐ , 2 + ☐ = 7, ☐ + 5 = 7; and also for subtraction, e.g., 13 – 5 = ☐ , 13 – ☐ = 8, and ☐ – 5 = 8.

Show the facts 2 + 2 and 3 + 1. Have the students show their equal signs if they think 2 + 2 equals 3 + 1. Use the pan balance to show the equation. For 2 + 2, put 2 red linking cubes and 2 blue linking cubes on the right side of the pan balance. For 3 + 1, put 3 red linking cubes and 1 blue linking cube on the left side of the pan balance. Discuss how the equal sign can be used with the two facts. Do a few more addition problems before moving on to a mix of addition and subtraction problems.

Show the facts 5 + 2 and 7 + 1. Have the students show their equal signs if they think the problems are equal. Use the pan balance to decide if 5 + 2 equals 7 + 1. Show the facts 4 + 2 and 8 – 2. Have the students show their equal signs if they think the problems are equal. Use a pan balance to decide if 4 + 2 equals 8 – 2. Continue to show different problems and have students decide if the problems are equal or not equal. Have students generate a list of other facts that can be joined with the equal sign. Have students test their idea using the pan balance before adding the facts to the list.

Have students write in their *learning logs*, (view literacy strategy descriptions**)** about the meaning of the equal sign. Save the index cards with the equal signs for the next activity.

**Activity 3: True or False (CCSS: 1.OA.6, 1.OA.7, MP.2, MP.7)**

Materials List: equal signs made on index cards from Activity 2, True or False BLM, True or False Flashcards BLM

Have students work in groups of 2 (or pairs). Give each student a set of True or False Flashcards. Tell students to keep cards in a pile facedown. Have students work with their shoulder partners (students sitting next to one another). Place an equal sign index card between each pair of students. Have each student choose a card from his/her true or false pile and place it on his/her side of the equal sign. Have the pair then decide if the equation they created is true or false. Have students record the equations on the BLM.

| True | False |
|---|---|
| 4 + 2 = 3 + 3 | |
| | 3 + 4 = 5 – 1 |

This activity is a good way to review the facts within 10.

**Activity 4: 10 Plus (CCSS: 1.OA.3, 1.OA.6, MP.8)**

Materials List: chart paper, chart marker, cubes, Double-10 Frame BLM, 10 Plus Matching BLM

Distribute the Double-10 Frame BLM and 20 cubes to each student. Ask, "How many cubes do you have?" (20) Have students count out 10 of the cubes and place the cubes on the top 10 frame. Remind students to start on the left and fill the top row first, then move to the bottom row and start filling in on the left. Have students add 2 cubes to the bottom 10 frame. Ask, "How many cubes?" (12) Ask a few students, "How do you know that you have 12 cubes?" Can you write an addition sentence for this story?" (10 + 2 = 12) "Can you write the turnaround fact for this problem?" (2 + 10 = 12) Tell students to remove the 2 cubes from the bottom frame. Have them count out 5 cubes and place them on the bottom ten-frame. Ask, "Can anyone say the addition sentence for the number of cubes you now have?" (10 + 5 = 15) "What about the turnaround fact?" (5 + 10 = 15) Continue having students add different amounts to the 10 cubes. Focus only on the numbers 11 to 20.

Hand out a copy of the 10 Plus Matching BLM to each student. Have students cut apart the cards. Have students play a matching game by matching the 10 plus facts to the double 10 frame that shows the fact.

Display the number ten. Say, "I'm going to say a number from 0 to 9. You must add this number to 10 as quickly as you can." Set a quick pace for this game. Call out 5. (Students answer 15.) Call out 2. (12) Call out 8. (18) Continue calling out numbers. *Repeat this activity often as a quick warm-up.*

**Activity 5: Using Friendly 10 to Add (CCSS: 1.OA.6, 1.OA.7, MP.7, MP.8)**

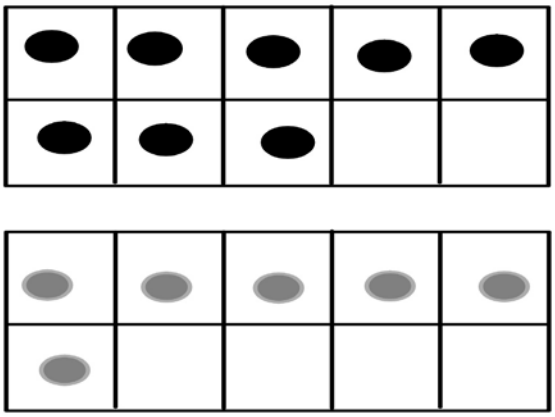
Materials List: Double-10 Frame BLM, 2 different color cubes, pan balance, Friendly 10 Addition Flashcards BLM, Friendly 10 Addition Spinners BLM, bobby pin, sharpened pencil

To use the spinners, have students place the closed end of a bobby pin in the center of the spinner and hold a sharpened pencil (point down) inside the closed end. Students will spin the bobby pin around the pencil.

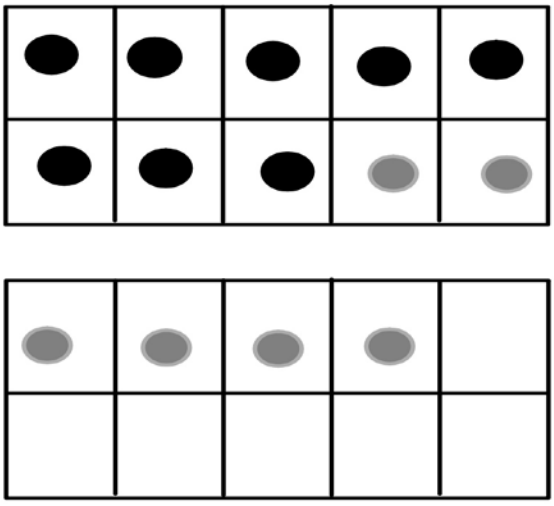
As a way to review the "Make Ten" strategy, play the following game. Say, "I want to make the number 10. I'm going to say a number from 0 to 10. You must tell me what to add to that number to get 10." Set a quick pace for this game. Call out 5. (Students answer 5.) Call out 2. (8) Call out 8. (2) Continue calling out numbers. *Repeat this activity often as a quick warm-up.*

Write 8 + 6 = _____ on the board. Ask for strategies that can be used to solve this problem. List the strategies on the chart paper. Some strategies might be using fingers to add, counting on, or drawing pictures. Add the strategy, Friendly 10, to the list. If a student has already named a similar strategy, place a star next to his/her strategy. Explain that Friendly 10 uses the "Make Ten" strategy. Friendly 10 changes harder math problems into easier ones by making a group of 10.

Hand out Double-10 Frame BLM and 20 cubes (10 of one color and 10 of another) to each student. Show the problem 8 + 6. Have students place 8 red cubes in the top 10-frame and 6 blue cubes in the bottom 10 frame.



Ask, "Can you move cubes around to make a group of 10?" Demonstrate moving 2 cubes from the bottom 10 frame to the top 10 frame to make a group of 10.



Ask:

- "What new addition fact did you make?" (10 + 4)
- "What is the answer to 10 + 4 = ?" (14)

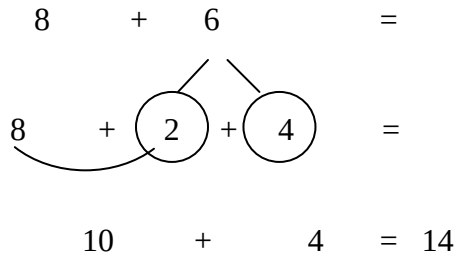
Write: 8 + 6 = 10 + 4 on the board. Ask, "Is this fact true?" (If students do not see the connection between the facts, use the pan balance scale to show that 8 cubes + 6 cubes is equal to 10 cubes + 4 cubes.)

Explain that the Friendly 10 strategy is a way to change a harder problem into an easier problem by making a group of 10. 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14

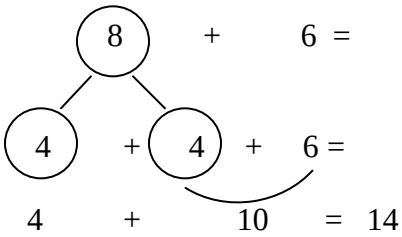
*Teacher Note: Some students may take 4 counters from the top frame and move them to the bottom frame. They have thought 8 + 6 = 4 + 4 + 6 = 4 + 10 = 14.*

Continue to practice this strategy using addition facts with double digit sums to 20. Allow students to practice the strategy using Double-10 Frame BLM until mastery. **This is a critical strategy and will need a lot of practice.**

Extension: Have students use Friendly 10 without using a double 10-frame. After students have mastered the strategy using the Double-10 Frame, show how to change the fact by breaking apart numbers to make 10.




In the preceding example, the student broke the number 6 into partners 2 and 4, so he/she now has 8 + 2 + 4.
The student added 8 + 2 and got 10.
The student would then add 10 + 4 to get 14.




In the example above, the student broke the number 8 into partners 4 and 4, so he/she now has 4 + 4 + 6.
The student added 4 + 6 and got 10.
The student would then add 4 + 10 to get 14.

Practice ideas of adding using Friendly 10.

- Have students use the Double-10 Frame BLM to solve problems from the Friendly 10 Addition Flashcards BLM. Later, have students cut the cards apart to use as flashcards.
- Have students spin the 2 spinners on the Friendly 10 Addition Spinners BLM and add together the numbers shown.
- Each time, have students explain to each other how they added the two numbers.

**Activity 6: Bigger Doubles (CCSS: 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: Bigger Doubles Clue Cards BLM, double-nine dominoes

Demo Dominoes can be printed at http://mathwire.com/templates/domflash2.pdf and http://mathwire.com/templates/dominoflashcards.pdf

Student Dominoes can be printed at
http://lrt.ednet.ns.ca/PD/BLM/pdf_files/number/dominoes.pdf
Copy the dominoes on card stock for added durability.

Display the facts 6 + 6, 7 + 7, 8 + 8, 9 + 9, 10 + 10 and the corresponding dominoes. Ask, "What do you notice about all of these facts?" (All the facts involve partners that are the same.) Remind students that these facts are called "doubles." Ask students which of the doubles facts they already know. Have the students recall what pictures were used for these facts. (1 + 1, eyes; 2 + 2, legs on a horse; 3 + 3, legs on a bug; 4 + 4, legs on a spider; 5 + 5, fingers on 2 hands) Show a picture clue card from the Bigger Doubles Clue Cards BLM. Have students match the picture to the correct doubles fact. Have students explain why they matched the picture clue to the doubles fact. After all picture clues have been matched, talk about how the clues will help them remember their facts. Six eggs and six eggs is 12 eggs. Seven petals and seven petals is fourteen petals. Have students practice doubles facts by flashing the clue cards and having the students name the corresponding fact.

**Activity 7: Doubles Practice (CCSS: 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: Doubles Practice BLM, Doubles Practice Answer Sheet BLM

Review the doubles facts using the following chant:
0 + 0 = 0 oh, 1 + 1 = 2 ooo, 2 + 2 = 4 more, 3 + 3 = 6 kicks, 4 + 4 = 8 that's great, 5 + 5 = 10 again, 6 + 6 = 12 that's swell, 7 + 7 = 14 let's lean, 8 + 8 = 16 really keen, 9 + 9 = 18 jellybean and 10 + 10 = 20 that's plenty
This is an additional song/chant idea:
http://www.songsforteaching.com/jennyfixmanedutunes/doubleitup.htm

Practice ideas using the Doubles Practice BLM and Doubles Practice Answer Sheet BLM.

- Cut apart the cards on the Doubles Practice BLM and have students match the problem to the answer on the Doubles Practice Answer Sheet BLM.

- Cut apart the cards on the Doubles Practice Answer Sheet BLM and have students match the answers to the problems on the Doubles Practice BLM.
- Cut apart the cards on the Doubles Practice Answer Sheet BLM and the Doubles Practice BLM. Hand out a problem card (from the Doubles Practice BLM) to half of the class. Hand out an answer card (from the Doubles Practice Answer Sheet BLM) to the other half of the class. Have students find the classmates whose card matches their own.

*Teacher Note: The following website is a great resource for ideas to practice doubles*
http://teachmath.openschoolnetwork.ca/wordpress/grade-1/addition-facts/doubles/
*This site has additional games to practice doubles facts and a read-aloud book that explores doubles.*

**Activity 8: Near Doubles (CCSS: 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: double-nine dominoes, Near Doubles Flash Cards BLM (2 pages)

*Teacher Note: The doubles facts need to be pretty solid before introducing doubles plus. Move to doubles plus 1 ONLY if almost all students have mastered the doubles. If not, continue with doubles practice activities.*

Display the double fact 2 + 2 = ☐. Then display the fact 2 + 3 = ☐ and ask students how they can use what they already know to figure out this new fact. Show the dominoes for both facts. Ask students what is different between the two dominoes. Ask students how the domino for 2 + 2 can be changed to make the domino for 2 + 3. Explain that the fact 2 + 3 is a near double or a doubles plus 1 fact. Near doubles or doubles plus 1 facts are facts that can be solved by adding one more to a doubles fact. Some students may think of doubles minus 1. For 8 + 7, they would think of 8 + 8 and subtract 1.

Display the near doubles facts 2 + 3, 3 + 4, 4 + 5, 5 + 6, 6 + 7, 7 + 8, and 8 + 9 and their corresponding dominoes. Ask students which doubles fact or doubles domino would be helpful in finding the answer to each of the facts. Use the Near Doubles Flash Cards to review the near doubles facts. For each flashcard, discuss the doubles fact being used to help solve the problem. Put students in groups of two. Hand out a set of Near Doubles Flash Cards to each pair. Have students use the flashcards to review the near doubles facts.

For practice:

- Give each group of students a set of double-nine dominoes. Have them find all of the doubles dominoes and then find the corresponding near doubles dominoes or doubles plus 1. Have them write the totals for each set of facts.
- Show a list of facts and have students choose which are doubles facts and which are near doubles facts.

*Teacher Note: The following website is a great resource for ideas to practice near doubles*
http://teachmath.openschoolnetwork.ca/wordpress/grade-1/addition-facts/near-doubles/

**Activity 9: Subtracting From 10 (CCSS: 1.OA.6, MP.7, MP.8)**

Materials List: Subtracting from 10 Practice BLM, Subtracting from 10 Practice Answer Sheet BLM

As a way to practice subtracting from 10, play the following game. Say, "I want to subtract from the number 10. I'm going to say a number from 0 to 10. You must tell me what the answer is if you subtract that number from 10." Set a quick pace for this game. Call out 5. (Students answer 5.) Call out 2. (8) Call out 8. (2) Continue calling out numbers. *Repeat this activity often as a quick warm-up.*

Practice ideas using the Subtracting from 10 Practice BLM and Subtracting from 10 Practice Answer Sheet BLM.

- Cut apart the cards on the Subtracting from 10 Practice BLM and have students match the problem to the answer on the Subtracting from 10 Practice Answer Sheet BLM.
- Cut apart the cards on the Subtracting from 10 Practice Answer Sheet BLM and have students match the answers to the problems on the Subtracting from 10 Practice BLM.
- Cut apart the cards on the Subtracting from 10 Practice Answer Sheet BLM and the Subtracting from 10 Practice BLM. Hand out a problem card (from the Subtracting from 10 Practice BLM) to half of the class. Hand out an answer card (from the Subtracting for 10 Practice Answer Sheet BLM) to the other half of the class. Have students find the classmates whose card matches their own.

**Activity 10: Friendly-10 Subtraction (CCSS: 1.OA.6, 1.OA.7, MP.7, MP.8)**

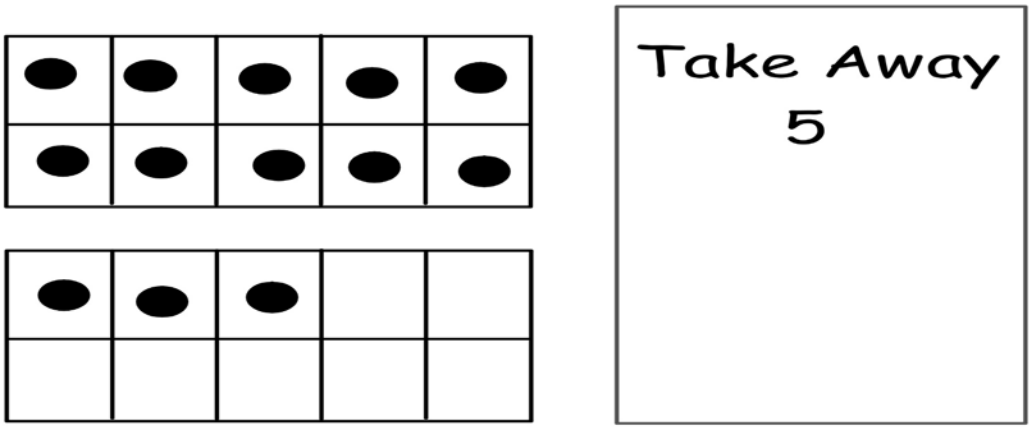
Materials: Subtraction Double-10 Frame BLM, cubes, Friendly 10 Subtraction Flashcards BLM, Friendly 10 Subtraction Spinners BLM, bobby pins, sharpened pencils

*Spinners: See the note about spinners in Activity 5.*

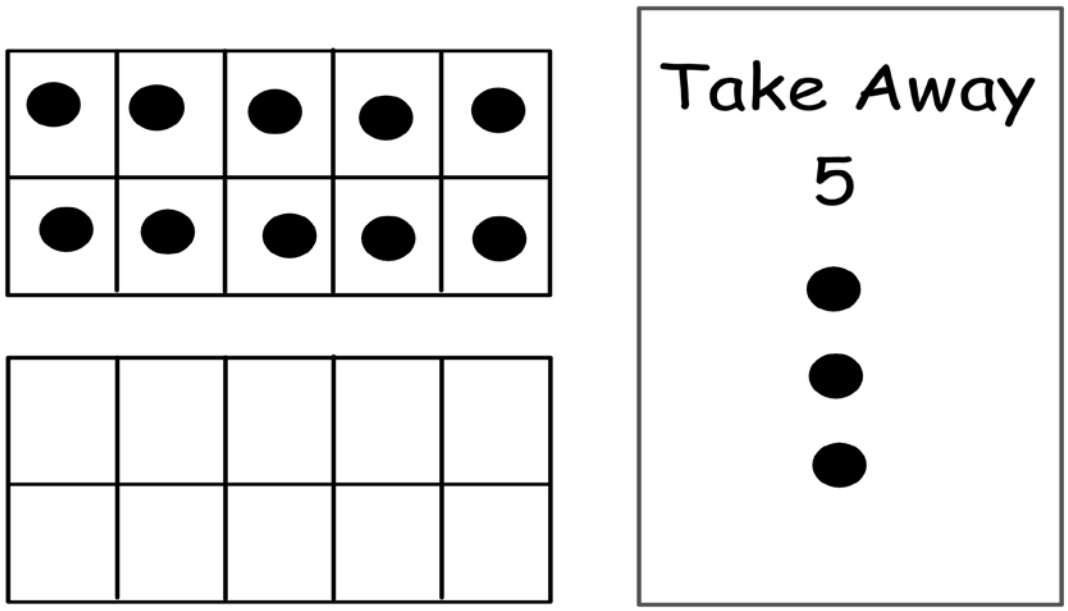
Write 13 – 5 = _____ on the board. Ask for strategies that can be used to solve this problem. List the strategies on the chart paper. Some strategies might be counting back, using fingers, drawing pictures. Add the strategy, Friendly 10, to the list. If a student has already named a similar strategy, place a star next to it. Explain that the Friendly 10 strategy from addition can be used in subtraction as well.

Hand out the Subtraction Double-10 Frame BLM and 20 cubes to each student.

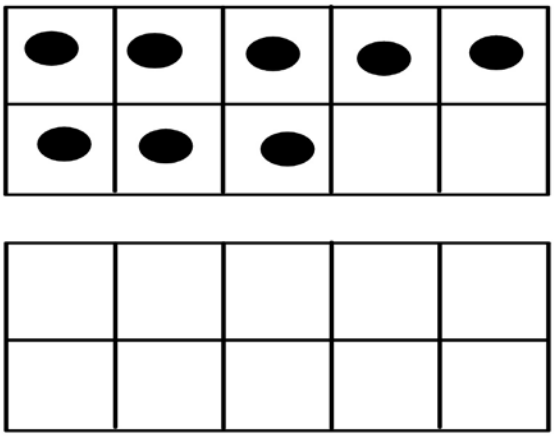
Show the problem 13 – 5 = _____. Have students place 13 cubes in the 10 frames and write a 5 in the take away area. Remind students to fill the top 10 frame first.

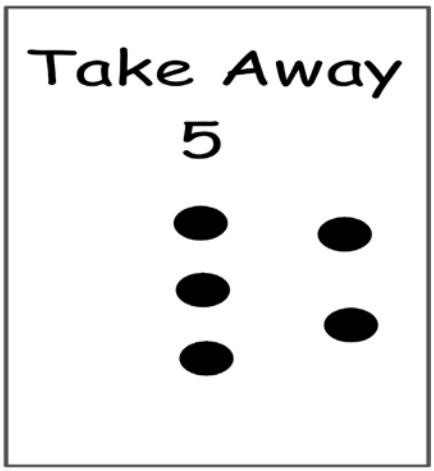



Explain that when using this strategy for subtraction, only the larger number is shown on the 10 frames. Ask, "How many cubes do you need to take away to have only a group of 10 left?" Have students move 3 cubes into the Take Away area.




Ask: "Have you taken away enough cubes yet? Do you have 5 cubes in the Take Away area yet?" Have students move 2 more cubes into the Take Away area.

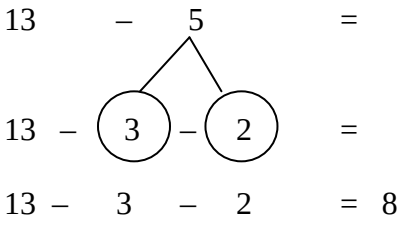





13 – 5 = 13 – 3 – 2 13 – 3 = 10 10 – 2 = 8

Continue to practice this strategy using subtraction facts with an addend that is 10 or greater. Allow students to practice the strategy using Double-10 Frame BLM until mastery. This is a critical strategy and will need a lot of practice.

Extension: Have students use Friendly 10 without using the Double-10 Frame BLM. After students have mastered the strategy using the Double-10 Frame, show students how to change the fact by breaking apart numbers to use 10.




In the example above, the student broke 5 into partners 3 and 2, so the problem became 13 – 3 – 2.

The student subtracted the 3 from the 13 to get 10.
Since there are still 2 left to subtract, the student would subtract 2 from 10 to get 8.
Continue to practice using this strategy with subtraction problems within 20.

*Teacher Note: Students should be allowed to use the Subtraction Double-10 Frame and manipulatives as long as they need in order to solve the problems.*

Have students practice subtracting using Friendly 10.

- Have students use the Subtraction Double-10 Frame BLM to solve problems from the Friendly 10 Subtraction Flashcards BLM. Later, have students cut apart the BLM to use as flashcards.

- Have students spin the 2 spinners on the Friendly 10 Subtraction Spinners BLM and solve the subtraction problem shown on the 2 spinners. Have students subtract the number spun on the second spinner from the number spun on the first spinner.

**Activity 11: Adding and Subtracting on a Number Path (CCSS: 1.OA.1, 1.OA.3, 1.OA.4, 1.OA.5, 1.OA.6, MP.7, W.1.8)**

Materials List: beans, Number Path BLM

Addition:
Give students this problem. Betty Bunny hopped to stone 7 and then hopped 6 more stones. On which stone did she stop? Write 7 + 6 = _____ on the board. Demonstrate using a number path to solve addition problems. Have the students start at the seven on the number path and make 6 jumps forward on the number path. The bean will be on the 13. Since students have learned to make use of 10, some students may jump 3 to 10, and then jump 3 more to 13.

Using a number path is also a good way to reinforce the commutative property. Have students work in pairs. Give one student the problem 4 + 7 = and another student the problem 7 + 4 =. Have them both use the number path to add and ask them where they both land on the number path. (on 11) Provide practice with additional addition facts.
When the students have had practice explaining how to solve addition problems using a number path, use *RAFT* (view literacy strategy descriptions) writing with them. *RAFT* writing is used after students have acquired new content information and concepts to help them rework, apply, and extend their understandings. RAFT is an acronym that stands for:

R – Role (role of the writer)
A – Audience (to whom the RAFT is being written)
F – Form (the form the writing will take, as in letter, song, etc.)
T – Topic (the subject focus of the writing)

In this RAFT, the students will write a letter to someone (the principal, a parent, or a friend) explaining to him/her how to use a number path to solve addition problems. They will write to this prompt:

Dear _____

Today we learned how to use a number path to solve addition problems. Here is how to solve the problem 8 + 4 using this tool.

_____

Your friend,

_____

Have students share their letters with the class while students listen for accuracy. Clarify any misconceptions and inaccuracies as needed. For homework, have them explain this strategy to two people in their home.

Subtraction:
Give students this problem. Buster Bunny started on stone 16 and hopped back 7 stones. On which stone did he stop? Write 16 – 7 = _____ on the board. Demonstrate using a number path to solve subtraction problems. Have students start at the 16 and make 7 jumps backwards on the number path. The bean will be on the 9. Because students have just had experience with using tens, some students may jump back 6 to get to 10 and then jump back 1 more to get to 9.

Provide practice with additional subtraction facts. Have students complete a second *RAFT* explaining how to use the number path to solve subtraction problems.

Dear _____

Today we learned how to use a number path to solve subtraction problems. Here is how to solve the problem 14 – 6 using this tool.
_____

Your friend,
_____

Subtraction - Counting Up:
Give students this problem, Bugs Bunny was on stone 8 but wanted to be on stone 15. How many stones must he hop? Have students solve the problem using their number path. Ask students how they solved the problem. (counting up from 8 to get to 15; counting down from 15 to 8; counting up to 10 and adding 5 to the 2; or counting back or knowing that 15 less 5 is 10 and counting back 2 more for 7) Write 8 + ? = 15 and 15 – 8 = ? on the board. Ask students which number sentence they think goes along with the story they just solved. Discuss with the class how both of the number sentences tell about the story. Explain that by counting up from 8 to get to 15, they solved both problems. Have students practice counting up using the number path.

**Activity 12: Number Family Dominoes (CCSS: 1.OA.3, 1.OA.6, MP.7)**

Materials List: double-nine dominoes (one set for each student), Domino Fact Family BLM

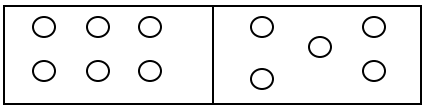
Demo Dominoes can be printed at http://mathwire.com/templates/domflash2.pdf and http://mathwire.com/templates/dominoflashcards.pdf

Student Dominoes can be printed at
http://lrt.ednet.ns.ca/PD/BLM/pdf_files/number/dominoes.pdf
Copy the dominoes on card stock and laminate, if possible, for added durability before cutting apart. Color coding each set somehow will help in keeping sets together.

Display the domino that shows 7 and 5 to the whole group. Ask students to tell the value of the domino. (12) Remind students that four different math facts can be written using this domino, two addition facts and two subtraction facts. Review the term "Fact Family." As a class, write

the two addition facts for the domino 7 + 5 = 12 and 5 + 7 = 12. Demonstrate the commutative property by turning the domino to show 7 + 5 = 12 and 5 + 7 = 12. Discuss with the class how the value of the domino does not change. As a class, write the two subtraction facts for the domino 12 – 7 = 5 and 12 – 5 = 7. Demonstrate the subtraction facts by covering one side of the domino to represent the unknown part.

Hand out a set of double-nine dominoes and a copy of the Domino Fact Family BLM to each student. Have students choose one domino from their set to use to complete the Domino Fact Family. Have students draw the dots to represent their domino on the BLM and then write the facts that can be made using the domino.



6 + 5 = 11

5 + 6 = 11

11 – 5 = 6

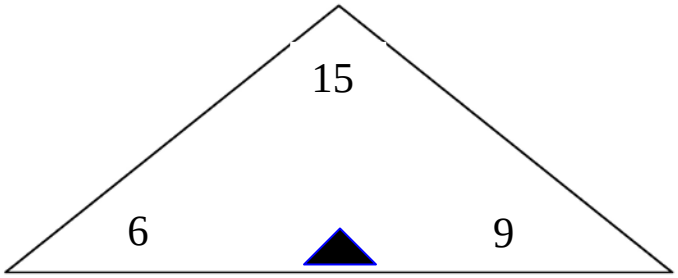
11 – 6 = 5

Allow students to work at their own pace by checking their BLM when complete and giving students a new sheet to use with a new domino.

**Activity 13: Practice for Facts (CCSS: 1.OA.3, 1.OA.6, MP.2, MP.7, MP.8)**

Materials List: Triangles BLM, triangle flashcards, baggies, Fact Strategies Word Grid BLM

*Teacher Note: Triangle flashcards were used in Activity 10 in Unit 2. This activity is similar to that activity. It can be used to provide practice for the facts with sums greater than 10. These flash cards, and the ones created in Unit 2 for the facts with sums less than and equal to 10, should be used all year to help students master the basic addition and subtraction facts.*




Provide students with enough triangles to make flash cards for these facts. Consider spending one day making the flash cards for facts that add to 11, 12, and 13 and a second day for making cards for facts that add to 15, 16, 17 and 18. While making the cards, ask students if a fact is a doubles fact, a near doubles fact, or a Friendly 10 fact. Some facts could fall into more than one category. The fact 7 + 8 could be thought of as a near doubles fact by thinking of 7 + 7 + 1 or as a Friendly 10 fact, by thinking 7 + 3 + 5 or 5 + 2 + 8. Have students discuss their thinking.

Use the flashcards to practice the facts.

- For many children, it may be better to focus on the quantities represented by the numerals than just focusing on the numerals themselves. Have students make up a simple story problem for each card.
- Practice by reading the flashcards
  - 5 and 9 make 14, 6 and 6 make 12, etc.
  - 16 is made with 7 and 9, 11 is made with 6 and 5, etc.
- Missing part: Have students work in pairs. Have Student 1 hold up a triangle with one corner (addend) covered. Have Student 2 name the missing number. Have students write number sentences to go with each problem.
- Practice missing whole: Have Student 1 cover the top number (the whole) and ask, "6 and 7 make what number?" Have Student 2 find the whole.
- Practice missing part: Have Student 1 cover one of the bottom corners and ask, "8 and what number make 13?" or "13 is made of 8 and what number?"
- Have students write the fact families that go with each triangle. Fact families show the relationship between addition and subtraction.
- Draw the number bond that goes with each triangle.

Have the students store their triangles in baggies for later use. Repeat this activity, creating triangles for other numbers.

This activity uses a modified *word grid* (view literacy strategy descriptions). A *word grid* is useful when introducing important related terms and concepts. Students are able to analyze similarities and differences of the features of key vocabulary. Display the Facts Strategies Word Grid BLM. Guide the students in completing the first 2 rows of the grid. Have students discuss the strategies with partners and identify which strategies would be helpful in solving the given facts. Allow students to complete the rest of the grid using the given facts. Provide guidance as needed. Allow students to add other facts to the grid as they finish.

For each fact given in the grid, students will decide which strategies could be used to help solve the fact.

Fact Strategies

| Facts | Friendly 10 | Doubles | Near Doubles | Number Path |
|---|---|---|---|---|
| 6 + 5 | Y | N | Y | Y |
| 8 + 5 | Y | N | N | Y |
| 7 + 7 | Y | Y | N | Y |
| 9 + 2 | | | | |
| | | | | |
| | | | | |
| | | | | |

After the grid is completed, lead a discussion about how the facts are the same and different. An example might be, "How many facts can be solved using Friendly 10? Which facts are doubles facts?"

Save the *word grids* as a strategy reference throughout the unit.

**Activity 14: Drawing Story Problems (CCSS: 1.OA.1, MP.2, W.1.8)**

Materials List: Drawing Story Problems BLM, Drawing Story Problems Work Page BLM, Types of Word Problems (teacher reference)

*Teacher Note: This activity can be used with the different types of story problems introduced in Unit 2, see Types of Word Problems BLM.*

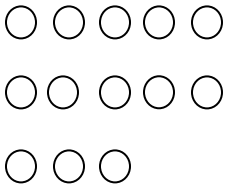
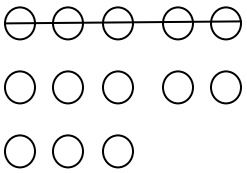
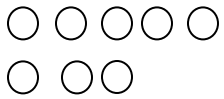
This activity uses modified *GISTing* (view literacy strategy descriptions)**.** *GISTing* is a strategy that guides students when summarizing. When *GISTing* a paragraph, students are limited in the number of words that can be used to retell the information. This limit forces students to think about the most important information in the paragraph. This strategy can be used in math when solving word problems. Students can use this strategy to focus on the important information for solving the problem.

The *GISTing* strategy is modified in this activity because the students are going to draw pictures for each step of the story problem. During this strategy, guide students to focus on the information that is needed to solve the problem. The drawing in each box should focus on the stated information in each sentence in the problem.

Display the following story problem: "Mom has 13 really yummy candies. She gives 5 to you for being good in school. How many candies does mom have left?"

Hand out the BLM. Guide students in completing the pictures for the story problem. As you model for students, remind them of how the organization of a tens frame helps with quick

counting. Spacing or placing their drawings as if in a tens frame makes it easier to count the items.

| A | B | C | D |
|---|---|---|---|
|  |  |  | 13 – 5 = 8 |

Box A: The first sentence says, "Mom has 13 really yummy candies." What is the important information in this sentence? (number of candies) Let's draw mom's candies in box A.

Box B: The next sentence says, "She gives 5 to you for being good in school." What is the important information in this sentence? How can you show this in box B. (Draw mom's candies and cross out the ones she gives you.)

Box C: How many candies does mom have left? Draw 8 candies.

Box D: Write number sentence for this problem. 13 – 5 = 8

Remind students that the purpose of the pictures is to help solve the problem. Decide on a class symbol (circles) that will be used to draw the items so the focus is not on the picture but on the problem. Continue to practice with other types of story problems using the problems from the Drawing Story Problems Work Page BLM, guiding the students as needed. Give students a blank copy of the Drawing Story Problems BLM for each problem that is to be solved. Keep extra copies of the Drawing Story Problems BLM in the class to be used with other story problems when time permits.

**Activity 15: Comparison Subtraction (CCSS: 1.OA.1, MP.2, MP.7)**

Materials List: cubes, Comparison Problems BLM, Comparison Problems with Answers BLM

This activity introduces the idea of comparative subtraction (comparing two amounts and finding the difference.) This concept is more difficult to understand than take-away or part-part-whole subtraction. This concept will be revisited again in other units.

Have the class line up with boys in one line and girls in the other line. Have them spaced so that each boy is directly across from a girl. There will probably be either extra boys or girls. Count the number of boys/girls and determine how many more/fewer people in the shorter/longer line would be needed to make the lines equal. Explain that this amount is the DIFFERENCE between the 2 lines. Next, represent the two lines with cubes and discuss the difference and how to find it. Record it as a number sentence.

Ask, "Which number is greater, 5 or 8?" When 8 is identified as the greater number ask, "How much greater is 8 than 5?" Model how to find the answer using cubes. Have students build one tower using 5 cubes and another tower using 8 cubes. Have students compare the towers and find how many more cubes are used to represent 8 than to represent 5. (Students can do this by placing the towers side by side and seeing how many cubes go past the top of the tower of 5.) When students have identified that 8 is 3 more than 5, show how to write the number sentence 8 – 5 = 3 to represent it. Ask, "How many fewer is 5 than 8?" Have students compare the towers again, this time focusing on how many fewer blocks were needed to build a tower of 5. When students have identified that 5 is 3 fewer than 8, write the number sentence 8 – 5 = 3. Point out that the number sentence is the same in a comparing problem as when finding out how many more or how many less. Compare two or three other pairs of numbers that same way.

Hand out the Comparison Problems BLM to each student. Have students practice solving comparison problems using cubes. For each problem, have the students represent the sets as towers (or trains) of cubes and compare the towers/trains to find the difference. Have students draw their towers and write the subtraction sentence for each problem

**Activity 16: Big Top Math (CCSS: 1.OA.1, 1.OA.2, MP.2)**

Materials List: dry erase boards, dry erase markers, *Animals on Board* by Stuart J. Murphy, Big Top Math BLM, Big Top Math Word Problems BLM, counters

This activity uses *DL-TA – directed learning-thinking activity* (view literacy strategy descriptions). *DL-TA* invites students to make predictions and check their predictions during and after learning. This strategy teaches students to self-monitor comprehension as they read and learn.

In the book, *Animals on Board*, a truck driver and her dog add up animals as they drive by.

Before reading:
Show students the front cover of the book. Read the title. Ask "What/who they think the story will be about?" Discuss what they know about animals. Give each student a dry erase board and dry erase marker. Explain that the main character is going to see different amounts/numbers of animals throughout the story and the boards and markers will be used to write number sentences describing what the character sees.

During reading:

- Stop reading as each type of animal passes by the narrator. Have students write a number sentence describing what is happening in the story before sharing the number sentence in the book. For example, on pages 7 and 8, Jill sees tigers, first a truck with 3 tigers and then a truck with 2 more. Have students write the number sentence telling how many tigers in all (3 + 2 = 5) before showing the number sentence on page 9. Do the same for the swans, frogs, horses, and pandas.
- On pages 30 and 31, have students identify the animals listed on the page. Guide students in writing a number sentence showing how many animals are on the merry-go-

round in all. 5 + 7 + 8 + 10 + 9 = 39. Students may need to see a model with a manipulative in different colors, e.g., unifix cubes: 3 blue cubes + 2 yellow cubes + 8 green cubes. Ask, "How many cubes in all?" Discuss with the class how this addition sentence is different from the ones they wrote on their dry erase boards. Explain that the number of addends (parts) in an addition sentence is not limited to two numbers and that the plus sign can be used as many times as needed to join the parts.

After reading:
Give each student a copy of the Big Top Math BLM and some counters. Display the word problem: "There are 4 lions and 3 tigers in the circus tent. How many animals are in the circus tent? Have students use their counters to solve the problem. As a class, write the number sentence 4 + 3 = 7.

Display the word problem: "There are 3 lions, 4 bears, and 2 horses in the circus tent. How many animals are in the circus tent?" Have students use their counters to solve the problem. (9 animals) Ask, "Can you write a number sentence for this problem?" Guide students in writing 3 + 4 + 2 = 9.

Continue to practice adding 3 numbers using the word problems on the Big Top Math Word Problems BLM. Have students explain how they solved each problem, demonstrating if possible.

Have students make up other story problems for their classmates to solve.

**Activity 17: Adding Three Numbers (CCSS: 1.OA.3, 1.OA.6, MP.7)**

Materials List: counters, number path, Single Digit Number Cards BLM

*Teacher Note: Students may need counters or a number path to solve the problems in this activity. Also, when writing unknowns for students, use a* ☐ *or* △. *A question mark has been used in the text below to avoid issues with graphic spacing.*

Display the problem 2 + 3 = ? and have students solve the problem.

Display the problem 2 + 3 + 4 = ? Ask how this problem is the same as the problem they just solved. (Both have 2 + 3.) Explain that when adding three numbers, the problem is broken down into 2 parts. The first two numbers, 2 + 3, are added to get 5 and then the last number, 4, is added to 5. The answer is 9. Display the problem 1 + 4 + 3 = ? on the board. Show how to break the problem into 2 parts. Have students add the first two numbers, 1 and 4 to get 5 and then add the third number, 3, to 5 to get an answer of 8. Tell students that they could add 4 and 3 first to get 7 and then add 1 to 7.

Continue with additional problems as needed. This is very important! To get this idea across to students, have them use different colored cubes to represent each numeral; have them arrange the cubes one way, write a number sentence and add. Have them then rearrange the colors in a

different order, write the number sentence and add. Continue until all combinations of addends have been made.

Display the problem 6 + 3 + 7 = ? and have students solve the problem. Students could add 6 + 3 to get 9 and then add 9 + 7 to get 16. Or students could add 3 + 7 to get 10 and then add 6 to 10 to get 16. Ask students which was easier to do. Have students model the methods used and explain why they added the way they did. Tell them that they need to look at a problem and decide which numbers are easier to add first.

Hand out a set of Single Digit Number Cards to each student. Have students choose 3 cards and write the addition sentence for the cards and then solve the number sentence. For example, a student picks 6, 4, and 6. Some students may write 6 + 4 + 6 = 16. They are probably thinking of making a ten. Other students may write 6 + 6 + 4 = 16. They are probably thinking about doubles. It is important to have students discuss their strategies. Have the student put all three cards back into the pile and choose three new cards. Allow students to use counters and number paths as needed to solve the problems.

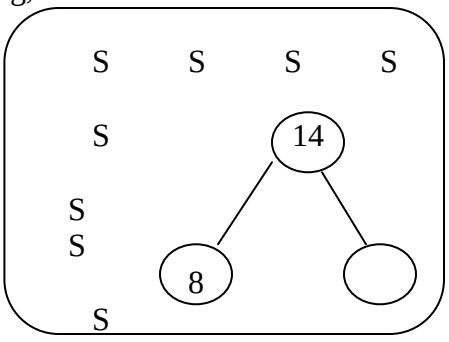
**Activity 18: Changing Subtraction to Addition (CCSS: 1.OA.4, 1.OA.8, MP.2, MP.7, SL.1.1)**

Materials List: paper, pencil, dry erase boards, dry erase markers, hoops, wooden dowels, tagboard

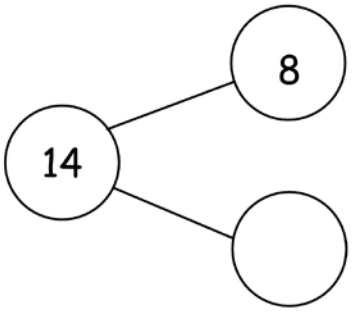
Ask the question, "Can a subtraction fact be turned into an addition fact?" Give students time to think about the question. Let students share their thoughts on this idea. Explain that a subtraction fact can be turned into an addition problem and that this strategy can be used to help solve subtraction problems.

Have students act out the following story problem.
There are 8 students sitting on the rug. Some more students come to the rug. 14 students are now on the rug. How many students came to the rug?

Make the problem really come alive by creating a model of a number bond. Use 3 small hoops, wooden dowels for the lines, and small white boards on which to write numerals to represent counts, e.g., 8 for number of students sitting on the rug, 14 for total number of students in the class. For example:



With help from the students, complete a number bond for this problem.




Place the dry-erase boards in a row to show 8 + ☐ = 14. (Make models of the symbols for +, –, and = on tagboard.)
Ask:

- "Can you write a subtraction problem using this bond?" (14 – 8 = _____ )
- "Can you write an addition problem using this bond?" (8 + _____ = 14)

Have students solve both problems.

Have students continue to change subtraction problems into addition problems using number bonds.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records as well as student-generated products may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction on the weaknesses that continue to persist.
- Have the student use math manipulatives to demonstrate an addition or subtraction story.
- Observe a student acting out addition and subtraction stories to see if he/she understands the difference between the 2 operations.
- Have the student create a story problem which uses addition (subtraction) and draw a picture. Have the student solve the problem and write the corresponding number sentence.

- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student- generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.
- Fluency Assessment – At the end of the unit, assess student fluency (for diagnostic or formative purposes only) in addition and subtraction to 10. Individually assess each student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the amount of time it takes for the student to complete the sheet and the number of errors.
- Assess whether the student is using appropriate mathematical language in speaking and recording an addition or subtraction equation.
- Take time to determine if there is a pattern to the errors a student makes. This will guide in decisions made for addressing this student's misconception.

**Activity-Specific Assessments**

- Activity 3: Assess students' True or False BLM to see if students correctly identified the pairs of facts as equal or unequal.

- Activity 5: Assess to see if students can correctly use the Friendly 10 strategy to add by having them solve addition facts with sums greater than 10 using the strategy.

- Activity 7: Assess to see if students can solve doubles facts by having students solve the problems on the Doubles Practice BLM independently.

- Activity 10: Assess to see if students can correctly use the Friendly 10 strategy to subtract by having them solve subtraction facts larger than 10 using the strategy.

- Activity 11: Provide students addition and subtraction facts and assess to see if they can correctly use a number path to add and subtract.

- Activity 12: Hand out a different double-nine domino to each student and have him/her write the fact family for the domino using the Domino Fact Family BLM.

- Activity 15: Choose one problem from the activity. Individually assess students to see if they can solve comparison problems using cubes.

- Activity 16: Choose one problem from the activity. Have students draw a picture to solve the problem and write the addition sentence that goes with the story problem.

# Grade 1
# Mathematics
# Unit 4: Number and Operations in Base Ten


**Time Frame:** Approximately four weeks

*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit will build an understanding of place value for numbers between 10 and 100.

## Student Understandings

Students will understand place value of whole numbers between 10 and 100. Students will represent numbers as amounts of tens and ones. Students will understand that the two digits of a two-digit number represent the number of tens and ones. Students will compare two two-digit numbers based on the meanings of the tens and ones digits, and will record the results with the symbols >, =, and <.

## Guiding Questions

1. Do students understand that the two digits of a two-digit number represent amounts of tens and ones?
2. Do students understand that 10 can be thought of as a bundle of ten ones – called a "ten"?
3. Do students understand that the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones?
4. Do students understand that the numbers 10, 20, 30, 40, 50, 60, 70, 80, and 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones)?
5. Can students compare two digit-numbers based on the meanings of the tens and ones digits?
6. Can students record the results of comparisons using the symbols >, =, and <?

**Unit 4 Common Core State Standards (CCSS)**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Numbers and Operations in Base Ten** | |
| 1.NBT.1 | Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. |
| 1.NBT.2 | Understand that the two digits of a two-digit number represent amounts of tens and ones. |
| 1.NBT.3 | Compare two two-digit numbers based on meaning of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. |
| **Standards for Mathematical Practice (MP)** | |
| MP.2 | Reason abstractly and quantitatively |
| MP.6 | Attend to precision |
| MP.7 | Look for and make use of structure |
| MP.8 | Look for and express regularity in repeated reasoning |
| **CCSS for ELA Content** | |
| **CCSS#** | **CCSS Text** |
| **Writing** | |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |
| **Speaking and Listening** | |
| SL.1.1 | Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussion (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).<br>b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.<br>c. Ask questions to clear up any confusion about the topics and texts under discussion. |

**Sample Activities**

The first three Suggested Activities in Unit 1 (Straw Count, Number Path Math, and Counting Activities) should be part of the daily routine in every unit and should be used each day that students are in school.

Additionally, students will need continued practice with addition and subtraction facts and strategies within 20 throughout the rest of the units. Students can review the facts and strategies learned in Units 2 and 3 with the use of the triangle flashcards, dominos and number bonds. Addition and subtraction practice should be done daily in small groups or centers.

**Activity 1: Daily Professor (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.7, MP.8)**

Materials List: linking cubes

Do this activity every day as part of the daily counting activities. Make ten sticks by linking ten cubes together. Make sure that there are extra or loose cubes available.

Use a modified *professor know-it-all* (view literacy strategy descriptions) to review the number of the day. Each day after recording the number of days in school, choose a student to represent that number using the ten sticks and loose cubes. If it is day 63, the professor will show six ten sticks and 3 loose cubes. Have all of the students count by 10s (10, 20, 30, 40, 50, 60) and then count on with the loose cubes. (61, 62, 63.) Be sure to give every student the chance to be the *professor-know-it-*all.

**Activity 2: Building Bean Sticks (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.7, MP.8)**

Materials List: beans, craft sticks, glue, zipper bags

Give each student 100 beans, 10 craft sticks, and liquid glue. Have students glue beans to the craft sticks to create tens sticks to be used during the lessons on place value.

Provide each student with correctly spaced beans on a tens bean stick. This will assist with correct placement of beans spread across the entire stick instead of just clumped at one end. Have students count out 10 beans. Have them put a stream of glue along the stick then glue on the 10 beans. Have students continue to glue beans onto sticks until each student has a set of ten sticks. After the sticks have dried, have students put another stream of glue along the top of the beans to keep them from falling off. Note: Do this activity at the end of the day so that the glue has time to dry. When the bean sticks are dry, store them in the zipper bags.

Use the bean sticks to practice counting by ten. Create a classroom chart showing the relationship between the number of tens bean sticks and the decade number.

*Teacher Note: Referring to the bean sticks as "tens bean sticks" will reinforced the idea that each bean stick represents a ten.*

| number of tens bean sticks | Numeral |
|---|---|
| 1 | 10 |
| 2 | 20 |
| 3 | 30 |
| 4 | 40 |
| 5 | 50 |
| 6 | 60 |
| 7 | 70 |
| 8 | 80 |
| 9 | 90 |

Ask what pattern can be seen in the numeral column. (Each number ends in 0.) Explain that because these numbers are made only of groups of 10, there are no left-over ones. Call out a decade number and have students show the correct number of bean sticks. Post the chart to be used as a reference.

*Teacher Note: Save the bean sticks and loose beans to model 2-digit numbers later.*

**Activity 3: Tens and Ones (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.7, MP.8, SL.1.1a, SL.1.1b, SL.1.1c)**

Materials List: color tiles or cubes, straws, Place Value Cards BLM (2 pages)

*Teacher Note: Prior to this lesson, copy the BLM on card stock and cut apart the cards.*

Display 26 color tiles and have students count them as the tiles are arranged loosely into rows of 5 with some left over. Move the tiles in the first two rows closer to each other to show that ten tiles form one set. Write the word "ten" by the set. Ask students why they think that the tiles are being put into groups of 10. (We just counted by tens; counting by tens is easy, etc.) Do the same for the next two rows of tiles. Again write the word "ten" next to the set. Write the word "ones" next to the loose tiles. Ask students how many tens there are. (2) Ask students how many leftover ones there are. (6) Ask students how many tiles there are altogether. (26) Ask students how they could explain to someone else how the 26 tiles are grouped. (26 ones can be grouped as 2 tens and 6 ones.) Repeat this process with different amounts of tiles between 20 and 99.

Put 32 straws in a pile. Ask a student to count the straws aloud. Ask three students to take 10 straws each from the box. Give each student a rubber band to put around his/her bundle of ten straws. Ask several other students to check whether each bundle contains ten straws. Have one student count aloud both the number of bundles and the number of leftover straws in the box. Ask students to tell what they notice about the number of straws. Did the amount/number of straws change when they were put into groups of 10? Ask students to display the two place-value cards that represent the number of straws in bundles and the leftover amount/number. Students should show the "30" card and the "2" card. Tell them that they have 30 straws plus two more straws. Overlap the two cards to form the numeral 32. Display 30 + 2 = 32. Ask students what the 3 in 32 represents and what the 2 in 32 represents. (30 ones or 3 tens; 2 ones) Give students other numbers to represent with the straws and the place value cards.

Use fishbowl *discussion* (view literacy strategy descriptions). A small group of students are asked to discuss a topic while another group of students look on. The idea of the fishbowl is that the outer group of students must listen to the conversation but not contribute. At some point, those in the outer group are given the chance to discuss the conversation in the fishbowl. Both groups can then share their thoughts about the discussion.

Place four students in a center group. Have the remaining students form a circle around the center group to watch and listen. Give the fishbowl group a set of tiles (or straws). Have the students arrange them into groups of tens and ones and choose the correct place value cards to represent the amount/number of tiles. Have students in the fishbowl discuss their reasoning for

choosing the place value cards. Bring the whole class together to discuss the arrangement of the tiles and the place value cards. Choose another group of students to be in the fishbowl and give them another set of tiles. Continue with the activity until all students have had a chance to be in the fishbowl.

Have students return to their desks and work in pairs to make other numbers using the tiles and the place value cards.

**Activity 4: The Place Value Board (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.7, MP.8)**

Materials List: Place Value Board BLM, bean sticks from Activity 1, loose beans, chart paper, markers, Place Value Cards BLM (2 pages), linking cubes

*Teacher Note: Either copy the Place Value Board BLM on card stock and laminate it or place it in a clear plastic sleeve/paper protector. The protector can serve as a "white board" and can be written on with a dry-erase marker and easily wiped clean with a tissue.*

Work with the entire class to create a *graphic organizer* (view literacy strategy descriptions) *w*ith three columns labeled *tens and ones, expanded form, and numeral.*
Discuss with the students that the chart shows different ways to represent the same number. In the first column, the number is represented by the tens and ones, in the second column the number is represented in expanded form, and in the third column the number is represented by a numeral. Explain that expanded form shows the value of a number using addition.

Have students take 23 linking cubes and find a way to display them on the Place Value Board. Lead them to put 10 of the cubes together and put the 1 tower of 10 in the tens column. Lead them to put 10 more cubes together and build a second tower of 10. This should be placed in the tens column. Ask them to describe what is on the mat. (2 towers of 10 and 3 loose cubes.) Tell them that they could write this as 2 tens and 3 ones. Show the expanded form of 20 + 3 and have students explain how these two ways of writing the number names are the same number. (2 tens is the same as 20.) Display the place value cards showing 20 and 3. Move the 2 cards together, place the "3" card on top of the 0 in the "20" card to show that 20 + 3 is equal to 23. Give students other amounts/numbers, such as 34 cubes, to represent on the chart.

| Tens and Ones | Expanded Form | Numeral |
|---|---|---|
| 2 tens and 3 ones | 20 + 3 | 23 |
| 3 tens and 4 ones | 30 + 4 | 34 |
| etc. | | |

Now, give students a written numeral such as 52 to see if they can change it to the number of tens and ones and to the expanded form. Display the numeral 52 and have students represent (or display) that number with whatever materials they are using on their Place Value Boards. Have them fill in the chart. They should show 5 tens and 2 ones, 50 + 2, and finally 52. Ask them to explain how all of these show or express the same number. Continue to give other numbers for the students to model.

Once the chart is completed, allow students to quiz each other on building two-digit numbers using bean sticks, loose beans, and the Place Value Board BLM in preparation for tests and other class activity.

Display the numeral 40. Ask students how they could display the number 40 on the Place Value Board using the bean sticks. Explain that since 40 is made of 4 groups of ten and 0 ones, the 4 bean sticks are placed in the tens column of the Place Value Board and no beans are placed in the ones column. Display other decade numbers and have students represent the numbers on the Place Value Board using bean sticks.

Display the numeral 47. Ask student how they could display this number on the Place Value Board. Ask them if they could use only their tens bean sticks to show the number 47. (Students should point out that the number 47 has a 7 in the ones place meaning loose beans will be needed to show this part of the number.) Have students represent the number using 4 beans sticks in the tens column and 7 loose beans in the ones column. Give students other numbers to model on the Place-Value Board.

**Activity 5: Place Value Practice (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.7, MP.8)**

Materials List: Place Value Practice Numerals BLM, Place Value Practice Expanded Form BLM, bean sticks and beans from Activity 2

The activities listed can be used to practice place value in whole group, small group, or center settings.

- Place Value Match – Cut apart the cards on the Place Value Practice Numerals BLM and the cards on the Place Value Practice Expanded Form BLM. Students can use these cards to play a matching game, either individually or with partners. Students match the numeral to the correct expanded form.
- Place Value Go Fish – Cut apart the cards on the Place Value Practice Numerals BLM and the cards on the Place Value Practice Expanded Form BLM. Have students play a Go Fish type game where the goal is to match the numeral to the expanded form. For example, a student with the number 32 would ask another player for the card 30 + 2 to make a match.
- Bean Sticks – Use the cards from the Place Value Practice Numerals BLM and the beans sticks and beans from Activity 1. Have students choose a numeral card and show that number using bean sticks and loose beans.

- Base Ten Concentration – Students play a concentration type game where they match the numeral to a pictorial representation showing tens and ones. Materials can be found at http://www.k-5mathteachingresources.com/support-files/2digitbase10concentration.pdf.
- Online Tens and Ones Game – Students type in the numeral that matches the tens and ones shown at http://www.dositey.com/2008/addsub/tenoneex.htm.

**Activity 6: More or Fewer (CCSS: 1.NBT.1, 1.NBT.2, 1.NBT.3, MP.2, MP.6, MP.7, MP.8)**

Materials: More or Fewer BLM, More or Fewer Spinners BLM, bean sticks, bobby pins, sharpened pencils

*To use the spinners, have students place the closed end of a bobby pin in the center of the spinner and hold a sharpened pencil (point down) inside the closed end. Students will spin the bobby pin around the pencil.*

Have students work in pairs. Using the More or Fewer Spinners BLM, have each student spin for a number.

Have students use bean sticks to represent the numbers spun. Students should decide which set of beans shows more and which shows fewer and place the bean sticks on the correct plate of the More or Fewer BLM. Have Players say a comparison statement. For example, "30 is more than 20" or "20 is fewer than 30."

Have students remove the bean sticks and spin again. Ask students what they should do if they both spin the same number. Since the numbers are equal, they cannot be placed on the sheet, so the students should spin again. When this happens, the students announce, "No beans for lunch!"

**Activity 7: Comparing Two Numbers (CCSS: 1.NBT.1, 1.NBT.2, 1.NBT.3, MP.2, MP.6, MP.7, MP.8, W.1.8)**

Materials List: index cards, pan balance, bean sticks, place value cards, Comparing Numbers Anticipation Guide BLM

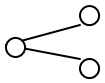
Hand out the Comparing Numbers Anticipation Guide BLM. An *anticipation guide* (view literacy strategy descriptions) is a list of statements about a topic that students respond to prior to instruction on a topic. *Anticipation guides* can activate prior knowledge and allow for pre-assessment of student understanding of a topic. *Anticipation guides* are especially useful for struggling and reluctant readers and learners as they increase motivation and help students focus on important information. Have students respond to each statement by circling yes if they agree with the statement and no if they do not. After the lesson is completed, allow the students to revisit their anticipation guide to see if they want to change their original answer. Be sure to check that all students' final *anticipation guide* responses are correct.

*Teacher Note: Use the students' original response sheet as formative assessment to determine who may need additional help with this topic.*

Write two, one-digit numbers on the board. Ask students which number is greater. Ask students which number is less. Ask how they know which is the greater number. Have a student demonstrate using a pan balance. Repeat the comparison with several other pairs of one-digit numbers. Introduce the symbols for greater than and less than. Have students write the symbol for greater than on an index card. Demonstrate how the index card can be turned to show the is less than sign. Explain that the pointer of the symbol points toward the smaller number.

Students often have trouble remembering in which direction the greater or less than symbol points. The idea of an alligator mouth is a visual representation which can help students remember the direction of the signs. Using the alligator does not help them understand the concept of comparing, it simply helps them remember the direction of the signs. The alligator mouth opens toward the bigger number. The alligator wants to eat the bigger number. Students can also use their arms to show the symbols. Their arms would open to the larger number.

Another visualization tool to help students remember which direction the greater or less than symbol points is to draw dots on the symbol. Have students draw one dot on the point of the V and one dot on the end of each "arm" of the V. Have students place the V so that the ONE DOT is near the smaller/lesser side and the TWO DOTS face the greater/larger number.

23  46, Have the students draw the dots rather than drawing the dots for them.

Compare two one-digit numbers using the pan balance. For example, for the numbers 4 and 8, have students place 4 cubes on one side of the balance and 8 cubes on the other. The side that goes down shows the greater number. It shows that there are more cubes on that side or that 8 is greater than 4. Repeat with several other pairs of single-digit numbers.

Display the numbers 30 and 70. Ask students which number is greater. Ask students which number is less. Ask students how they know. (Some will say that 30 is only 3 bean-sticks and that 70 is 7 bean-sticks, so 30 is fewer beans than 70. Some may say when skip counting by tens, 30 comes before 70 so 30 it is the smaller/lesser number. Some may say that 30 is 3 tens and 70 is 7 tens, so 30 is less than 70.) Have students use a pan balance and bean sticks to check. Have a student place 3 bean sticks on one side of the balance and 7 bean sticks on the other side. Before the bean sticks are placed, ask students how they will know which number is larger. (The side with the greater number will dip down and that will be the greater number.) Repeat the comparison with several other pairs of two-digit numbers.

Display two two-digit numbers that have the same tens digit such as 23 and 27. Ask students which number is greater. Ask students which number is less/fewer. Ask them to explain how they know. They can use the bean sticks, the pan balance, the place value cards, words or symbols to explain how they know. Focus on the fact that the tens digit is the same; they both have 2 tens. Students must now look to the ones digit to decide which number is greater or lesser.

Display a two-digit and a one-digit number and ask which number is lesser and how do they know. For example, display 9 and 13. Have students use the Place Value Board to display both numbers. They should see immediately that 9 has no tens and 13 has 1 ten, so 9 has to be smaller. Continue giving students other pairs of 1- and 2-digit numbers to compare.

Display two 2-digit numerals and ask which number is smaller and how they know. For example, display 25 and 19. Have students use the Place Value Board to display both numbers. They should see immediately that 25 has 2 tens and 19 has 1 ten, so 19 has to be the lesser, even though 9 ones is greater than 5 ones. Students need to understand when comparing two 2-digit numbers they need to look at the tens place first. If the ten-digit is the same, then they need to look at the ones digit. The place value cards can help with this. For 25, they would use cards 20 + 5 and for 19. They would use cards 10 + 9. This will help them to see that 20 > 10, therefore 25 > 19.

When the students have had practice using the symbols for greater than and less than, use *RAFT* (view literacy strategy descriptions) writing with them. *RAFT* writing is used after students have acquired new content information and concepts. It helps them rework, apply, and extend their understandings. *RAFT* is an acronym that stands for:

R – Role (role of the writer)
A – Audience (to whom the RAFT is being written)
F – Form (the form the writing will take, as in letter, song, etc.)
T – Topic (the subject focus of the writing)

In this RAFT, the students in the role of themselves will write a letter to someone (the principal, a parent, or a friend) telling him/her what they have learned about using symbols to represent greater than and less/fewer than. They will write to this prompt:

Dear _____

Today we learned about the symbols for greater than and less than. With the numbers 36 and 24, the symbol > means _____. With the numbers 17 and 54, the symbol < means _____. This is how we use the symbol:

36 _____ 24

17 _____ 54

Your friend,
_____

Have students share their letters with the class. For homework, have them explain what they think about comparing any two numbers to two people in their home.

**Activity 8: Guess My Number (CCSS: 1.NBT.1, 1.NBT.2, 1.NBT.3, MP.2, MP.8)**

Materials List: paper, pencil, dry-erase board, markers, 100s chart, red cubes, blue, cubes, yellow cubes

In whole group, write a numeral on a slip of paper making sure to keep it a secret from the students. Give students one clue. Have the students write their guesses on their dry-erase boards. Continue to give clues, allowing the students to change their guesses. For example, if the number is 39, say things similar to the following in response to student guesses:

My number is less than 50.
My number is larger/greater than the number that you said.
My number has two digits.
My number has three tens.

When the students are ready, have them play the game with a partner.

Guess My Number example:

- Player 1 turns his/her back to his/her partner, writes a two-digit number on a slip of paper, folds the paper, and puts it away.
- Player 1 gives a first clue – My number is more than/less than 50.
- Player 2 guesses a number.
- Player 1 gives clues to help the partner guess the number, saying:
    - My number is larger/greater than that number.
    - My number is smaller/less than that number.

Continue the game with players reversing roles.

For a similar activity, it is also fun to play this game on a hundreds chart. Students can then see what numbers they have already tried. The guessing partner will need a 100s chart and red, blue, and yellow cubes. The activity proceeds as above. Have Player 1 chooses a mystery number and gives the first clue, "My number is more than/less than 50." Have Player 2 guess a number and use the cubes to mark his/her guess. If the guess is too high, player 2 covers that number on the 100s chart with a red cube. If the guess is too low, player 2 covers that number on the 100s chart with a blue cube. The yellow cube is for the correct number.

Sample game:

- Player 1 chooses a number and says, "My number is more than 50."
- Player 2 covers the number 50 with a blue cube and guesses the number 87.
- Player 1 answers, "My number is less than 87."
- Player 2 covers the number 87 with a red cube and guesses the number 60.

Play continues until Player 2 guesses the mystery number, then the players switch roles.

**Activity 9: Base Ten Riddles (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.8)**

Materials List: Place Value Board BLM, linking cubes, Base Ten Riddles BLM (2 pages), I Have Who Has BLM (2 pages)

In whole group, call out riddles such as these: I have 3 tens and 2 ones. What number am I? (32) Have students model the riddles using linking cubes and Place Value Boards. Continue with other riddles.

Have students work in pairs to match the riddles and numerals from the Base Ten Riddles BLM.

This activity can also be expanded into an "I Have, Who Has?" game to be placed into a center.

**Activity 10: Cover It! (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.8)**

Materials List: red beans, pinto beans or elbow macaroni; Cover It BLM, pencils, Cover It Shapes BLM (3 pages)

Divide the students into pairs and provide each pair of students with a shape from the Cover It Shapes BLM. Explain that students are going to cover the different shapes using a manipulative to practice counting groups of tens and ones. On the Cover It BLM, they should write the manipulative that they used and the letter of the shape. To find the number of red beans, pinto beans, etc. needed, Student 1 will cover the shape with the manipulative until he/she gets to 10. Student 2 will continue to cover the shape with the same manipulative until he/she gets to 10. Students continue until they have covered the shape with manipulatives. Have students count the number of red beans, pinto beans, etc that they used to cover the shape. On the BLM, have them write the number of tens and ones used and the total number of the manipulative. When the two students finish with one shape, have them choose another shape.

There is no "one right answer" for this activity. Some students will push the manipulatives very close together, and others will not be so precise. This doesn't matter because the purpose is to provide practice with counting tens and ones in this activity.

Example of BLM:

| I used red beans to measure. | | |
|---|---|---|
| Shape _A___ | _2_ tens __3_ ones | Number __23__ |
| Shape _C___ | __3_ tens _5__ ones | Number __35__ |
| Shape _____ | ____ tens ____ ones | Number _____ |

**Activity 11: Show Me the Number (CCSS: 1.NBT.1, 1.NBT.2, MP.2, MP.7, MP.8)**

Materials: Spinner BLM , bean sticks and beans, linking cubes, sticky notes, marker, bobby pins, pencils

*Teacher Note:To use the spinners, have students place the closed end of a bobby pin in the center of the spinner and hold a sharpened pencil (point down) inside the closed end. Students will spin the bobby pin around the pencil.*

Have students work in groups of three. The first student spins both spinners on the Spinner BLM and writes the number on a sticky note. Example: Spinner 1 landed on 30 and Spinner 2 landed on 6. The student writes the number 36 on the sticky note. The second student uses bean sticks and beans to represent this number. Example: The student shows the number 36 using 3 bean sticks and 6 loose beans. The third student uses linking cubes to represent this number. Example: The student shows the number 36 using linking cubes, 3 towers of 10 and 6 loose cubes.

Have the group check all of the representations. Have students switch roles and continue to play. Have students keep track of the numbers they created using the sticky notes. If a number repeats, students should spin again.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records as well as student-generated products may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction on the weaknesses that continue to persist.
- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student- generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.
- Fluency Assessment – At the end of the unit, assess student fluency (for diagnostic or formative purposes only) in addition and subtraction to 10. Individually assess each student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the time it takes for the student to complete the sheet and the number of errors. Check for possible repeated error patterns. Use the data to plan further instruction for individual students or small groups.

- Assess that the student is using appropriate mathematical language in speaking and recording place value.

**Activity-Specific Assessments**

- Activity 3: Give the student a set of rectangle cutouts and a set of place-value cards. Have the student arrange the rectangles into groups of tens and ones, find the total number of rectangles, and choose the correct place value cards to represent the number. Have the student explain his/her reasoning for choosing the place value cards.

- Activity 4: Choose 5 two-digit numbers and have the student build each number independently on a place-value board using bean sticks and loose beans.

- Activity 5: Give students a copy of the Place Value Practice Expanded Form BLM and have students write the numeral for each expanded form.

- Activity 7: Assess the student's *Raft* writing for understanding of the symbols for greater than and less than by looking to see if they correctly identified each symbol and used the symbols correctly in their examples.

- Activity 9: Give students a copy of page 1 of the Base 10 Riddles BLM. Have students write the numeral that matches each riddle.

## Resources

**Websites**

- http://www.k-5mathteachingresources.com/support-files/2digitbase10concentration.pdf
- http://www.dositey.com/2008/addsub/tenoneex.htm

# Grade 1
# Mathematics
# Unit 5: Geometry

**Time Frame:** Approximately four weeks


*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit focuses on reasoning about shapes and their attributes. Students will build and draw shapes that possess certain attributes. Students will engage in activities that compose and decompose plane and solid figures. Students will recognize shapes from different perspectives and orientations. Fractions, as equal shares, will be introduced in this unit.

## Student Understandings

Students will identify two-dimensional and three-dimensional shapes based on defining attributes of the shape. Students will use two-dimensional and three-dimensional shapes to compose new shapes. Students will decompose two-dimensional and three-dimensional shapes to create new shapes, with a focus on decomposing circles and rectangles into halves and fourths.

## Guiding Questions

1. Can students distinguish between defining attributes and non-defining attributes?
2. Can students build and draw shapes to possess defining attributes?
3. Can students compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, rhombuses, hexagons, circles, half-circles, and quarter-circles) to create a composite shape, and compose new shapes from the composite shape?
4. Can students compose three-dimensional shapes (cubes, rectangular prisms, cones, and cylinders*) to create a composite shape, and compose new shapes from the composite shape?
5. Can students partition (decompose) circles and rectangles into two and four equal shares?
6. Can students describe the shares of circles and rectangles using the words halves, fourths, and quarters?

7. Can students describe the whole as two of or four of the shares when shapes are partitioned?
8. Do students understand that decomposing shapes into more equal shares creates smaller shares? (involving only halves and fourths at this grade level)

**Unit 5 Common Core State Standards**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Geometry** | |
| 1.G.1 | Distinguish between defining attributes (e.g, triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. |
| 1.G.2 | Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. (Note: Students do not need to learn the formal names such as right rectangular prisms.) |
| 1.G.3 | Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves, fourths, and quarters,* and use the phrases *half of, fourth of, and quarter of.* Describe the whole as two of or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares. |
| **Standards for Mathematical Practice (MP)** | |
| MP.1 | Make sense of problems and persevere in solving them. |
| MP.2 | Reason abstractly and quantitatively. |
| MP.3 | Construct viable arguments and critique the reasoning of others. |
| MP.4 | Model with mathematics. |
| MP.6 | Attend to precision. |
| MP.7 | Look for and make use of structure. |
| **CCSS for ELA Content** | |
| **CCSS#** | **CCSS Text** |
| **Reading Standards for Informational Text** | |
| RI.1.1 | Ask and answer questions about key details in a text. |
| **Writing** | |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |

## Sample Activities

The first 3 activities from Unit 1 (Straw Count, Number Path Math, and Counting Activities) and first activity from Unit 4 (Daily Professor) should be part of the daily routine in every unit and should be used each day that students are in school.

Students will also need continued practice with addition and subtraction facts and strategies within 20 throughout the rest of the units. Students can review the facts and strategies learned in Units 2 and 3 with the use of the triangle flashcards, dominos, and number bonds. Addition and subtraction practice should be done daily in small groups or centers.

Students will use pattern blocks throughout this unit. Create sets of pattern blocks for each student to use by placing at least 6 of each type of pattern block in a zipper bag. If pattern blocks are not available, printable pattern blocks can be found in the Blackline Masters. (See Pattern Block Templates BLM, 4 pages.) Print the pattern blocks on cardstock and laminate for extra durability.

Additionally, 3-D shapes will be taught later in the unit. In order to have enough samples of each shape, send a letter home asking for containers that fit the descriptions of the solid shapes. A letter has been included in the Blackline Masters. (See Family Letter BLM.) Send home this letter at the beginning of Unit 5 in order to have enough examples of the 3-D shapes.

The Common Core State Standards state that students compose right rectangular prisms, right circular cones, and right circular cylinders. Students do not need to learn these formal terms and will do well to use the more common names. The types of solid figures found in most classrooms are right rectangular prisms, right circular cones, and right circular cylinders. A teacher reference page is located in the BLMs explaining the difference between right and oblique shapes. (See Teacher Reference BLM.) Teachers can also go to the following websites to learn more about right and oblique figures.
http://www.icoachmath.com/math_dictionary/Cone.html
http://www.mathopenref.com/pyramidoblique.html
http://www.mathopenref.com/cylinder.html
http://www.mathopenref.com/cylinder.html

### Activity 1: When a Line Bends (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.7, RI.1.1, W.1.8)

Materials List: *When a Line Bends… a Shape Begins* by Rhonda Gowler Greene, extra-long pipe cleaners

The book, *When a Line Bends… a Shape Begins*, describes and gives examples of many two-dimensional shapes, including squares, rectangles, triangles, and circles. Students will have learned the names of these shapes in Kindergarten. The book begins with a description of a line and examples of lines. The line then begins to bend to form other shapes.
This activity uses *lesson impression* (view literacy strategy descriptions). *Lesson impression* creates interest in content to be studied by evoking student curiosity. Students are asked to form an impression of the topic to be covered based on key words from the lesson or text to be

studied. This strategy engages struggling and reluctant readers in that these students want to see how closely their impression matches the actual content.

Display these impression words for this activity: sides, corners, square, and triangle.

Have students write a short passage using the words to make a guess about what will be learned in class. For example, a student might write: "I think we will learn about shapes. *Squares* and *triangles* are shapes. Some shapes are made of *sides* and *corners*."

Have students share their impression with partners, discussing how their impressions were the same yet different. Allow several students to share their impressions with the whole class.

Hand out a pipe cleaner to each student. Read the book to the students, pausing at each description to let the students bend their pipe cleaners into the shape. As different terms are introduced, write the term on the board and give a brief description of the term. For example, describe a side as one of the straight line segments that make up a shape.

*Teacher Note: Although the term "line" is often used with primary students, they are usually drawing a line segment. Relate the word segment to the slices or pieces in an orange (bringing in and pulling apart the pieces). It is not a whole orange until all of the segments are together. A line goes on and on; it is called a line only when all the segments are put together. So when a "line" is drawn, it is really a line segment because the length of a line is not known.* Encourage the students to make straight line segments, not curves with the pipe cleaners. They should also make the corners come to points.

After the book has been read, students should be allowed to return to their impression to identify similarities between their impression and the book.

**Activity 2: Open or Closed (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.7)**

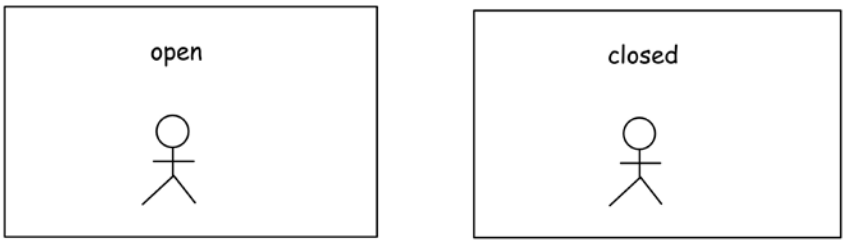
Materials List: red and green pipe cleaners, counters

*Teacher Note: Plane shapes are flat figures. If one places a plane figure on a flat surface, all segments/parts of the plane figure will lie on the flat surface. A closed figure is a plane shape that can be traced with the same starting and stopping points, and without crossing or retracing any part of the figure. Circles and any polygon is an example of a closed figure. The letter* ∪ *is a plane shape, but it is not a closed shape.*

Have students hold hands and form a circle. Stand in the center of the circle and try to get out. Ask, "Why can't I get out of the circle?" Explain that it is impossible to get out because the circle is closed. Have two students drop their hands. Walk through the opening. Ask students why they think that it is now possible to walk out of the circle. Explain that the circle is no longer closed, because as there is an opening in the circle.
Therefore, it is no longer a circle.

Draw a stick picture of a person on the board. Ask a student to draw a shape around the person. Ask if the person could walk out of the shape. Explain that if the person could walk out of the shape, it is an open shape. If the person cannot walk out of the shape, it is a closed shape. Choose two to four more students to draw shapes around the person, asking the class if the student drew an open or closed shape.

Give each student a red and green pipe cleaner and two index cards. Have students label the index cards "open" and "closed" and draw a stick person in the center of each card.




Have students make an open figure using the green pipe cleaner and place the pipe cleaner figure around the person on the card with "open" written on it. Have the students make a closed figure using the red pipe cleaner and place the pipe cleaner figure around the person on the card with "closed" written on it. Ask, "Out of which figure would the person be able to walk?" Repeat the activity several times, creating new open and closed figures each time.

Have students glue their final figures around the people on the index cards.

**Activity 3: Symmetry (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.7)**

Materials List: die-cuts of the following letters: A, H, M, U, P, G, F, S, or Letters BLM; zipper bags; die-cuts of the following shapes: square, rectangle, circle, triangle, hexagon, trapezoid or Symmetry BLM; pattern blocks; paper

Prior to the lesson, use a die-cut machine to make zipper bags filled with the following letters, A H M U P G F S, for each student. If a die-cut machine is not available, use the Letters BLM. The letters will need to be cut out carefully to maintain the ability to fold and find the symmetry. Perhaps ask an older student or parent helper to do the cutting. It is important that each student have his/her own set to practice folding.
Hand out a zipper bag of letters to each student. Have students remove the letter ☐ from the zipper bag. Guide students in folding the letter A in half (side to side). Provide assistance to students who need help folding their letters. Ask students what they noticed when they folded the letter A in half. (It is a fair share. The sides match up. The sides are the same.) Have students fold the rest of the letters in the zipper bag in half (side to side). Ask if there are any other letters like the letter A where letters are exactly the same on each side of the fold. Have students identify these letters. (H, M, U). Explain that the letters can be folded so that the two

halves match exactly have symmetry. The line that divides the letter in half is called the line of symmetry. Ask students to sort the letters into two groups – those that have a line of symmetry and those that do not.

Have students take out the letter H. Ask students if there is another way to fold the letter H to find a second line of symmetry. Have students make different folds to determine that the letter H can be divided in half by a fold that follows the horizontal bar in the letter. Ask students if there are any other letters in the alphabet that have symmetry when folded top to bottom. Let them experiment with the other letters and determine that B, C, D, E, I, K, O, X have horizontal lines of symmetry. Ask students if they can think of a letter other than H with two lines of symmetry (I, O).

Create a class "Symme-Tree" in the class or hallway. Let students place the symmetrical letters on the tree.

Extension: Extend the activity by providing each student with a set of pattern blocks. Explain that each of these shapes has at least one line of symmetry. Have students find the lines of symmetry by tracing the shapes and drawing the lines of symmetry for each shape. These could also be added to the Symme-Tree display.

Center Idea: Have various die-cut shapes or the Symmetry BLM cut-outs available in a center for students to fold to see if the shape is symmetrical. Allow students to add symmetrical shapes to the "Symme-Tree." Students need to see many more examples of symmetrical shapes.

**Activity 4: Sides, Corners, and Angles (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.6, MP.7, W.1.8)**

Materials List: straws, clay, Attribute Shapes BLM (3 pages), Vocabulary Cards BLM, Dot Paper BLM, pattern blocks, index cards

Prior to the lesson copy the Attributes Shapes BLM on the appropriate color paper and cut out the shapes. Only 1 set needs to be cut out for demonstration purposes.

Use the shapes from the Attribute Shapes BLM to display/show the triangles. Ensure orientation of the triangles in different ways/positions. Point to the first triangle and say,"Tell me everything that you know about this shape." Write students' responses on the board. (It is red. It is small. It has 3 sides. It has 3 corners. It is pointy.) If no one says anything about the sides being straight or that the shape is closed, add those attributes to the list of responses. Ask, "Does anyone know the name of this shape?" (triangle) Point to the blue triangle and ask the same questions and write the responses next to the other responses. (It is blue. It has 3 sides. It has 3 corners. It is pointy. It is bigger than the red triangle.) Do the same with the green triangle. Say, "Let's see or figure out what is the same about each of these shapes." With student responses, either connect each word or draw an oval around the first common attribute, a rectangle around the 2nd common attribute, a flat heart (or squiggly line) for the next common attribute, and so on. Through further

questioning, have students point out that the colors and size are not part of the definition for triangle.

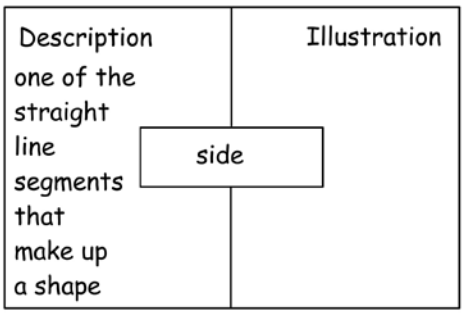
Follow the same procedure for the squares and rectangles. Tell students that they are going to learn a new word today, attribute. An attribute is any characteristic or description that helps describe something, such as a shape or even a person. For example, "I wear glasses." That is one of my attributes. Sally doesn't wear glasses, so that is one of her attributes or something that helps to describe her. "Some of us have straight hair and some of us have curly hair. These are words that help to describe us – they are attributes." Ask, "What are some other attributes we could use to describe the friends in our class?"

Only then move on to say, "We can use this same idea of attributes to describe shapes." Explain to students that some attributes help them define or describe a shape. For example, a triangle can be defined or described as always being closed, having 3 straight sides and 3 corners. If a shape has 4 sides, it is not a triangle. If a shape is open, it is not a triangle. Non-defining attributes are ones that could be used to describe any shape. Triangles do not have to be blue or small.

Have students create *vocabulary cards* (view literacy strategy descriptions) during this activity. *Vocabulary cards* are used to help students develop understanding of content -specific vocabulary. The cards allow students to develop student-friendly definitions or descriptions of the words and connect the words to examples, illustrations, and attributes of the words. Copy the Vocabulary Cards BLM on stock paper and cut the BLM in half horizontally. Distribute the cards to the students.

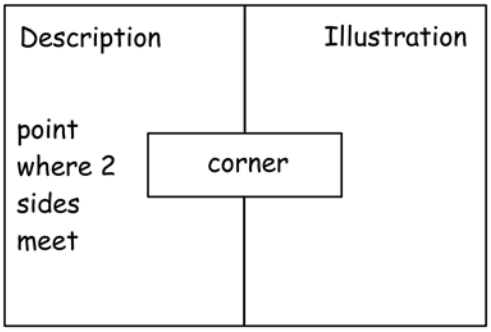
Give each student 4 straws. Have students make a triangle using 3 of the straws. Explain that the 3 straws make up the 3 sides of the triangle. Define side as one of the straight line segments that form a shape. Ask students the number of sides in a triangle (3).

Have students add the fourth straw and make a square. Ask students how many sides the square has (4). Guide students in completing the *vocabulary card* for the term side. Possible Illustration – Students may draw a triangle or a square with an arrow pointing to one of the sides.



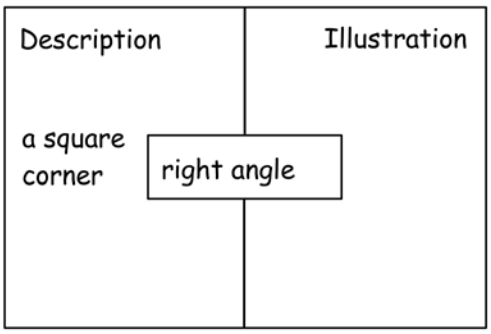

Give each student some clay. Have students use the clay to connect the straws to form a triangle or a square. Explain that the clay represents the corners of the shapes. A corner is formed where two sides of a shape meet. Ask students how many corners a triangle has and how many corners a square has. Guide students in completing the *vocabulary card* for the term corner.

As a possible illustration of a corner of a figure (see below), students might draw a triangle or square with an arrow pointing to one of the corners.




Introduce the word *angle*. Explain that an angle is formed at the corner of a shape where two sides meet. Tell students that some angles are big, some are small, and some are special. Display the large square from the Attributes BLM. Point out an angle in a square. Explain that the angle is called a *right angle*. It looks like an ∟ and it can also be called a square corner. Ask students if they can find other right angles in the room (corner of a rectangular door or window, corner of the teacher's desk). Tell students that right angles are an important attribute of squares and rectangles. Hand out a set of pattern blocks and an index card to each student. Ask students to identify the shape of the index card (rectangle). Explain that the corners of the index card are right angles or square corners. Have students determine which pattern blocks have right angles by lining up the corner of each pattern block with the corner of the index card (square and rectangle). Tell students that they can show angles with their arms. Have students to use their arms to show a small angle, a large angle, and then a right angle.

Guide students in completing the *vocabulary cards* for the term right angle. Possible Illustration – Students may draw a rectangle with a circle around one of the corners.




Have students work as partners to review their *vocabulary cards*. Save the cards for future activities.

Hand out two copies of the Dot Paper BLM to each student. If geoboards have been used, this activity could be done using geo-boards and transferring shapes to the BLM.

Review the vocabulary by asking students to draw shapes possessing certain attributes. For example:

- Draw a shape with 3 sides and 3 corners.
- Draw a shape with 4 sides and 4 corners.
- Draw a shape with 5 sides and 5 corners.
- Draw a shape with 2 square corners. Ask, "How many sides does your shape have?"
- Draw a shape with 3 sides and 1 right angle.
- Draw a shape with 4 sides and only 1 square corner.

(These may be difficult for students who are not strong in spatial skills.)

**Activity 5: The Greedy Triangle (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.6, MP.7, RI.1.1, W.1.8)**

Materials List: *The Greedy Triangle* by Marilyn Burns, rope, *learning log*

This activity uses the book *The Greedy Triangle* by Marilyn Burns. In this book the triangle is unhappy with its shape and keeps adding sides to change into another shape. To begin, just read through the entire book without too many stops along the way. Lead a discussion about what the students heard and saw – what was happening – as the story progressed. Have students write about what happened in the story.

This activity uses *DL-TA – directed learning-thinking activity* (view literacy strategy descriptions). *DL-TA* invites students to make predictions and check their predictions during and after learning. This strategy teaches students to self-monitor comprehension as they read and learn.

Reread the book, completing the following activities:

Before reading:

- Show students the front cover of the book. Read the title. Ask, "What do you remember about this story? What happened in the story? Who is the main character and what was his problem?"
- Have students discuss what they know about triangles.
- Explain that as the story is read again, they are going to act out the changes that happened to the triangle.

During reading: Have students sit on the floor/rug with a large center space open.

- Read the first page of the story. Use a piece of rope (soft clothesline works well) tied into a circle. Ask 3 students to sit outside the rope and each hold a piece of the rope in one hand. They are to stretch the rope to form straight line segments to form the Greedy Triangle.
- Stop reading when the triangle is turned into a quadrilateral. Before having another student join to make another corner, ask "What will happen to the number of sides, the number of corners?" Have another student join the 3 and hold another part of the rope in

one hand. Students need to scoot around to make straight sides. Ask, "What shape has been made? How many sides? How many corners?" It is here that you can discuss the term quadrilateral (quad meaning 4 and lateral meaning sides) and the various quadrilaterals they know from the pattern blocks. Have students shift to form various quadrilaterals. Ask for ideas from the students who are not making the shape. Finally ask, "How did this/these shape(s) change from the previous/last shape?"

- Have students predict what will happen if another person joins the rope group of 4 and holds a piece of the rope?
- Continue to have students predict how the shape would change by adding a student to the shape for several more shapes. Say the name and ask, "How many sides? How many corners? How is each shape changing from the previous one?" (rectangle – 4 sides, pentagon – 5 sides, hexagon – 6 sides, heptagon – 7 sides, octagon – 8 sides, nonagon – 9 sides, decagon – 10 sides) Students do not have to know the names pentagon, heptagon, octagon, nonagon, or decagon. Guide the students to see that each time a new corner (student) is added to the shape, a new side is added. There is no need to go through all the shapes in the "Greedy Triangle.
- As the shape changes, discuss the changes being made. As the shape begins to get more and more sides, the students may try to identify the new shape as a circle. If students do, explain that as more sides are added, the shape becomes circle-like, not that it is not a circle since it still has sides and corners. Tell them that a circle is round and has no straight sides and corners. Students may not see that the shape is approaching a circle.

After reading:
Have students write in their *learning logs* (view literacy strategy descriptions) what happened to the shape each time a new corner was added. Allow students to share with a partner what was written to check for accuracy.

**Activity 6: Parallel Lines (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.7)**

Materials List: geoboards, rubber or geo-bands, Dot Paper BLM, toy train, toy train tracks, pattern blocks

Hand out geoboards and rubber or geo-bands to each student. Prior to the activity, establish some guidelines for use of the bands. Example: bands are to be used only on the boards, bands are not to be worn, bands must be returned at the end of the activity. Give the students time to explore with the geoboards. Encourage students to see what shapes or figures they can create using the geoboards. Free exploration is very important in the use of geoboards. If geoboards are not available, have students draw the figures on the Geoboard Dot Paper BLM. They will need multiple copies.

Have students use 2 bands to make a one line segment at the top of the geoboard and a one line segment at the bottom of their geoboards. Ask the students if the rubber or geo-bands were stretched to go on forever, do they think that these line segments will ever touch or cross. Have students provide reasons for their thinking. Line up multiple geoboards in a row showing the continuation of the line segments. Explain that these line segments are called parallel line

segments and that parallel line segments are found in many shapes. Take out a piece of train track. Roll the train car down the track. Explain that the sides of the track are parallel. They keep going without crossing so the train can keep rolling. Add additional tracks to show the train's movement.

Have students use the two rubber bands to make 2 other line segments anywhere on the geoboard. Start sorting the boards into those on which students formed parallel line segments and those without parallel line segments. After sorting 4 or 5 boards, ask students if they know how the boards are sorted. Have each student place his/her geoboard into the correct category. Have other students check to make sure that each board is placed in the correct category.

On their geoboards, have students make a 4-sided figure in which the top and bottom line segments are parallel. Have students compare the shapes made at their tables. They should see that shapes can have parallel line segments yet still look very different. Remind students that the figures that they made are all called quadrilaterals.

*Teacher Note: They may have made rhombuses, squares, rectangles, trapezoids or parallelograms. First grade students do not have to know the term parallelogram.*

Have students make a figure with the top and bottom sides parallel and the right and left sides parallel and with right angles. They now can only make rectangles and squares. Introduce the idea that a square can be called a square rectangle. Referring to a square as a square rectangle emphasizes that squares are just special rectangles. Discuss that a square is a part of the rectangle family. Both have 4 sides and 4 square corners. A square is a special rectangle because it has both square corners and all of its sides are the same length.

Hand out a set of pattern blocks. Have students trace the pattern blocks to help determine which shapes have sets of parallel sides. (A square, rectangle, rhombus, trapezoid, hexagon all have some parallel sides. The triangle does not.) If a student is struggling to decide if a pair of sides is parallel, reminder him/her to think about the train. Ask, "Could the train travel between those two sides or would it have to stop?" Have students look for other examples of parallel line segments in class and at home.

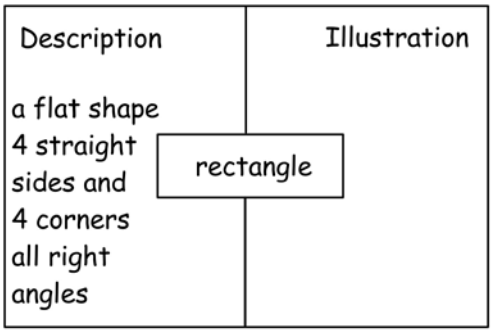
**Activity 7: Shapes and Their Attributes (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.6, MP.7)**

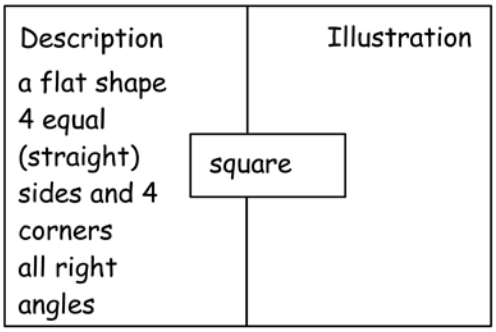
Materials List: Vocabulary Cards BLM, Shapes BLM (2 pages), zipper bags

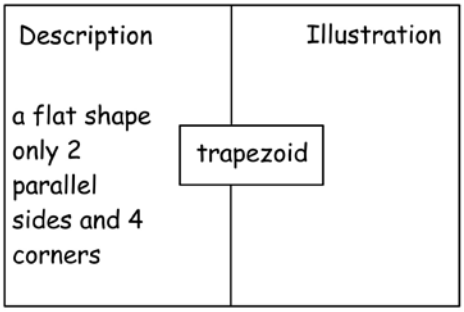
Prior to the lesson, copy a set of Shapes BLM cards on cardstock for each student, cut rectangular cards containing the shapes apart, and place in zipper bags. Copy the Vocabulary Cards BLM on stock paper, and cut the BLM in half horizontally.

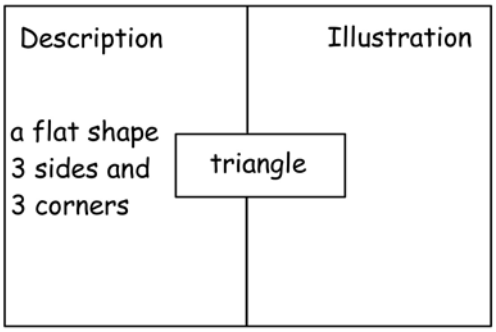
Students will make *vocabulary cards* (view literacy strategy descriptions) for the shapes: rectangles, squares, trapezoids, triangles, circles, rhombus, and hexagon. Give each student a set of shapes as a reference while completing the *vocabulary cards*. Guide students in completing each *vocabulary card*, ensuring that the students include a student-friendly description and an

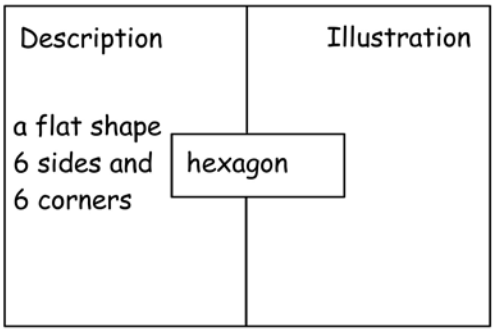
illustration. While completing each *vocabulary card,* discuss the attributes of each shape and identify these attributes on the shape. Have students identify all the shape cards in their set that match the shape's being defined. Have students rotate the shapes, pick them up, and move them around. Ask, "Does my shape change when I turn it or pick it up and look at it from underneath?" Discuss how the shapes stay the same no matter the position or orientation. Discuss that turning a square does not change the shape into a diamond, although it could be referred to as a RHOMBUS. The shape is still a square that has been turned. Spend a bit of time comparing the square, blue and tan rhombi for likeness and differences.

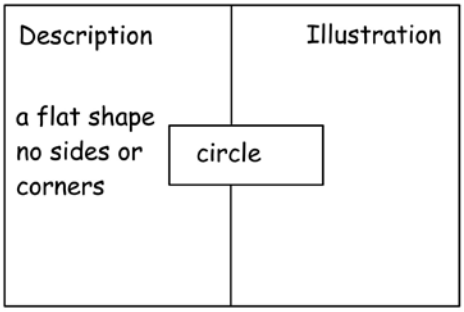


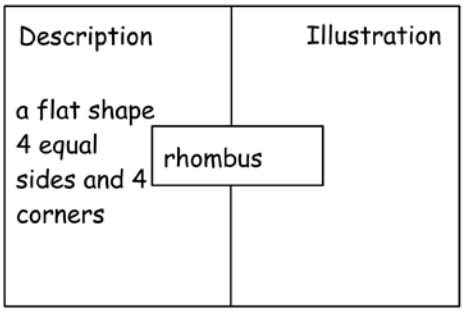






A nice model to visually show the difference between a square and a rectangle is to join 4 equal length straws together with bread ties or small pieces of pipe cleaner to form a square. It is best to make two of these models. When set up on a table, push down gently on the top side and the shape will form a rhombus. Ask students questions that will lead them to notice the similarities and differences (slide lengths are still equal, corners in rhombus are no longer right angles, square stands up straight, rhombus slants).

Allow students time to review their *vocabulary cards* with a partner. Students should save their cards to be used as a reference in later activities. Have students match the shape cards to each vocabulary card to review. Save the bags of shapes for future activities.

**Activity 8: These Are, These Are Not (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.6, MP.7)**

Materials List: Are These Triangles? BLM, Are These Rectangles? BLM, Sorting Page BLM

This activity uses *discussion* (view literacy strategy descriptions) in the form of Think Pair Square Share. When students participate in discussion about class topics, their learning and memory improves. It encourages students to think about specific topics. It gives students the chance to share their own ideas and to process ideas from other students. It allows the teacher to identify any misconceptions in students' knowledge about a given topic.

Place students in groups of four. Hand out a Sorting Page BLM and Are These Triangles BLM to each group. To save cutting time, have each student cut out one row of the rectangular cards containing the shapes on the Are These Triangles? BLM. Have students mix the cards and place them in a pile face down. Each student should choose a card. Have each student think about whether his/her shape is a triangle. The students will then partner up with one other person in their group, creating two pairs. Have the pairs discuss their ideas about whether the shape is a triangle. Each pair then shares with the other pair about whether their shapes are or are not triangles. All 4 students must agree on the placement of their cards on the sorting page.

Have students pick another card and continue the process (think about shape on their own, share with a partner in the group, share as a whole group and come to a group consensus). As students sort the cards, observe and question students about the decisions being made. Ask students why they decided some shapes are triangles and why some shapes are not triangles. Guide/encourage students to use geometric language and discuss the attributes while justifying their decisions.

Have student complete the same activity using the Are These Rectangles? BLM. Expand the activity by creating cards for other shapes.

**Activity 9: Examining Shapes (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.7)**

Materials List: Shapes Word Grid BLM, zipper bags of shapes from Activity 7, *learning log*

Give each student a bag of shapes from Activity 5. Review with the students the names of the shapes in their bags. Play a few games of Show Me. Call out the name of a shape, and have the students show it. Call out an attribute and have students show a shape that has this attribute. For example, ask students to show a shape with 3 straight sides or show a shape with no corners. Asking students to show a shape with 3 straight sides can lead to a great discussion that although many of the figures have straight sides, not all of them have 3 straight sides. Also if the students have different types of triangles, this can lead to a discussion that not all triangles look exactly alike.

Have students complete the Shapes Word Grid BLM using the shape cutouts and the shape *vocabulary cards* made in Activity 7 as a reference.

Shapes Word Grid

| | How many sides? | How many corners? | Curves? | Open or closed? |
|---|---|---|---|---|
| triangle | 3 | 3 | No | closed |
| rectangle | 4 | 4 | No | closed |
| square | 4 | 4 | No | closed |
| trapezoid | 4 | 4 | No | closed |
| circle | 0 | 0 | Yes | closed |
| rhombus | 4 | 4 | No | closed |
| hexagon | 6 | 6 | No | closed |

This activity uses a *word grid* (view literacy strategy descriptions). A *word grid* is useful when introducing important related terms and concepts. Students are able to analyze similarities and differences of the features of key vocabulary.

The *word grid* will help the students to compare, contrast, and describe the attributes of shapes. Display the Shapes Word Grid BLM. Guide the students in completing the first row of the grid. Have students take out a triangle from their bags. Use the triangle shape to fill in the number of sides, corners, etc. Have students continue to complete the grid using a rectangle from their bags. Allow students to complete the rest of the grid using the other shapes in their bags. Provide guidance only as needed. Observe for formative assessment to provide additional instruction for students not yet comfortable with these geometry lessons.

After the grid is completed, lead a discussion about how the shapes are the same yet different. An example might be, "How many shapes have 4 sides? Do they look the same? How are they different and how are they alike? Which of these shapes have four right angles?"

Have students glue the *word grids* in their *learning logs* (view literacy strategy descriptions) to use as a reference throughout the unit.

**Activity 10: The Pizza Party (CCSS: 1.G.2, 1.G.3, MP.1, MP.2, MP.3, MP.4, MP.6, MP.7)**

Materials List: paper plates that can easily be folded, crayons, markers, art paper, scissors

*Teacher Note: When referring to fractional parts in Grade 1, always talk about fair shares and equal pieces/parts.*

Tell the students that each of them is to plan a pizza party and invite one other person. Holding up a paper plate, ask them to close their eyes and visualize how the pizza could be divided or shared equally between two people. Have a student volunteer to fold the plate, and draw a line segment down the middle of the paper plate dividing it into halves. Cut the plate on the line showing 2 equal parts. Explain that the parts are called halves, and the new shape is called a half-circle. Hold the pieces close together showing a full circle. Take them apart again to show half-circles. Share one part of your pizza with a student. Explain that each person gets one half of the pizza.

Give each student 3 paper plates. One plate will not be cut so that students see the "whole."

Have students put two of the plates aside. Instruct the students to decorate one plate to look like a pizza. Ask students how many whole pizzas they each have (one whole pizza). Have students fold the plate in half and draw a line on the plate showing a fair share between two people. Ask how many pieces of pizza they would have if they cut the pizza on the line. Cut the plate in half. Discuss with the students that their 1 pizza was split into 2 equal pieces by cutting it in half. Ask if the new pieces are the same size. Ask which is more pizza, the two halves or the whole pizza. Some students will say two pieces of pizza is more than one piece of pizza rather than looking at the size of the parts. Guide students to the understanding that the new pieces are equal to each other but that each of the pieces is smaller than the original pizza. (Guide students through questioning rather than telling. There will be students who can express what the class needs to know.) The two halves when put back together are equal to the original whole pizza. If necessary, clear up the misconception that more pizza is created by decomposing a circle into 2 half-circles. Have students write sentences on the back of the pizza explaining how they shared the pizza. An example might read, "I shared my pizza with my friend. I cut it into 2 equal pieces. We each got one-half of the pizza."

Have students use one of the other paper plates. Ask students how the pizza could be shared fairly among four people. Have students fold the plate in half and draw a line on the plate showing a fair share between two people. At both ends of the line, have them draw a dot. Ask how many pieces of pizza they would have if they cut the pizza on the line. Ask if they would

have enough pieces to share equally with 4 people. Ask the students how they could fold the pizza again to make enough equal pieces for four people. Demonstrate folding the plate into fourths by matching the two dots that were drawn at the ends of the first fold. Have students trace the new line formed on the plate and cut the plate on the 2 lines.

Ask the students if there are now enough equal pieces to share fairly among four people. Discuss with the students that the 1 pizza was split into 4 pieces by cutting it into four equal parts or pieces which are each called or named one-fourth. Ask students to explain how they can show or prove that the 4 new pieces are equal to each other (put the smaller pieces on top of one another) and that the pieces are smaller than the original pizza (put one of the one-fourths sections on top of the uncut plate, matching the rims of each). If necessary, clear up the misconception that by decomposing a circle into 4 quarter-circles, more pizza was created. Have students write sentences on the back of the pizza explaining how they shared the pizza. An example might read, "I shared my pizza with three friends. I cut it into four equal pieces. We each got one-fourth of the pizza or one of the four equal pieces."

Have students compare one of the one-half sections to one of the one-fourth sections by matching. Ask students which is larger ½ of the pizza or ¼ of the pizza. Students should say the ½ pieces are larger. Lead a discussion that centers on the fact that when cutting the pizza into more equal sections, the smaller each section must be. For example, "Who can explain what happens to the size of a piece of pizza if you keep cutting the pizza into more and more equal sized pieces?" (Each piece gets smaller, but all the pieces will be the same size.)

**Activity 11: GeoBoards (CCSS: 1.G.1, 1.G.2, MP.1, MP.3, MP.4, MP.7)**

Materials: geoboards, rubber or geo-bands, Dot Paper BLM, Geoboard Shapes Cards BLM (2 pages)

Give a geoboard and a rubber or geo-band to each student.

Have students make a figure with 3 straight sides. Ask students what shape they made. Compare the different triangles being made by using samples created by students on their geoboards. If necessary, demonstrate triangles that are scalene (no sides the same length) and some that have an obtuse angle or a right angle. (Students will not be able to make an an equilateral triangle on a geoboard or on dot paper.)

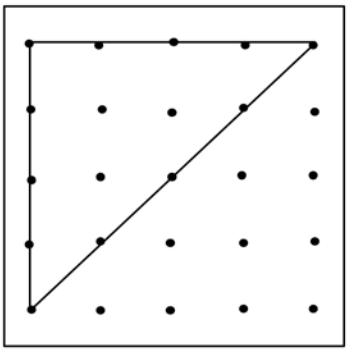
Have students make a figure with 4 sides, a quadrilateral. Group the class by the different shapes they made (rectangle, square, rhombus, trapezoid). Have students describe their figures. (I made a shape with 4 sides. The top and the bottom lines are parallel. It is a trapezoid.) Remind students that squares are special rectangles and that some rhombuses (those with 4 square corners) are squares.

Have students make any geometric shape that they want. They must be able to name the shape and describe the attributes of the shape. Challenge the class to make a hexagon.

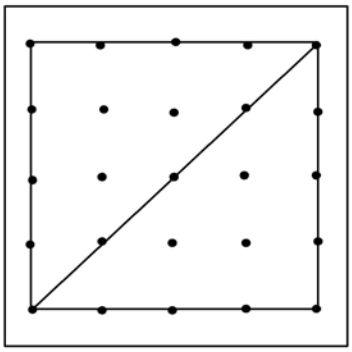
*Teacher Note: Students will not be able to make a regular hexagon. A regular hexagon is one in which all of the sides are the same length.*

*Center activity:* Have geoboards, copies of the Geoboard Shapes Cards BLM, and blank dot paper available at a center. Have students copy the geoboard shapes onto the geoboard or have them make a figure of their choice and copy it on the blank dot paper.

Give students a second rubber or geo-band. Explain that by putting two shapes together, you can make a different shape. Have students make a triangle using the pegs on the top and left sides of the geoboard. (See the figure below.)



Ask students what they think will happen if they make a second triangle using the rest of the space on the geoboard. Have them make the second triangle. They should see that the two triangles together make a large square. Have pairs share their shapes with each other before involving the whole class.



Ask students to build a rectangle using two squares. Give each student additional rubber or geo-bands and challenge them to build a trapezoid, a rhombus, and a hexagon using rectangles, squares, and triangles.

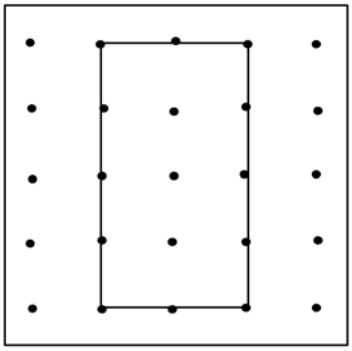
Ask students to use two different shapes to form a new shape. Have students draw a picture of their new shape in their *learning logs* and indicate which shapes were used to compose their new shape. For example, a student might say he made an arrow by making a skinny rectangle and putting a triangle at one end.

*Teacher Note: If students make a 5-sided shape, it is certainly OK to let them know it is a pentagon. And if they make a 4-sided shape with which they are not familiar, remind them that the Greedy Triangle turned into a quadrilateral. All quadrilaterals have four sides. They already know these special quadrilaterals: square, rectangle, rhombus and trapezoid.*

**Activity 12: GeoBoards Fair Share (CCSS: 1.G.2, 1.G.3, MP.1, MP.2, MP.3, MP.4, MP.6, MP.7)**

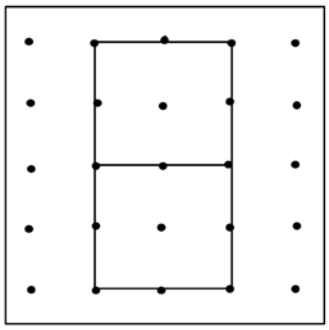
Materials: geoboards, rubber or geo-bands, Fair Share BLM

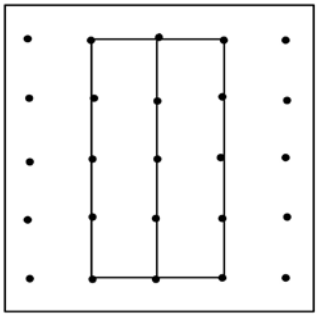
Give a geoboard and rubber or geo-band to each student. On the side of the geoboard with the rectangular grid, have students make a rectangle that uses 3 pegs on one side and five on the other.

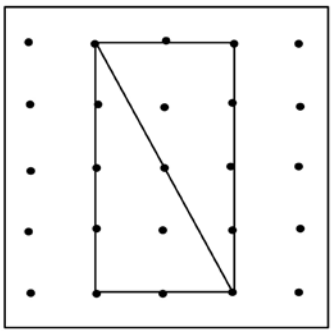


Have students share their rectangle with a neighbor and discuss how the rectangles are the same and different. Choose different students to share their rectangles with the class and discuss how the rectangles are the same yet different. Have students rotate their shape to see that all the shapes are the same.

Give each student a second rubber or geo-band. Have the students imagine that their rectangle is a candy bar. Have them use the second rubber or geo-band to show how they would share the candy bar with a friend. Emphasize the idea of a fair share. Ask, "How much of the candy bar will you receive? Will your friend receive?" (1/2 of the candy bar) Ask students how they could tell if the two pieces are the same size (Count the squares in each half. Count the pegs in each half. Draw it on dot paper and cut out one half and put it on top of the other half.)



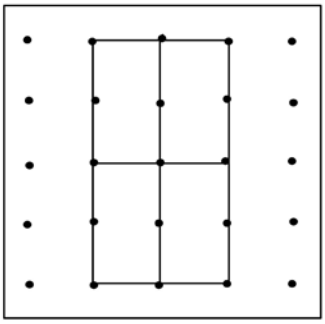


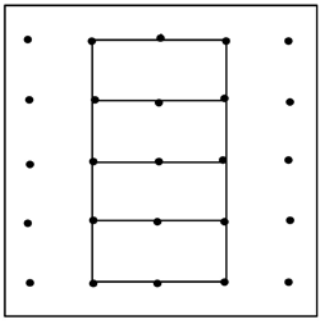


If no-one divides his/her rectangle with the diagonal, show one divided that way and ask, "Could I share my candy bar with a friend this way? Would it be fair? How can you prove it?" (Cut the shape out, cut along the diagonal, and rotate one piece to put on top of the other.)

Compare the different ways the students divided their candy bar in half. Emphasize the terms "half" and "half of." Have students explain to a partner how they shared their candy bar with a friend. "I would break my candy bar in half to make 2 equal pieces. Then I would give half of the candy bar to my friend and I would eat the other half."

Ask, "How could you fairly share the candy bar with 3 other friends?" Hand out a third rubber or geo-band to each student. Have the students use the rubber or geo-band to break the candy bar into 4 equal pieces. Emphasize the terms "fourth," "quarter," "fourth of," and "quarter of."





Have students explain to partners how they would fairly share their candy bar among 4 people. "I would break my candy bar into 4 equal pieces called fourths. Then I would give one fourth (or one of the fourths) to each of my 3 friends and keep one fourth (or one of the fourths) for myself."

Hand out a Fair Share BLM to each student. Have students draw lines showing how they would share the first rectangle among two people and how they would share the second rectangle among 4 people.

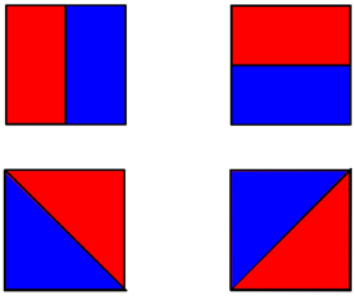
*Teacher Note: Don't expect students to "see" the 4 fair shares of the diagonal cut as being equal. If the diagonal is too difficult for most of the students, skip doing the diagonal division altogether.*

**Activity 13: Fraction Book (CCSS: 1.G.2, 1.G.3, MP.1, MP.2, MP.3, MP.4, MP.6, MP.7)**

Materials List: 12 in. × 18 in. construction paper (2 colors)

Prior to the activity, cut the 12 in. × 18 in. construction paper into 6 in. × 6 in. squares. This will yield six 6 in. × 6 in. squares. Each student will need six 6 in. × 6 in. squares. Half of the class will need one color of construction paper, and the other half will need the other color of construction paper.

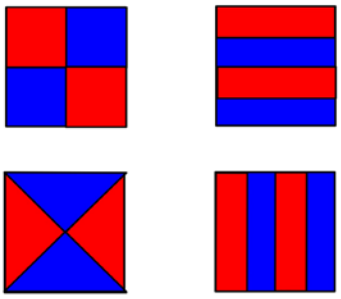
Have students work in pairs. Provide each student in the pair a different colored set of squares. (For example: Partner 1 has 6 red squares. Partner 2 has 6 blue squares.) Have the pair discuss how they could fold one of the squares to show halves. Some pairs may decide to fold the square in half either horizontally or vertically, resulting in two rectangles. Other pairs may decide to fold the square diagonally, resulting in two triangles. Once students have decided how to fold the square, have each student in the pair fold one of their squares. Have the students cut along the fold and use a piece of each person's square to see if together they can make a whole square.



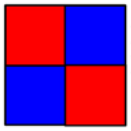
Have each student in the pair compose the original square by gluing a half of their square and a half of their partner's square to a piece of plain paper and write a sentence describing the square.

I cut the square into halves. Each half is shaped like a rectangle. The rectangles are smaller than the square. Together they make a whole square.

Next, have each pair discuss how they could fold one of the squares to show fourths. Students may decide to fold the square into 4 smaller squares, 4 rectangles, or 4 triangles.
Once students have decided how to fold the square, have each student in the pair fold one of their squares. Have the students cut along the folds and use pieces of each person's square to see if together they can make a whole square.



Have each student in the pair compose the original square by gluing pieces of their square and pieces of their partners square to a piece of plain paper and write a sentence describing the square.



I cut the square into fourths. Each fourth is shaped like a square. The new sqaures are smaller than the first square. Together they make a whole square.

Have each pair use the remaining squares to show halves and fourths by folding the squares in other ways. Have students glue these new squares to a piece of plain paper and write a sentence describing the square. Staple all of the pages the student makes to create a fraction booklet.

**Activity 14: Creating New Shapes (CCSS: 1.G.2, MP.1, MP.3, MP.4, MP.7)**

Materials List: pattern blocks, zipper bags

Prior to the activity, make a set of shapes for each student including a rectangle, circle, hexagon, trapezoid, rhombus, triangle, and square.

Hand out a set of pattern blocks to each student. Allow students time to explore with the shapes and discuss with a partner the new shapes and images they can create by combining two or more of the shapes.

*Teacher Note: When students combine shapes to form a new shape, they are composing shapes.*

Hand out sets of pattern blocks to each student. Have students try to make the following shapes. If they cannot make the new shapes, have them explain why they think it cannot be done.

- Make a trapezoid using 2 shapes. What shapes did you use?
- Make a trapezoid using 3 shapes. What shapes did you use?
- Make a larger triangle using smaller triangles. How many did you use?
- Make a hexagon with any other shapes. What shapes did you use? Can you make it a different way? (there are 6 different combinations of blocks)

Observe students as formative assessment to determine who needs more help. Students with strong number skills don't necessarily also have strong spatial skills

**Activity 15: Math Monsters (CCSS: 1.G.1, 1.G.2, MP.1, MP.3, MP.4, MP.7)**

Materials: Math Monsters Geometry video, Math Monsters Geometry teacher's guide, Math Monsters Geometry Blackline Masters.

All Math Monsters: Geometry materials can be downloaded from Unitedstreaming. (http://player.discoveryeducation.com/index.cfm?guidAssetId=0E897FB2-4F7B-431E-A3D6-199043BE63AB&blnFromSearch=1&productcode=US)
Most districts in Louisiana are members, so teachers should have access.

The video provides a good introduction to three-dimensional shapes. At this site, activities are included to be used before viewing the video, during the video, and after viewing the video. In a video from this site, the characters are attempting to build a model of the town in which they live. As they attempt to build their model, they encounter the idea of perspective and how two-dimensional shapes come together to form three-dimensional shapes.

**Activity 16: 3-D Shapes (CCSS: 1.G.1, MP.6)**

Materials List: 3-D shapes, 3-D Shapes BLM, shapes brought in from home, coffee stirrers and clay - optional

*Teacher Note: Samples from home (the real-world) for this activity are definitely needed, but there may be a need to create some shapes, especially the pyramid. Consider making pyramids with coffee stirrers and clay. Make one with a square base and one with a triangular base.*

In a whole-class lesson using 3-D shapes, have the students describe each shape, allowing them to use the informal language of ball, can, cone and box. Ask: What does this remind you of in real-life? Where would you see this shape? Introduce the formal language of mathematics (e.g., a ball is a sphere, a box is a rectangular prism or a cube if all faces are equal, a can is a cylinder, a party hat is a cone, pyramids can be seen in Egypt). Hand out the 3-D Shapes BLM. Using modified *split-page notetaking* (view literacy strategy descriptions), have students list real-world items of each shape.

Where can we find these shapes?

| | |
|---|---|
| rectangular prism | cereal box |
| | mattress |
| | crayon box |
| | |
| cone | party hat |
| | ice cream cone |
| | |
| | |
| cylinder | cans of soft drink |
| | oatmeal box |
| | |
| | |
| cube | Block |
| | Dice |
| | |
| | |
| pyramid | pictures of the pyramids in Egypt |
| | possibly a lamp shade |
| | |
| | |

Have students compare their lists with classmates and add new items to their notes. Have students bring their notes home to add items that they can find at home. Students can quiz each other by naming the real-world items and having their partner name the 3-D shape associated with the items. Student should save their notes to be used during future activities.

**Activity 17: Real Life Objects (CCSS: 1.G.1, MP.1, MP.3, MP.4, MP.7)**

Materials List: real life objects

Have the students sort the real-life objects into categories (by shape, by faces, by vertices, if it will stack, if it will roll). Stress the proper mathematical language. Turn objects in different positions and orientations to demonstrate that no matter which way the object is turned, it still remains the same object. To make sure there are plenty of objects for the lesson, consider having extra containers should some students forget to bring them to class. Save unusual items that fit the descriptions from year to year – adding them into the items students bring from home each year.

**Activity 18: Putting Together 3-D Shapes (CCSS: 1.G.2, MP.1, MP.4, MP.7)**

Materials List: 3-D shapes, real-life objects

*Teacher Note: If a class set of 3-D shapes are unavailable, patterns for each of the 3-D shapes can be printed at www.senteacher.org/wk/3dshape.php. Creating the shapes using cardstock will make the shapes sturdier.*

Using the real-life objects, review the names of each shape. Ask students to find an object in the classroom that matches each shape. Ask students if they see any objects that are made of more than one of the shapes. For example, a desk can have a rectangular prism on top and legs that are 4 cylinders. Place students in groups of 4. Give each group two sets of the 3-D shapes. Students will need more than one of each type of 3-D shape. Allow students time to explore with the shapes. Observe to see what students create using the 3-D shapes. Have groups share what they created and describe which shapes were used. Example: "We built a house using a cube and a pyramid. The cube is the building part and the pyramid is the roof. We made a pine tree using a cone and a cylinder." If enough 3-D shapes are not available, consider placing this activity in a center.

Take digital pictures of students' creations. Start posting pictures on a bulletin board to promote creativity in less motivated students. Continue to add more items to make an attractive display.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records as well as student-generated products may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction on the weaknesses that continue to persist.

- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student-generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

- Fluency Assessment – At the end of the unit, assess student fluency (for diagnostic or formative purposes only) in addition and subtraction to 10. Individually assess each

student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the time it takes for the student to complete the sheet and the number of errors. Check for possible repeated error patterns. Use the data to plan further instruction for individual students or small groups.

- Assess that the student is using appropriate mathematical language in speaking and recording geometric terms. This must occur frequently at the formative level to ensure all students are acquiring these geometry skills.

**Activity-Specific Assessments**

- Activity 1: Observe the shapes the student makes with their pipe cleaners to assess prior knowledge of shapes. Make note of any misconceptions to be addressed throughout the unit. Stress that the shapes should have straight lines, unless it is a circle.

- Activity 2: Assess student understanding of open and closed figures by observing the figures being made and placed on each card during the activity.

- Activities 4 and 7: Assess student understanding of vocabulary words by asking the student to identify given shapes and their attributes.

- Activity 10: Use the pizzas created and the sentences written for each pizza to assess student understanding of halves and fourths as equal pieces. Question the student about his/her pizza to check for understanding that the fractional pieces are smaller than the original shape.

- Activities 16 and 17: Have each student match real-life examples of 3-D shapes to 3-D shapes (plastic or wooden used for teaching purposes).

**Resources**

www.brainpopjr.com – has short videos about plane and 3-D shapes that could be used as supplemental information. Can log in for a free trial but must be purchased afterward.

http://www.mathopenref.com/pyramid.html - a site where the students can view a right pyramid from various perspectives. The shaped can be "exploded" to show all the faces. This site refers to the vertex of a pyramid as the "apex." Before using this site, prepare students that sometimes the vertex of solid shape, such as a pyramid and cone, can also be referred to as the apex.

http://www.ixl.com/math/grade-1 - Students can go to the Geometry section and test their knowledge of names and attributes of 2- and 3-D figures, and symmetry.
Additional resource books:

- Blackstone, Stella. *Bear in a Square.* Barefoot Books.
- Elhert, Lois. *Color Zoo.* Harper Collins
- Leedy, Loreen. *Fraction Action.* Holiday House.

- Maccarone, Grace. *The Silly Story of Goldie Locks and the Three Squares.* Scholastic.
- McMillan, Bruce. *Eating Fractions.* Scholastic, Inc.
- Matthews, Louise. *Gater Pie.* Sundance Publishing.
- Murphy, Stuart. *Give Me Half!* Harper Collins Publishers.

# Grade 1
# Mathematics
# Unit 6: Measurement and Data

**Time Frame:** Approximately three weeks

*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit focuses on measurement of length and time. Non-standard units will be used to allow students to develop an understanding of the meaning and process of measurement. Also included are the organization, representation, and interpretation of data.

## Student Understandings

Students will understand the concept of length. Students will compare and order objects by lengths. Students will measure the length of objects using non-standard units. Students will tell and write time in hours and half-hours. Students will organize, represent, and interpret data with up to three categories.

## Guiding Questions

1. Can students order three objects by length?
2. Can students compare the lengths of two objects indirectly by using a third object?
3. Can students express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end?
4. Do students understand that the length measurement of an object as the number of same-size length units that span it with no gaps or overlaps?
5. Can students organize, represent, and interpret data with up to three categories?
6. Can students answer questions about the data in a graph, including questions about how many more/fewer?
7. Can students tell and write time in hours and half-hours using both analog and digital clocks?

**Unit 6 Common Core State Standards**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Measurement and Data** | |
| 1.MD.1 | Order three objects by length; compare the lengths of two objects indirectly by using a third object. |
| 1.MD.2 | Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-sized length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.* |
| 1.MD.3 | Tell and write time in hours and half-hours using analog and digital clocks. |
| 1.MD.4 | Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. |
| **Standards for Mathematical Practice (MP)** | |
| MP.2 | Reason abstractly and quantitatively. |
| MP.3 | Construct viable arguments and critique the reasoning of others. |
| MP.4 | Model with mathematics. |
| MP.5 | Use appropriate tools strategically. |
| MP.6 | Attend to precision. |
| MP.7 | Look for and make use of structure. |
| **CCSS for ELA Content** | |
| **CCSS#** | **CCSS Text** |
| **Writing** | |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |
| **Speaking and Listening** | |
| SL.1.1a, b, c | Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussion (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).<br>b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.<br>c. Ask questions to clear up any confusion about the topics and texts under discussion. |

Note: The first 3 activities from Unit 1 (Straw Count, Number Path Math, and Counting Activities) and first activity from Unit 4 (Daily Professor) should be part of the daily routine in every unit and should be used each day that students are in school.

Additionally, students will need continued practice with addition and subtraction facts and strategies within 20 throughout all remaining units. Students can review the facts and strategies learned in Units 2 and 3 with the use of the triangle flashcards, dominos and number bonds. Addition and subtraction practice should be done daily in small groups or centers.

## Sample Activities

### Activity 1: Ordering Length (CCSS: 1.MD.1, MP.6, MP.7, SL.1.1a)

Materials List: string, Paper People BLM, zipper bags

Prior to this activity, cut pieces of string of varying lengths and copy the Paper People BLM on card stock or other thick paper.

Give each student a piece of string. Have two students show their strings to the class. Discuss with the class the difference in length between the two pieces of string. Students should be able to identify which string is longer and which string is shorter. Have students make comparing statements such as, "Mark's string is longer than Sam's string" or "Sam's string is shorter than Mark's string."

Use the inside-outside circles *discussion* (view literacy strategy descriptions). Have students stand and face each other in two circles. Those in the inside circle face out while those in the outside circle face in. Students are asked to have a discussion with the person standing in front of them. After an amount of time, either circle can be instructed to rotate until told to stop. The discussion will begin again with a new partner. This strategy allows for a variety of ideas to be shared by different partners.

Place students in two circles (inside and outside). Have the outside circle begin to rotate. When told to stop, have students compare the lengths of their strings. Have students make comparing statements about each person's string. Continue to have the outside circle rotate, stopping to allow students to compare their strings. Periodically call on a pair of students to report to the whole class what they have been discussing about the length of their strings.

Have students work in groups of three. Have students put their strings in order from shortest to longest. Choose 3 groups. Have the student with the longest piece of string in each group come to the front of the class. Have these 3 students put their strings in order from shortest to longest. Have the student with the longest piece of string remain standing and have the other 2 students return to their groups. Choose 2 more groups. Have the students with the longest piece of string in each group join the standing student. Have these 3 students put their strings in order from shortest to longest. Continue this process until the longest string in the class is discovered. Follow the same procedure to find the shortest piece of string in the class.

Arrange three students by height, either shortest to tallest or tallest to shortest. Have students explain how the students are arranged. Practice a few more rounds with students' identifying how students are arranged. *Teacher Note: Not all students will order from left to right; some may order from right to left. Briefly discuss the 'convention' of ordering from left to right and the reason for doing it this way.*

Pose this problem to the class:

> Maria is taller than Sam. Sam is taller than Ann. If you wanted to place them in order from shortest to tallest, in what order would you place them?

Have students discuss the order and why they think that would be the order. Show them the 3 paper people and have one student place the 3 people in the correct order. Give similar scenarios and have students decide the order.

Give each student a Paper People BLM and have students cut out the cards. Have students cut out the entire rectangle for a person, not the individual people. Have students turn all the cards face down on their desks and choose three cards with which to work. Call out instructions for how to arrange cards, either shortest to tallest or tallest to shortest. Have students explain how they arranged the people. (I put Keko, Pete and Juan in order. Keko is the shortest, next comes Pete, and Juan is the tallest.)

Save the people cards in zipper bags for future activities.

**Activity 2: Prove It (CCSS: 1.MD.1, MP.6, MP.7)**

Materials List: string, other non-standard units

Pose this problem to the class:

> Suppose you want to find out which is longer, the top of my desk or the length of the whiteboard. The whiteboard cannot be moved and my desk is too heavy to move. How can you find which is longer?

Allow students time to think about the problem. Have some non-standard measuring units such as paper clips, strips of paper cut the same length, or craft sticks. Give students time to explore how they could determine which is longer. Some students may answer that the whiteboard is longer without needing to measure. Tell the students that they need to prove that the whiteboard is longer. Allow students to share their methods.

Ask students if there is a way to use string to prove that the whiteboard is longer. Allow them time to offer suggestions. One way to do this is to first measure the whiteboard using the string. Cut the length of string to match the length of the whiteboard. Have two students compare the length of the string to the length of the desk. Ask students how using the string helps them decide which is longer. (Possible answer: We measured the whiteboard using the string and cut the string. When we used that string to measure the desk, there was string leftover. That means that the whiteboard is longer.) As a class, generate a list of objects that can be compared but are

too large or heavy to move together (height of the door and the height of the window, height of the bookshelf and length of the computer table, length of the rug and height of the door). Have students work in groups to prove which object is longer. Make sure that students can explain how they know one object is longer than the other.

**Activity 3: Measure It! (CCSS: 1.MD.2, MP.5, MP.6, MP.7, W.1.8)**

Materials List: paper clips, color tiles, craft sticks, pipe cleaners, Non-standard Measurement Practice BLM

Gather students around a collection of objects (paper clips, color tiles, craft sticks, pipe cleaners) that can be used to measure other objects. Tell students that they are going to use objects like these to measure the length of larger objects. Ask if anyone knows how to use a shorter object such as a paper clip to measure a longer object such as the length of a desk. Allow a student to demonstrate how to measure. Have another student measure the same object. Lead a discussion of the process that each student used when measuring. Tell students that there are certain rules that they should follow when measuring. Otherwise everyone may get a different answer. Allow students to generate the list of rules stated below. Provide help only if students don't state all of the rules.

Distribute the Non-standard Measurement Practice BLM and some small paper clips to each student. Demonstrate how to measure the length of the first line segment using small paper clips. Review the list generated by the students. It should contain all the rules listed below:

- Start measuring at the very beginning of the segment.
- Place paper clips end-to-end.
- Leave no spaces in between the paper clips.
- Make sure that the paper clips do not overlap.

*Teacher Note: The segments on the BLM have been drawn so that each length will be a whole number of paper clips; however, teachers should print and test as there could be variances depending on the printer/copier used. Adjustments can be made by changing the cell widths in the table.* As students measure the rest of the segments on the page, observe and provide assistance as needed. Have students write the number of paper clips for the length of each line segment on the line segment. Have students include the unit "paper clips."

After students understand the process of measuring with a unit, have students measure the length of a pencil using paper clips. If the number of paper clips is not exact, discuss with the students how to decide the length of the object. If the pencil is close to (a little longer or a little shorter than) 6 paper clips long, then students can say it is about 6 paper clips long. If the pencil is close to 7 paper clips long, then students can say it is about 7 paper clips long. If the pencil is about halfway between the two lengths, accept either answer. Students may say "about" more readily when the space left over can't be covered by another measure; it is more difficult for them to come to the same conclusion when the measure exceeds the item being measured.

Easier to say "about" More difficult to say "about"

If students are having trouble understanding the term "close to," have 3 students come to the front of the class. Have two of the students stand about 3 feet apart. Place the other student between the two students. Move the middle student to different places between the other two and discuss.

Have students measure the pencil a second time using the edge of a color tile. Discuss why the measurement is different even though the same item was measured. Guide students to understand that the length of the measuring unit will determine the number of units needed to measure the pencil. Because paper clips are longer than color tiles, it takes fewer paper clips than color tiles.

Provide each student with a craft stick and a pipe cleaner. Have students first measure the craft stick using paper clips. Observe students to ensure that they are starting at the end of the craft stick and lining up the paper clips correctly, with no gaps or overlaps.

Discuss with the class how many paper clips long the craft stick is. Next have students measure the craft stick using colored tiles. Discuss with the class the results of this measurement. Ask students why they used more colored tiles than paper clips when measuring the same object. Lead a discussion about how the length of the unit used to measure increases or decreases the number of the units needed. Repeat the above steps having students measure the pipe cleaner, but this time allow students to choose two different objects (e.g., toothpick and linking cubes). Before students measure, ask them to predict which of the two objects they pick will require the greatest number of units to measure the pipe cleaner.

When the students have had practice measuring using non-standard units, have them engage in *RAFT writing* (view literacy strategy descriptions). *RAFT writing* is used after students have acquired new content information and concepts. It helps them rework, apply, and extend their understandings. *RAFT* is an acronym that stands for:

R – Role (role of the writer)
A – Audience (to whom the RAFT is being written)
F – Form (the form the writing will take, as in letter, song, etc.)
T – Topic (the subject focus of the writing)

In this *RAFT*, the students in the role of themselves will write a "how-to list" for someone (the principal, a parent, or a friend) telling him/her how to measure an object using Tootsie® rolls.

Sample *RAFT*:

1. Start by lining up the end of one Tootsie® roll with one end of the object.
2. Lay the Tootsie® rolls one after another making sure not to leave any space.
3. Keep placing Tootsie® rolls until you reach the other end of the object.
4. Count how many Tootsie® rolls you used.

Have students share their "how-to" list with the class. For homework, have them explain their how-to list to two people in their home.

**Activity 4: Measurement Practice (CCSS: 1.MD.2, MP.5, MP.6, MP.7)**

Materials List: textbooks, pipe cleaners, unsharpened pencils, notebooks, bobby pins, cotton swabs, Measurement Practice BLM

Set up 6 stations. In each station include a textbook, a pipe cleaner, an unsharpened pencil, and a notebook. Divide the class into two groups. Give the students in one group bobby pins with which to measure and give the students in the other group cotton swabs. Assign students to the stations by the type of tool they are to use. (Have 3 stations for students with bobby pins and 3 stations for students with cotton swabs.) Have students measure the length of each object at the station using their assigned tool. Have students record the length of each object on the Measurement Practice BLM.

Once students have measured all the objects, have the students compare their measurement results with the people at their station. If there are different measures within the group, discuss why this might have happened (did not measure from the end of the item, overlapped or left gaps between the measurement unit). If necessary, have the members at each station come to a consensus about the length of disputed objects. Next have students partner with a classmate using a different measurement tool (bobby pin student with cotton swab student) and compare all measurements. Have students discuss why results differed between the two types of tools. Come together as a whole class and discuss the measurement of each item and why the measurement differed between bobby pins and cotton swabs.

*Teacher note: Students will need additional practice measuring with non-standard units. Have objects available as measurement units and allow students to measure varying items in the classroom during center time.*

**Activity 5: Time to the Hour on an Analog Clock (CCSS: 1.MD.3, MP.5, MP.6, MP.7)**

Materials List: Analog Clock BLM, brads, scissors, demonstration clock with 1 hand, demonstration clock with gears, if possible

Copy the Analog Clock BLM on tagboard or glue the paper version to a small paper plate to increase durability.

Elicit from students what they know about hours and minutes. (Hours are long, minutes are fast. My favorite TV show is an hour long.) Ask students to think of things that take an hour (math class, favorite TV show). Ask students what they think they could do in a minute (tie their shoe, write their name). Strengthen students' understanding of a minute by having them do different activities for only one minute. (Sit still, run in place, write as many numbers as they can). Ask students what is used to use keep track of time (clocks, watches, timers, calendars). Ask students if all clocks look the same and have them describe some of the clocks they have seen.

Display an analog clock which has only the hour hand. A clock with only one hand can be read with considerable accuracy. Tell students that this hand tells the hour but not the minute. Set the

hour hand to 5 o'clock. The hand should point straight to the 5. Tell students that when the hour hand points directly to a number it means that it is that number o'clock. Set the hand to 7 o'clock. Ask the students to tell the time. Continue to set times and have the students tell the hour. Discuss the terms "about," "a little before," and "a little after." Display a time where the hour hand is a little past the 5. Ask students to tell something about the time. They should say, "It is about 5 o'clock." or "It is a little after 5 o'clock." Display other times that show "a little before" and hour. This knowledge can help students when they have to tell time to the minute. The book, *One Hand at a Time*, by Patricia Smith has great ideas for teaching time with a one-handed clock.

Display an analog clock with 2 hands. Ask students to give examples of where they have seen analog clocks (clock in school hallway, clock in town square, some watches). Ask students to describe the clock (has numbers, has hands, one hand is long, one hand is short, has little lines, some are darker than others). Hand out the Analog Clock BLM. Explain that the hands of the clock provide different information about time. The short hand tells the hour. The long hand tells the minute. Have students color the hour hand red and write *hour* on the hand. Have students color the minute hand blue on their clock and write *minute* on the hand. Have students cut out the clock and hands. Use brad fasteners to attach the hands to the clock. *Teacher Note: As a way to avoid having students be very exact when they cut out the hands, make a page of hands and copy them on a transparency sheet. When cutting out hands, the students won't have to be so exact as the numerals on the clock will show through the transparency material. Be sure to use a hole puncher to make the holes in the transparency material so the brad will insert easily through the transparency material.*

Explain that when the minute hand (the long hand) points straight up to the number twelve, it means an exact hour (an o'clock). The hour hand (the short hand) points to the hour.

Display 4 o'clock on the demonstration clock. Ask students to which number the hour hand is pointing and to which number the minute hand is pointing. Explain that the time on the clock is 4 o'clock. Display different times to the hour and have students tell the time using the word *o'clock*. Call out different times to the exact hour and have the students show the time on their clock.

**Activity 6: Half Hour CCSS: <u>1.MD.3</u>, MP.5, MP.6, MP.7)**

Materials List: 2 small paper plates of contrasting colors per student, demonstration clock with gears

Using a gear clock, display the time 2 o'clock and ask the students to watch the hour hand as the minute hand is moved around the clock. Move the minute hand one full rotation around the clock. Ask the students what they notice about the hour hand as the minute hand moves. (The hour hand moves from the 2 to the 3.) Ask the students what they think will happen if the minute hand is moved around the clock again. (The hour hand will move from the 3 to the 4.) Make sure that students realize that as the minute hand moves quickly, the hour hand also moves, but much more slowly.

Move the minute hand from 8 o'clock to 9 o'clock, stopping when the minute hand reaches the 6. Ask students to describe where the hour hand is pointing (half way between the 8 and 9). Do this a few more times until students make the connection that when the minute hand is on the 6, the hour hand does not point to one of the hour numbers, but is halfway between two hours.

Ask the students the number of minutes in one hour. As a class, have students count as the minute hand is moved around the clock. Explain that it takes 60 minutes for the hour hand to travel from one number to the next. Have students count by ones again to go around the clock. Stop at 30 and ask students to tell what is special when 30 is said. (The minute hand has gone halfway around the clock.) Have students count by fives to go around the clock. Again, stop at 30 minutes and discuss what is special about 30 minutes.

*Teacher Note: It is important that each student have his/her own set of set plates for the next section so that they can participate in the movement of the plates as the teacher demonstrates. This part of the activity is very teacher-directed, but students must be highly engaged by doing each of the steps.* Use two small paper plates of contrasting colors to demonstrate the minute hand moving around the clock. Make one cut on each plate from the edge to the center, and then slide one plate into the other. Rotate the plates against each other to show various fractional parts, and in this instance, half shows up beautifully – as though the line connects the 12 and the 6. Each student should have a set of the plates to manipulate. Using the bottom plate, draw the numbers that would be seen on the face of a clock. Rotate the top plate to each of the numerals on the clock counting by five until 60. Ask students how many minutes are in a half hour. Rotate the second/top plate and count by fives until half of the clock is covered.

Use a paper plate or a circle cutout to review the idea of one-half of a circle by folding the paper plate or circle cutout in half. Place the half circle over the face on the demonstration clock, covering the numbers from 12 to 6. Ask students on which number the minute hand will point to if it travels halfway around the clock. (The minute hand will be on the 6.) Count with the students to number of minutes between the 12 and the 6 on the demonstration clock (30 minutes). Explain that when the minute hand reaches the 6 on the clock, 30 minute have passed. Have them count by fives to confirm that when they reach the 6 on the clock, 30 minutes have passed. Have students think of events that last a half-hour (center time, library, favorite cartoon). Relate quarter turns to fractional parts (e.g., one quarter turn is 15 minutes after the hour, one half is two quarter turns or the half-hour, three quarter turns after one hour is a quarter to the next hour).

**Activity 7: Time to the Half-Hour on an Analog Clock (CCSS: 1.MD.3, MP.5, MP.6, MP.7)**

Materials List: student clocks made in Activity 5, demonstration clock (clock with gears, if possible), paper plate or circle cutout

Review with students the idea of a half hour. Ask students how many minutes are in an hour. Ask students how many minutes are in a half hour.

On the demonstration clock, show 3 o'clock. Move the minute hand to show 3:30. Ask where the hour hand is for the time 3:30. (It is between the 3 and the 4.) Explain that the hour hand is not on the three any longer because the time is now between 3 and 4 o'clock. Three-thirty is after 3 o'clock but before 4 o'clock. Show students additional examples of times to the half-hour, drawing students' attention to the placement of the hour hand. Display different times to the half-hour and have students tell the time. Call out different times to the half-hour and have the students show the time on their clock.

*Teacher Note: It is important that students show their understanding of ½ hours by showing the hour hand PAST the designated numeral, not on the designated numeral (e.g., past the 6 if the time is 6:30). It is also important for the teacher to point to the classroom clock as frequently as possible and state the time, using terms such as almost, close to, quarter after, half past, etc. This should actually occur from the beginning of the year to get students used to the vocabulary associated with telling time.*

**Activity 8: Hours and Minutes on a Digital Clock (CCSS: 1.MD.3, MP.5, MP.6, MP.7)**

Materials List: Digital Clock BLM, real digital clock, clear page protectors, dry erase makers, analog demonstration clock

Make a copy of the Digital Clock BLM for each student. Place each BLM in a page protector. This will allow the students to use the BLM multiple times by writing on the outside of the page protector with a dry erase marker.
Display a real digital clock and use it to explain what the numbers shown mean. Ask students to indicate where they have seen digital clocks (watches, electronic displays, microwave, stove, long distance runs, etc.). Tell them that this is a type of clock and explain that the hour is written first, followed by a colon, and followed by the minutes. When it is an exact hour, the minutes are shown as two zeros. Set the time on the real digital clock to show a full hour. Ask students to tell the time using the word o'clock each time (10 o'clock, 5 o'clock). Show students several examples of time to the hour.

Give each student a Digital Clock BLM in a page protector and a dry erase marker. Call out various times to the exact hour and have students write the time on their digital clocks. Use an analog demonstration clock to display various times to the exact hour and have students write the time on their digital clocks.

On another day, repeat the activity for telling time to the half-hour. Use a real digital clock to show time to the half-hour. Explain that the hour is written first, followed by a colon, and followed by the minutes. When it is a time to the half-hour, the minutes are shown as 30. Show this by changing the time to read 1:30. Show various times to the half-hour on the digital clock. Ask students to tell the time. Distribute the Digital Clock BLM in a page protector and a dry erase maker to each student. Call out various times to the half-hour and have students write the time on their digital clocks. Use an analog demonstration clock to display various times to the half-hour and have students write the time on their digital clocks.

**Activity 9: Digital and Analog Match (CCSS: 1.MD.3, MP.5, MP.6, MP.7)**

Materials List: Time to the Hour Matching Game BLM (2 pages), Time to the Half-Hour Matching Game BLM (2 pages), zipper bags

Game 1:
Run copies of the Time to the Hour Matching Game BLM on cardstock. Have each student cut out a set of cards and place the cards in a zipper bag. This game is played like a regular matching game where a student chooses two cards and removes them if they are a match. Students need to match the times on each digital clock to the times on an analog clock. Students can play on their own or with partners. Allow students to take the game home for more practice.

Game 2:
Run copies of the Time to the Half-Hour Matching Game BLM on cardstock. Have each student cut out a set of cards and place the cards in a zipper bag. Have students play the game following the rules in Game 1.

Game 3:
Have students mix the two sets of cards together and practice matching time to the hour and half hour at the same time. Have students play the game following the rules in
Game 1.

**Activity 10: The Best Vacation Ever (CCSS: 1.MD.4, MP.2, MP.3, MP.4, MP.5, MP.6)**

Materials List: *The Best Vacation Ever* by Stuart J. Murphy, Story BLM (4 copies), Vacation BLM (4 copies), Vacation Sample BLM

While reading the book *The Best Vacation Ever* students will use the *DL-TA – directed learning-thinking* (view literacy strategy descriptions) to make predictions based on data provided in the book.

In this book, the family is very busy. The daughter decides that the family needs to go on a vacation. The daughter is trying to figure out the best place for a family vacation. She asks the family questions such as: Should we go somewhere warm? Should we travel somewhere far?

She creates charts for each question that she asks her family members, records each family member's response, and uses these charts to determine the best place for the family vacation.

Before reading:
Show students the front cover of the book. Read the title. Ask "What do you think the story will be about?" Have students discuss what they know about vacations and tell about vacations they have taken. Explain that the characters in the book are trying to decide where they want to go on vacation and are going to use some charts to help them make their decision.

During reading, stop each time the daughter asks a question to create a chart to reflect what is being discussed in the book. The questions and the discussion that should occur for each question are provided below.

- Pages 16-17 – "Should we go somewhere warm?" Continue reading and using the Story BLM to make a chart similar to the one the daughter makes (see example below). Discuss the data on the chart (How many people wanted to go somewhere warm? How many people wanted to go somewhere cool? How many more people wanted to go someplace cool rather than someplace warm? How many people were surveyed in all?) Ask the students to use the information to predict if the family will decide to go to a cool or a warm place. Make sure that they cite information from the text/chart in answering this question.

| | warm | cool |
|---|---|---|
| Mom | | X |
| Dad | X | |
| Grandma | X | |
| Charlie | X | |
| Me | X | |
| | | |

Create a list of places that the family could go that would be warm. Use the Vacation BLM to create a class chart showing how the class would vote for the choices for warm or cool. *See Vacation Sample BLM for a sample class chart*. Discuss the data on the class chart by asking questions similar to the questions asked about the story.

- Pages 18-19 – "Should we travel somewhere far?" Continue reading and use the Story BLM to make a chart similar to the one the daughter makes (see example below).

| | far | near |
|---|---|---|
| Mom | | X |
| Dad | | X |
| Grandma | | X |
| Charlie | X | |
| Me | X | |
| | | |

Discuss the data on the chart (How many people wanted to go somewhere far? How many people wanted to go somewhere near? How many more people wanted to go someplace near rather than someplace far? How many people were surveyed in all?) Ask the students to use the information to predict if the family will decide to go to a place that is near or far from home. Make sure that they use the data to support their answers.

Create a list of places that the family could go that would be near. (Since the location of the family in the story is unknown, elicit places that are near the city/town in which the school is located.) Use the Vacation BLM to create a class chart showing how the class would vote if deciding to go near or far. Discuss the data on the class chart by asking questions similar to the questions asked about the story.

- Pages 20-21 – "What about excitement?" Clarify that some people like different types of vacations. Continue reading and use the Story BLM to make a chart similar to the one the daughter makes (see example below).

| | fun | quiet |
|---|---|---|
| Mom | | X |
| Dad | | X |
| Grandma | X | |
| Charlie | X | |
| Me | X | |
| | | |

Discuss the data on the chart (How many people wanted to go somewhere fun? How many people wanted to go somewhere quiet? How many more people wanted to go someplace fun rather than someplace quiet? How many people were surveyed in all?) Ask the students to use the information to predict if the family will decide to go to a place that is fun or quiet. Make sure that they use the data to support their answers. Create a list of places that the family could go that would be fun. Use the Vacation BLM to create a class chart showing how the class would vote on choosing a fun or quiet vacation. Discuss the data on the class chart by asking questions similar to the questions asked about the story.

- Pages 22-23 – "Could Fluffer come with us?" Identify Fluffer as the pet cat. Ask for predictions about what the family will choose. Continue reading and use the Story BLM to make a chart similar to the one the daughter makes (see example below). Discuss the data on the chart (How many people wanted to bring the cat? How many people did not want to bring the cat? How many more people wanted to bring Fluffer rather than not bring Fluffer? How many people were surveyed in all? Do you think the family will bring the cat with them or not?) Create a list of places that the family could go that they could bring the cat. Use the Vacation BLM to create a class chart showing how the class would vote for each of these choices (bring a pet or not bring a pet). Discuss the data on the class chart.

| | do not bring Fluffer | bring Fluffer |
|---|---|---|
| Mom | | X |
| Dad | X | |
| Grandma | | X |
| Charlie | | X |
| Me | | X |
| | | |

- Pages 24-25 – Look back at all the charts created in the story and determine what kind of place the family would like to vacation. (warm, near, fun, bring the cat) Continue reading the rest of the story to find out where the family goes on vacation.

After reading, look at all the class charts created. Determine what kind of place the class would like to visit based on the data in the class charts. Have students write about a place that would meet the class requirements in their *learning log* (view literacy strategy descriptions). Have students discuss how they determined what kind of place they think the class would like to go. Their decisions should be based on the data that was collected about the class preferences. Be sure to ask and answer questions about the total number of people who were surveyed, how many people voted for each choice, and how many more or fewer people had responses in one category than in another.

Example: Our class wants to go somewhere that is warm, far away, fun without our pets. There were 25 class members who answered the questions. Five voted for a colder place and 20 people wanted to go to warmer place. Fifteen more people wanted to go far away than the number who wanted to go closer. No one wanted to take their pets. I think we should go to Disney World. Disney World is all the way in Florida so that is far away. It is also very hot there. We could not bring our pets because they would not let them in. Disney World would be the perfect place to go.

**Activity 11: Math Monsters (CCSS: 1.MD.4, MP.2, MP.3, MP.4, MP.5, MP.6)**

Materials List: Math Monsters Data Collection video, Math Monsters Data Collection teacher's guide, Math Monsters Data Collection blackline masters

Math Monsters Data Collection materials can be downloaded from Unitedstreaming, at http://player.discoveryeducation.com/index.cfm?guidAssetId=D036EA0D-E9B6-4970-9371-3A6720A92AAF&blnFromSearch=1&productcode=US. Most school districts in Louisiana have memberships which allow access to Unitedstreaming.

In the video from this site, the characters are planning to open a pancake restaurant. In order to determine which types of pancakes they should serve, they decide to ask the other monsters in their town. Each monster collects his/her data using a different method, and the monsters must figure out how to combine all their data. This video gives a good introduction to different types of data collection (pictographs, tally marks, chart) and ends with a bar graph. At this site,

activities are included to be used before viewing the video, during the video, and after viewing the video.

**Activity 12: Graphing with Blocks (CCSS: 1.MD.4, MP.2, MP.3, MP.4, MP.5, MP.6)**

Materials List: 3 different color linking cubes, small brown paper bags, Vertical Picture Graph Mat, Horizontal Picture Graph Mat

*Teacher Note: Although bar and picture graphs are not mastered until second grade, these types of graphs can be introduced at first grade as a way of organizing data. Students may use the idea of these types of graphs when trying to display and organize data. Picture graphs have been used here, but bar graphs or charts could be used as well. Students may use other types of displays such as tally charts or line plots.*

Real materials such as cubes can be placed on a chart to create a "real graph." When the students transfer a rendition/drawing of the cubes on paper, then it becomes a picto-graph or picture graph. If they replace each block with some other symbol to represent each block, then it becomes an abstract graph. The book *Graphing Primer* by Laura Duncan Chaote and JoAnn King Okey is a great resource. It has many great ideas for graphing.

Ideas for a class-sized graph (one in which students themselves or real items can be placed):

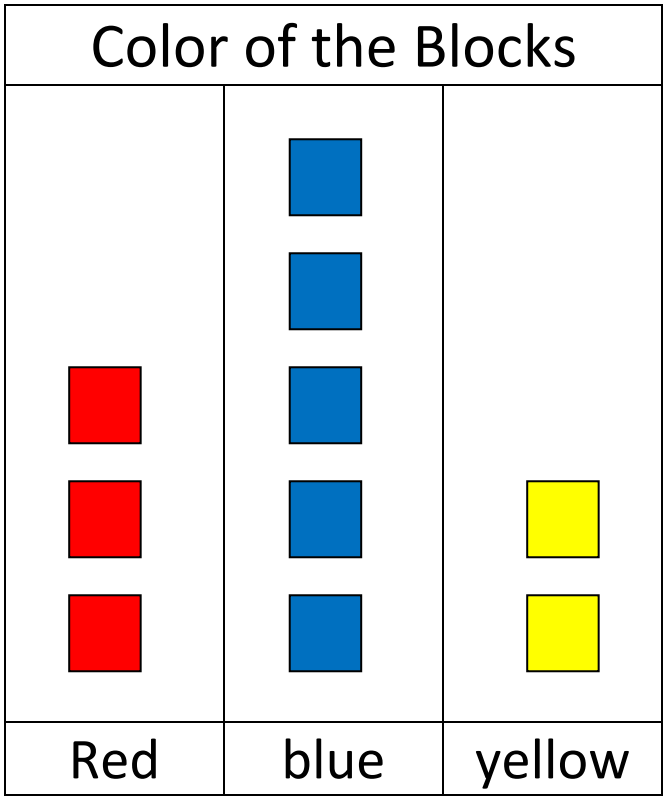
- Use an old roll-up window shade and grid it off into boxes large enough for the students' shoes to fit in each box. It can be rolled up for easy storage and used for other REAL items at various times.
- Use a flat bed sheet and grid it off into boxes large enough for students' shoes to fit in each box.
- Use thick tape (masking tape, duct tape) to tape off columns in which students can stand.
- Use sidewalk chalk to draw columns in which students can stand.

Place 10 red cubes, 10 blue cubes, and 10 yellow cubes in a paper bag. Choose 10 students to pick a cube from the bag. Discuss with the class how many of each color cube was pulled from the bag. (3 red, 5 blue, 2 yellow) Place all the cubes back in the bag. Choose 10 different students to pick a cube from the bag. Discuss how many of each color was pulled from the bag. (6 red, 1 blue, 3 yellow) Place all the cubes back in the bag and have 10 students pull a cube again. Discuss how many of each color was pulled from the bag. Ask students how the class could keep track of the colors that were pulled each time. Remind students of the vacation charts the class created and how the Math Monsters used graphs to keep track of the kinds of pancakes the people in the town liked. Have each student in the class pick a cube from the bag. Using a class sized graph, have students arrange themselves in order to organize the data about the cubes each student pulled. If students cannot physically fit in the graph, use students' shoes or a post it with their name on it to represent each student.

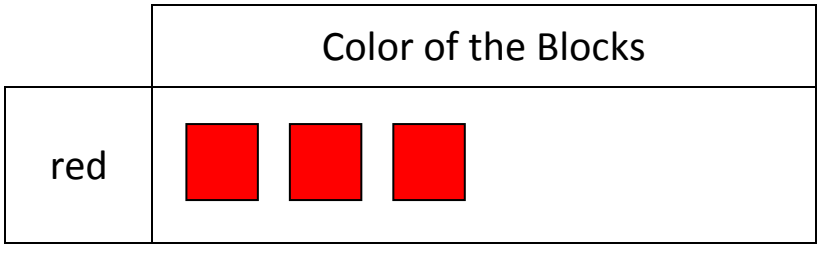
Display the Vertical Picture Graph Mat BLM. Have students help give a title to the graph. Write red, yellow, and blue on the blanks at the bottom of the chart. Pull 10 cubes from the bag. Create a graph by placing the cubes on the mat. Point out that when making a vertical picture graph,

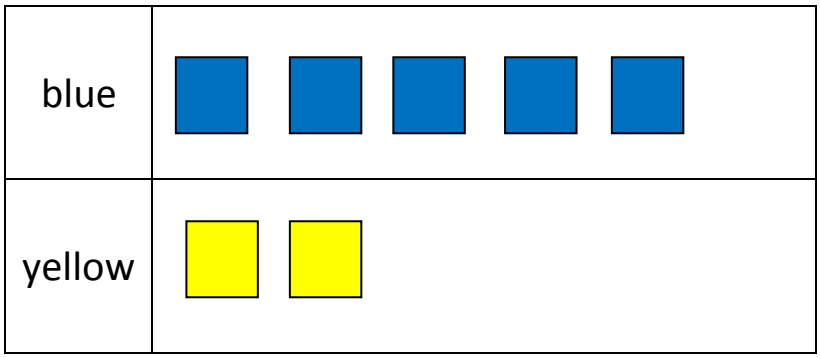
students should begin placing the cubes in the boxes at the baseline or the bottom of the graph. Make sure that students align the cubes in straight lines horizontally (one-to-one correspondence) to make it easy to visually read and compare data, such as exact lengths and counts. Ask questions such as:

- How many yellow cubes are on the graph?
- How many blue cubes?
- How many red and blue cubes?
- Did you pull more red or more blue cubes?
- How many cubes did you pull in all?




Display the Horizontal Picture Graph Mat BLM. Write in the title of the graph. Write red, yellow, and blue in the blanks on the left side of the graph. Create the same graph as before on this BLM. Point out that when making a horizontal picture graph, students should begin placing cubes in the boxes on the left side of the graph.






Give each student a paper bag with 5 cubes of each color inside (5 red, 5 blue, 5 yellow). Have students create graphs for pulling cubes randomly from a bag. Have students reach into the bag and pull out 10 cubes. Give half of the class the Vertical Picture Graph Mat BLM and half of the class the Horizontal Picture Graph Mat BLM. Have students complete a graph on the provided BLM by drawing squares to represent the cubes. Encourage students to carefully draw (and explain/demonstrate why) each box approximately the same size and align them vertically (one-to-one correspondence) for easy visual discrimination in the boxes on the graph. Provide support as needed while students create their graphs.

Display several of the student graphs. Ask questions such as:

- How many yellow cubes did _____ pull?
- How many total cubes did _____ pull?
- How many cubes did ____ pull in all?
- Did _____ pull more red cubes or blue cubes? How many more? How many fewer?

Have extra Vertical and Horizontal Picture Graph BLM pages available for students who finish early. Challenge these students to create a second graph and compare the two graphs that were made. Which graph has more red? Which graph has less/fewer blue? How many yellow are on both graphs?

**Activity 13: Graph/Chart Questions (CCSS: 1.MD.4, MP.2, MP.3, MP.4, MP.5, MP.6)**

Materials List: Graph/Chart Questions BLM

After students understand the concepts behind graphing, class graphs or charts can be done at any time for a quick review. Students need to understand that a graph is a visual display (or picture) of data/information that is easy to read and it is used to make comparisons, answer questions, or make decisions.

Use the Graph/Chart Questions BLM as a reference for questions that can be asked after the class creates a graph.

Ideas for graphs/charts:

- number of boys and girls in the class
- ages of students in the class (6, 7, 8)

- favorite milk choice (white, chocolate, strawberry)
- favorite candy
- favorite sport
- favorite pet
- how we get to school (bus, car, walk)

When creating graphs or charts in class, limit the choices on which students can vote. For example, in a favorite pet graph, students may only choose from dog, cat, and fish. A category of "other" could be added to include pets such as fish, turtles, birds, snakes, etc.

Ways to graph:

- Create a graph using sticky notes by having students place their sticky note on the appropriate part of the graph.
- Make a chart using stickers by having students add a sticker to represent themselves on the graph.

Have students ask their own questions about the graphs.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records, as well as student-generated products, may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction on the weaknesses that continue to persist.

- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student-generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

- Fluency Assessment – At the end of the unit, assess student fluency (for diagnostic or formative purposes only) in addition and subtraction to 10. Individually assess each student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the time it takes for the student to complete the

sheet and the number of errors. Check for possible repeated error patterns. Use the data to plan further instruction for individual students or small groups.

- Assess that the student is using appropriate mathematical language in speaking and recording.

**Activity-Specific Assessments**

- Activity 1: Give the student 3 objects of varying length. Ask the student to identify which item is longest and which item is shortest. Have the student put the objects in order by length starting with the longest item. Give the student 3 different objects of varying lengths. Have the student put the objects in order by length starting with the shortest item.

- Activity 3: Give the student a non-standard measurement tool (paper clips, color tiles) and 3 objects of varying lengths. Have the student measure the different items using the given unit of measure. Make sure to provide enough items (with which to measure) to lie end to end along the entire item to be measured.

- Activity 9: Assess student understanding of time by showing the student different times on both digital and analog clocks. Show times to the hour and half-hour. Have the student tell the correct time. Call out different times (to the hour and half-hour) and have the student write each time and show each time on a clock.

- Activity 12: Give the student a paper bag with 5 cubes of each color inside (5 red, 5 blue, 5 yellow). Have the student reach into the bag and pull out 10 cubes. Have the student create a graph by drawing (or just placing) the cubes on the graph to show which color cubes were pulled randomly from a bag. Allow student to create either a horizontal or a vertical real or pictograph. Ask the student the follow questions and record the student's answers:
  - How many yellow cubes did you pull?
  - How many total cubes did you pull?
  - Did you pull more red cubes or blue cubes? How many more? How many fewer?

**Resources**

**Books:**
*One Hand at a Time* by Patricia E. Smith
*Graphing Primer* by Laure Duncan Choate and JoAnn King Okey

**Websites:**
Unitedstreaming: This site has Math Monster videos on Time and Measurement that can be used as an additional resource.

- Math Monsters: Time video
  http://player.discoveryeducation.com/index.cfm?guidAssetId=D05FE02A-93B2-4246-9E13-0CC768E49FE6&blnFromSearch=1&productcode=US
- Math Monsters: Standard and Non-Standard Measurement video
  http://player.discoveryeducation.com/index.cfm?guidAssetId=B6ADB13B-000A-4C08-AB85-1AF69D0D050B&blnFromSearch=1&productcode=US

# Grade 1
# Mathematics
# Unit 7: Numbers and Operations in Base Ten – Place Value


**Time Frame:** Approximately four weeks

*Note: The Comprehensive Curriculum is designed to allow students to achieve end-of-grade goals in developmentally-appropriate increments. The Unit Description, Student Understandings and Guiding Questions describe the developmentally-appropriate increments for each unit. The chart containing the CCSS for Mathematical Content provides the end-of-grade goals.*

## Unit Description

This unit will continue to focus on solving different types of addition and subtraction word problems and equations to 20. The unit serves as an introduction to using place value to solve addition problems involving two-digit and one-digit numbers.

## Student Understandings

Students will solve various types of addition and subtraction word problems and equations using strategies. Students will use place value to compare two numbers. Students will add two-digit and one-digit numbers with and without composing a group of ten.

## Guiding Questions

1. Can students solve addition and subtraction word problems using various strategies?
2. Can students solve for the unknown number in an equation?
3. Can students add three whole numbers within 20?
4. Can students compare a two-digit number and a one-digit number based on the meanings of the tens and ones digits?
5. Can students add within 100, including adding a two-digit number and a one-digit number using models or drawings?

**Unit 7 Common Core State Standards**

| CCSS for Mathematical Content | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Operations and Algebraic Thinking** | |
| 1.OA.1 | Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |
| 1.OA.2 | Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |
| 1.OA.3 | Apply properties of operations as strategies to add and subtract. Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.) |
| 1.OA.4 | Understand subtraction as an unknown-addend problem. For example, subtract 10 – 8 by finding the number that makes 10 when added to 8. |
| 1.OA.6 | Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use mental strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13). |
| 1.OA.8 | Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □. |
| **Numbers and Operations in Base Ten** | |
| 1.NBT.3 | Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. |
| 1.NBT.4 | Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. |

| Standards for Mathematical Practice (MP) | |
|---|---|
| MP.1 | Make sense and persevere in solving problems. |
| MP.2 | Reason abstractly and quantitatively. |
| MP.7 | Look for and make use of structure. |
| **CCSS for ELA Content** | |
| **CCSS#** | **CCSS Text** |
| **Writing** | |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. |
| **Speaking and Listening** | |
| SL.1.1 | Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussion (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). |

## Sample Activities

Note: The first 3 activities from Unit 1 (Straw Count, Number Path Math, and Counting Activities) and first activity from Unit 4 (Daily Professor) should be part of the daily routine in every unit and should be used each day that students are in school.

Additionally, students will need continued practice with addition and subtraction facts and strategies within 20 throughout the rest of the units. Students can review the facts and strategies learned in Units 2 and 3 with the use of the triangle flashcards, dominos and number bonds. Addition and subtraction practice should be done daily in small groups or centers.

### Activity 1: Missing Card (CCSS: 1.OA.4, 1.OA.6, 1.OA.8, MP.1, MP.2)

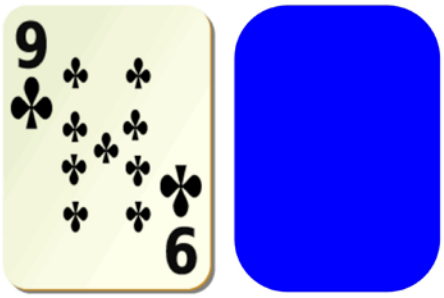
Materials List: playing cards (remove face cards), Missing Card BLM, Missing Card with Answers BLM, counters

Tell students that they are going to solve problems using a deck of cards. Discuss the fact that each card is worth a different number of points. For example, a 5-card will be worth 5 points, a 7-card will be worth 7 points, and an Ace will be worth 1 point, etc.

Using a 5-card and a 9-card from the deck of cards, pose this problem:

You have two cards. The first card is worth 9 points. Together the cards are worth 14 points. What is the second card worth?

Display the two cards, showing the 5-card number down and the 9-card number up.




Have students write an addition sentence for the same problem. (9 + ☐ = 14 or ☐ + 9 = 14) Have the students solve the addition problem and share the strategies used. (I counted on from 9 until I got to 14. I counted 10, 11, 12, 13, 14. I said 5 numbers, so my answer is 5 points. I counted from 9 to 10 and got 1. I knew it was 4 more to get to 14, so the answer is 5 points.)

Ask students for a subtraction sentence to go with the problem. (14 – 9 = ☐ or 14 - ☐ = 9) Have the students solve the subtraction problem. Have the students share the strategies used to solve the subtraction problem. (I drew a number path and counted down from 14 to 9. I subtracted 4 from 14 to get to 10 and then subtracted 5 more to get to 5. My answer is 5 points. I drew a picture to solve the problem. I drew 14 circles and crossed out 9. I was left with 5.)

Ask the students to explain how it is possible to solve the same word problem using both addition and subtraction. Review with students the relationship between addition and subtraction. Explain that in both equations the missing number is one of the parts or addends. The missing addend can be found by subtracting the known addend from the total or the missing addend can be found by counting on (up) from the known addend to the total. In both equations the missing number is the same.

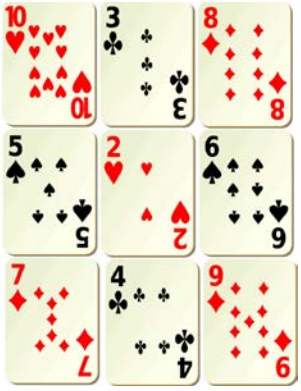
As a class, work through a few more problems by choosing two new cards each time. Give students both addition and subtraction equations for each set of 2 cards.

Hand out a Missing Card BLM to each student and counters. Have students work in pairs to solve each problem. Have students first write an addition equation for each problem, using ☐ to represent the missing part in each equation. Then have them write the related subtraction equation. Have students solve both equations and have them explain how they solved the problems. Observe and question students about the strategies used to solve each problem.

**Activity 2: I Spy (CCSS: 1.OA.4, 1.OA.6, 1.OA.8, MP.1, MP.2, MP.7)**

Materials List: playing cards (remove aces and face cards), I Spy BLM, counters

Have students work in pairs. Distribute the I Spy BLM, a deck of playing cards, and some counters to each pair. Have students arrange 9 playing cards in a 3 by 3 grid. Have them keep the rest of the cards in a stack.



- Have Player 1 think of two cards that are either side by side or top to bottom. The cards should not be removed from the grid or pointed out. Player 1 gives a clue about the cards. For example: I spy two cards that equal 11. One of the cards is 7.
- Player 2 writes down an addition equation and a subtraction equation for the given clue, using a ☐ to represent the unknown card (7 + ☐ = 11 or ☐ + 7 = 11 and 11 – 7 = ☐ or 11 - ☐ = 7) on the I Spy BLM.
- Player 2 then uses the "count on" strategy, "make a 10" strategy, or another strategy to solve both problems. Player 2 looks for the two cards that fit both equations and removes them from the grid. Player 2 takes two cards from the leftover stack to complete the 3 by 3 grid.
- The players switch roles and now Player 2 gives the clue and Player 1 writes the equations and looks for the two cards that would solve each equation.

| I Spy an Addition Equation | I Spy a Subtraction Equation | ☐ = ? |
|---|---|---|
| 7 + ☐ = 11 | 11 – 7 = ☐ | ☐ = 4 |
| | | |
| | | |

Students can also use the cards to practice addition and subtraction facts by removing all face cards and letting the Ace represent one. Have students shuffle the cards and place the deck number side down.

For addition, each player turns over 2 cards and calls out the sum. The player with the larger/greater (or smaller/lesser) sum wins that round and takes the 4 cards. If there is a tie, each player turns over 2 more cards and calls out the sum. The player with the higher/greater (or smaller/lesser) sum takes all 8 cards. Go through the deck once. The player with the most cards wins the game.

For subtraction, each player turns over 2 cards and calls out the difference. The player with the larger/greater (or smaller/lesser) difference wins that round and takes the 4 cards. If there is a tie, each player turns over 2 more cards and calls out the difference. The player with the higher/greater (or smaller/lesser) difference takes all 8 cards. Go through the deck once. The player with the most cards wins the game.

**Activity 3: Word Problem Think-Pair-Square-Share (CCSS: 1.OA.1, 1.OA.6, MP.1, MP.2, MP.7)**

Materials List: Types of Word Problems (teacher reference), Word Problem Cards BLM (3 pages), Word Problem Cards with Answers BLM (3 pages), dry erase boards, dry erase markers, counters

*Teacher Note: Use the Types of Word Problems BLM (reference sheet) to see the different types of addition and subtraction problems to model for students. During this lesson model problems of all types. There are two books that can be used as references for the different types of word problems, Teaching with Curriculum Focal Points: Focus in Grade 1 and Children's Mathematics: Cognitively Guided Instruction. Children should not be taught the names for the different types of problems, but should be exposed to all types.*

Prior to the activity, copy the Word Problem Cards BLM and cut apart cards.

Students will solve different word problems using *discussion* (view literacy strategy descriptions) in the form of Think-Pair-Square-Share.

In Think-Pair-Square-Share, students first think about a problem or discussion topic on their own. The students then pair up with partners to share their thoughts on the posed topic or problem. Each pair then joins with another pair to form a square. In this square, the students share their thoughts again, coming to a group consensus.

Place students in groups of 4. Give each group one of the word problem cards and some counters. Have students use Think-Pair-Square-Share to solve the given problem.

- Think: Have students work the given word problem independently, using any strategy they choose. Have them record their answer on a dry erase board.
- Pair: Have students in the group form 2 pairs. Each person in the pair shares his/her answer and the strategy used to solve the problem with his/her partner. The pair decides if the answers are the same and if not, decides which answer is correct.
- Square/Share: All 4 students in the group share with each other the answers they got and the strategies used. Students come to a consensus about the answer to the problem.

As a group finishes, give them a new word problem card to work using the same steps. Observe students as they work the given problem. Discuss with students their chosen strategy and why they decided to use the strategy. This activity includes various types of word problems, some of which can be interpreted as addition or subtraction. Sample equations are on the BLM with answers. Allow students the freedom to interpret each problem the way they see it.

**Activity 4: Write the Story Problem (CCSS: 1.OA.1, 1.OA.6, 1.OA.8, MP.1, MP.2, MP.7, W.1.8)**

Materials List: Equation Starter Cards BLM, Story Problem BLM, counters, zipper bags

Prior to the activity, copy and cut out the Equation Starter Cards BLM. Place the cards in zipper bags. Make enough sets for each group of 4 students to have a set.

Display the equation 6 + ☐ = 11. Ask the students what the equation means. (There are 6 of something. Some more are added. The total is 11.) Ask the students if they can think of a number story to go with the equation. Have students discuss possible number stories with partners. Have students share different number stories for the equation. Record one of the number stories. (Mom gave me 6 candies. Frank gave me some more candies. Now I have 11 candies.) Ask the students how a number story can be changed to make a word problem. (Add a question to solve for the missing part. How many more candies did Frank give me?) Have students solve for the missing part.

Display the equation 9 – ☐ = 3. Ask the students to think of a number story to go with the equation. Have students discuss possible number stories with partners. Have students share different number stories for the equation. Record one of the number stories. (I caught 9 bugs. Some of the bugs got away. I have 3 bugs left.) Ask the students how a number story can be changed to make a word problem. (Add a question to solve for the missing part. How many bugs got away?) Have students solve for the missing part.

Display the equation ☐ + 7 = 13 and a copy of the Story Problem BLM. As a class, create a word problem for the equation by having different students add to the word problem each time. Have a final student, write a question, solve the problem, and explain how they solved the problem.

Example:
For the equation, ☐ + 7 = 13
Student 1 – Mike has some stickers
Student 2 – Beth has 7 stickers.
Student 3 – They have 13 stickers together.
Student 4 – How many stickers does Mike have? Mike has 6 stickers. I figured this out by adding 3 to 7 to get to 10. I then added 3 more to get to 13. 3 and 3 make 6.

This activity has students create a modified *text chain* (view literacy strategy descriptions) while writing a number story. A *text chain* gives students the opportunity to apply what they have learned in a written format. A *text chain* can be used by students in math to describe the steps in a procedure or to write story problems.

Arrange students into groups of 4. Have students write number stories using a modified *text chain*. Hand out a Story Problem BLM to each student and give some counters and a zipper bag of Equation Starter Cards to each group. Explain to the students that they are going to work together to write different story problems. Their work on the problems will be broken down into

rounds. In round 1, all students will choose an equation from the Equation Starter Cards. On the Story Problem BLM, they will write the equation including a ☐ to represent the unknown part of the equation. In round 2, students will pass their paper to the person on their right in their group. Every person should get a paper. Students will write a first sentence of the story problem shown in the equation on the paper they received. In round 3, students pass their papers again. Students will write the next sentence in the story on the paper they received. In round 4, students pass their papers again. Students will write an additional sentence (if necessary) and a question based on the story they received. In round 5, papers are passed back to the original author who solves the story problem and explains the strategy used to solve the problem.

Round 1 – 8 + ☐ = 11
Round 2 – I gave my mom 8 flowers.
Round 3 – My sister gave her some more flowers.
Round 4 – Now she has 11 flowers. How many flowers did my sister give to our mom?
Round 5 – My sister gave our mom 3 flowers. I figured this out by first drawing my flowers. Then I added flowers until I got 11 altogether. I counted the ones I added and those are my sister's flowers.

Observe and assist (through questioning) as needed while students are working on their story problems. Encourage students to use the unknown (☐) symbol in a place other than the end of the equation.

By having each student start a number story using an Equation Starter Card, every student will be working on a different story each round. Have students share their number stories with the class, while students check for accuracy.

**Activity 5: Which Number is Greater? (CCSS: 1.NBT.3, MP.1, MP.2, MP.7, W.1.8)**

Materials List: Two Part Place-Value Board BLM, place-value blocks

Have students use place-value blocks to build the number 13 in the top section of the Two Part Place-Value Board BLM and build the number 9 in the bottom section of the board. Ask students to describe what is different about the two numbers. (13 has a ten in it and 9 does not, 13 has 3 ones and 9 has 9 ones.) Ask students which number is greater and how they know. They should see that the digit in the place with the greater value determines which number is greater. Students may need additional practice with this skill since the concept was introduced earlier in the year. There are 9 ones in 9, and only 3 ones in 13. But 13 is greater than 9 because 13 is made of 1 ten and 3 ones. Have students write the comparison sentences $13 > 9$ and $9 < 13$. Continue to have students build a two-digit number and a single-digit number on the place-value board, compare the numbers, and write two number sentences to describe the comparison. Have a discussion with the students that leads to the conclusion that any 2-digit number is greater than a 1-digit number because it has tens and any 1-digit number is less than any 2-digit number because it does not have any tens.

Have students engage in *RAFT* (view literacy strategy descriptions) writing. *RAFT* writing is used after students have acquired new content information and concepts. It helps them rework, apply, and extend their understandings. *RAFT* is an acronym that stands for:

R – Role (role of the writer)
A – Audience (to whom the RAFT is being written)
F – Form (the form the writing will take, as in letter, song, etc.)
T – Topic (the subject focus of the writing)

In this *RAFT*, the students, in the role of themselves, will write a "rule" for future first graders telling them why any 2-digit number is greater than a 1 digit-number.

Sample :
Dear Future First Graders,

This year you will learn that any 2-digit number is greater than a 1-digit number because a 2-digit number has some tens and a 1-digit number does not have any tens.

Sincerely,
Jodee

**Activity 6: Two-Digit Count On (CCSS: 1.NBT.4, MP.1, MP.2, MP.7)**

Materials List: 100s chart BLM, plastic page protectors, dry erase markers

Insert the hundreds chart BLM in a plastic sleeve so it may be used for future lessons.

Hand out a hundreds chart to each student. Display the following expressions: 31 + 3, 46 + 2, 22 + 3, 75 + 1, 54 + 5. For each expression, have students underline the greater number on their hundreds chart using a dry erase marker and count on the lower/lesser number of spaces. Have students circle the sum. Provide students with multiple opportunities to practice using the hundreds chart. Ask students if they counted on to find the answer, and if not, to explain what they were thinking.

When students are ready, have them put away the hundreds chart and count mentally from different two-digit numbers. Students can use different methods for keeping track of how many ones they counted on (fingers, tally marks, etc). Have students share their methods for keeping track of the count.

**Activity 7: Adding Two-Digit and One-Digit Numbers (CCSS: 1.NBT.4, MP.1, MP.2, MP.7)**

Materials List: Place-Value Board BLM, place-value blocks, Blank 10 Frames BLM, 100s chart BLM, counters or other small manipulatives

Prior to the activity create 10 frames workmats by taping together 2 copies of the Blank 10 Frames BLM. Each student will need a workmat for this activity. Workmats will be used in later activities.

Divide class into 3 groups.

- Give each student in the first group a Place-Value Board BLM and place-value blocks.
- Give each student in the second group the Blank 10 Frames workmat and counters.
- Give each student in the third group a 100s chart and a counter.

Explain to the students that they are going to solve word problems using the tools they are given.

Pose this problem:

- Mom has 24 stamps. She buys 5 more stamps. How many stamps does she have now?

Have the different groups use the materials they were provided to solve the problem. While students are working on their solutions, observe and discuss with the students how they are using their tool to help them solve the problem. Have the students in each group share their solutions and how they used their tools. Ask guiding questions for each tool such as:

- 100s chart – Where did you start on the 100s chart? How did you know which way to move on the chart? How did you know how many more boxes to count?
- 10 Frames – How did you show the 24 stamps? Where did you put the 5 more stamps? When you counted the total amount what did you count first, the tens or the ones? Why?
- Place-Value Board - How did you show the 24 stamps using place-value blocks? What blocks did you use for the 5 more stamps? Where did you put the 5 blocks? When you counted the total amount what did you count first, the tens or the ones? Why?

Explain that when adding with numbers the tens are added to tens and ones are added to ones.

Switch the tools that each group is using and pose the following problem.

- Brett has 31 rocks. He finds 7 more rocks. How many rocks does he have now?

Have the students use the new tools to solve the problem. Observe and discuss with students how they are using the tools to help them solve the problem. Have the students in each group share their solutions and how they used their tools.

Switch the tools that each group is using and pose the following problem.

- There are 45 ants in a line. They are joined by 4 ants. How many ants are walking in a line now?

Follow the same procedure as before.

Pose additional word problems and have the students solve the word problems using the tools of their choice.

**Activity 8: Human Number Line (CCSS: 1.NBT.3 MP.1, MP.2)**

Materials List: a rope or clothesline, numeral cards 1-100

This activity focuses on Number Sense. Use a rope (a clothesline works well) held at one end by a student holding the number zero, and the other end by a student holding 50 at first (and then later 100). Assign additional students with numeral cards 10, 20, 30, etc. and space themselves behind the rope as equidistant from each other as possible. Now have more students with 2-digit numeral cards come up and place themselves in the proper location on the "human number line". Ask questions such as, "How far are you away from 30?" "Is your number closer to 20 or 30?" Numbers ending in 5 would be right in the middle of two decade numbers, and student response should convey that they are the same distance from either decade number. This activity will promote number sense and a preparation for rounding in a later grade.

**Activity 9:** How Many to the Next Ten? **(CCSS: 1.NBT.4, MP.1, MP.2, MP.7, SL.1.1a)**

Materials List: 100s Chart BLM, Next Ten Number Cards BLM (2 pages), place-value blocks, Two Part Place-Value Board BLM

Prior to the activity, copy and cut out the cards on the Next Ten Number Cards BLM.

Have students find the number 42 on the 100s chart. Have students count on from 42. Ask students what is the next decade number they reach if they keep counting. (50) Ask students how many numbers they counted to get from 42 to 50. (8) Continue to call out numbers. For each number, ask students if they counted on, what would be the next decade number.

Distribute the Two Part Place-Value Board BLM. Have students make the number 34 using place value blocks in the top part of the board. Ask students what is the next decade number. (40) Have students begin to add ones to the bottom of the place-value board and count on until the next decade number is reached. Ask students how many ones they need to add to get to the next decade number. (6) Have students exchange the ten ones for a group of ten and place the new group of ten in the tens place.

Have students practice with other two-digit numbers.

Give a number card to each student. Use inside-outside circles *discussion* (view literacy strategy descriptions). Have students stand and face each other in two circles. The inside circle faces out while the outside circle faces in. Students are asked to have a discussion with the person standing in front of them. After an amount of time, either circle can be instructed to rotate until told to stop. The discussion will begin again with a new partner. This strategy allows for a variety of ideas to be shared by different partners.

Have the outside circle begin to rotate. When told to stop, have students in the inner circle show their number cards to their outer circle partner. Have the outer circle partner name the next decade number and tell how many need to be added to their number to reach the next decade number. The outer circle partner then shows his/her number card to the inner circle partner. The inner circle partner names the next decade number and tells how many need to be added to the number to reach the next decade number. Continue to have the outside circle rotate, stopping to allow students to share their number cards, name the next decade number, and tell how many need to be added to reach the decade number. Periodically call on a pair of students to report to the whole class what number is on one of their number cards, the next decade number, and how many are needed to reach that number.

Example: Inner circle partner show the number 32. Outer circle partner says the next decade number is 40. I need 8 more to get to 40. 32 + 8 = 40

**Activity 10**: **Addition using 100s Chart (CCSS: 1.NBT.4, MP.1, MP.2, MP.7)**

Materials List: 100s chart BLM, two different color counter

Hand out the 100s Chart BLM and 2 different color counters to each student. Display the equation 36 + 5 = ☐ and a 100s chart. Ask students on which number they would start and to explain why they chose that number. (36 because it is the greater number) Have them mark the number 36 with a counter. Ask how many more numbers they need to count on and why. (I counted on 4 more numbers because that is how many are needed to get from 36 to 40. I knew that 36 + 4 gives me 40 and 1 counted 1 more to get 41.) Have students count on 5 boxes. The second counter will be placed on the number 41. Ask students for the answer to 36 + 5 = ☐.

Give the equation ☐ = 23 + 9. Encourage students to think of what part of 9 could they add to 23 to get to 30.

23 + 9
  ∧
 7  2
9 = 7 + 2, so 23 + 7 = 30 and 30 + 2 = 32.

Have students practice the strategy using different addition equations. Students will be adding a 2-digit and a 1-digit number, using a count on or count up strategy.

Display the equation 40 + 10 = □. Ask students on which number they would start and to explain why they chose that number. (40 because it is the greater number) Have them mark the number 40 with a counter. Ask what is 10 more than 40. (50) Have students discuss how they found the total of 50. (I added 1 more and one more until I added 10 and I got to 50. I skip counted 40 and 10 more is 50. I thought 4 tens and 1 more ten is 5 tens or 50.) Have students place the second counter on 50. Ask students what is the answer to the equation 40 + 10 = □.

Provide other equations such as 50 + 30 = □, 83 + 10 = □, □ = 26 + 20, and 55 + 30 = □. Make sure that students explain how they find the totals.

**Activity 11: Adding With Composing a Ten (CCSS: 1.NBT.4, MP.1, MP.2, MP.7)**

Materials List: workmats made from Blank 10 Frames BLM from Activity 7, counters or other small manipulatives, Place-Value Board BLM, place-value blocks (tens and ones), Place-Value Cards BLM (two pages)

Prior to the activity, create a set of place-value cards for each student. Run off the Place-Value Cards BLM, cut apart the cards, and place in a zipper bag.

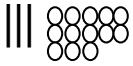
Give each student a 10 frames workmat and counters. Pose the problem:

> There are 36 sharpened pencils and 7 unsharpened pencils on a desk. How many pencils are on the desk?

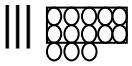
Have students use the blank 10 frames and counters to solve the problem. Ask students to describe the ten frames that they filled. (4 ten frames, 3 of them are completely filled and one has 6 counters on it) Ask students where they can place the counters for the 7 unsharpened pencils. (add to the ten frame that is not complete) Have students begin to add the counters. Ask students if all the counters will fit on the fourth ten frame. Ask students what they should do with the extra counters. (place them in another 10 frame) Ask students to describe their 10 frames. (I have four filled ten frames which shows 40. I have one 10 frame that has 3 in it.) Ask students what number of counter this shows. (40 + 3 or 43 counters) Discuss with the students how sometimes a new group of ten is made when adding numbers together. Remind students that when adding numbers they need to add tens to tens and ones to ones and sometimes they need to make a new 10 from the ones.

Have students solve the same word problem using a place-value board and place-value blocks. Ask students how to show the number of sharpened pencils on the place-value boards by using base ten blocks to represent the pencils. Have students add place-value blocks to the ones column to represent the 7 unsharpened pencils. Have students draw a picture to record what they see with the base ten blocks.

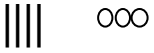

Have students combine the ones place-value blocks that represent the 7 unsharpened pencils with the ones place-value blocks in 36.



Ask students what they notice about the blocks in the ones place. Ask students if there is anything that can be done with some of the blocks in the ones place. Guide students to the idea of composing a group of ten.



Have students replace 10 of the ones with a 10 stick. They will now have 4 tens and 3 ones or 43.



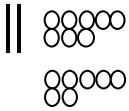
36 + 7 = 43

Ask students what number the place-value board shows now. (43) Return to the word problem. Ask students how many pencils are on the desk. (36 pencils + 7 pencils = 43 pencils on the desk.)

Pose additional word problems to the class in which composing a ten is required. Allow students to choose which tools they prefer to use and have them share how they used the tools to solve each problem.
Give the problem 28 + 7 = ____. Have students use the base ten blocks and draw pictures to add the 2 numbers. As students explain how they solved the problems, model the different ways to record the addition. The following are some examples that students may use.

**Method 1: Combining tens and ones on different lines.**
This strategy allows adding the same place value either from left to right or from right to left. The sums for each place are recorded below the problem on separate lines. These sums are then added together to get the total.

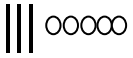
28
\+ 7



20 (sum of 2 tens and 0 tens)

15 (sum of 8 ones and 7 ones)

35 (sum of 2 tens and 10 ones and 5 ones)
This is the same as 2 tens and 1 ten and 5 ones OR 3 tens and five ones.

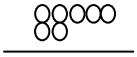


3 tens and 5 ones =35

In the example above, the numbers are added left to right – tens added to tens, then ones added to ones. Left to right addition is natural for students because reading is also done from left to right. Adding left to right also allows students to make closer approximations for sums earlier in the addition process.

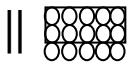
The example below shows addition from right to left – ones added to ones, then tens added to tens.

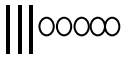
28 

\+ 7 

15  (sum of 8 ones and 7 ones)

20  (sum of 2 tens and 0 tens)

35  (sum of 2 tens and 10 ones and 5 ones)
This is the same as 2 tens and 10 ones and 5 ones
OR 3 tens and five ones.

 3 tens and 5 ones =35

**Method 2: Thinking of tens and ones**
Some students may think of the numbers as tens and ones.

| | |
|---|---|
| 28 | 2 tens and 8 ones |
| **+ 7** | + **7** ones |
| ------ | ---------- |
| | 2 tens and 15 ones |
| | = 2 tens and 1 ten and 5 ones |
| | = 3 tens and 5 ones or 35 |

Possible explanation: I can write 28 as 2 tens and 8 ones. I can add 8 ones and 7 ones and get 15 ones. I know that 15 ones is 1 ten and 5 ones. I now have 2 tens and 1 ten and 5 ones. This is 3 tens and 5 ones or 35.

**Method 3: Using place-value cards**
Have students use the place-value cards to find the total. Place-value cards were used in Unit 4, Activity 3. Review with the students how to use the place-value cards to represent the numbers in the equation. For the number 28 students should show the "20" card and the "8" card. Have students overlap the two cards to form the numeral 28. Have the students separate the two cards to show 28 as 20 plus 8.

28 20 + 8

**+ 7** **7**

20 + 10 + 5 is 35

Students may have other ways of solving the problems. As they explain their methods, make a drawing to record their ideas.

Pose other problems (2-digit plus 1-digit with composing) to the class. Have them solve the problem using the strategy of their choice. Students should be encouraged to use manipulatives and/or drawings to support their written methods.

**Activity 12: Adding to Total 99 (CCSS: 1.NBT.4, MP.1, MP.2, MP.7)**

Materials List: Place-Value Board BLM, place-value blocks (base ten blocks), Adding to Total 99 Number Cards BLM, 100s chart BLM, Adding to Total 99 Equation Sheet BLM, red and blue cubes, zipper bags

Prior to the activity, copy the Adding to Total 99 Number Cards BLM on stock paper. Cut the cards and place in a zipper bag. Make enough sets for each pair of students to have a set.

Students will work in pairs to play the game. Each pair of students will need a Place-Value Board BLM, place-value blocks, a set of Adding to Total 99 Number Cards, a 100s chart, a copy of the Adding to Total 99 Equation Sheet BLM, and a red and blue cube. Rules of the game:

- Player 1 will choose 2 cards from the zipper bag and record the numbers and an addition equation on the Total Adding to 99 Equation Sheet.
- Player 1 then uses the Place-Value Board BLM and the place-value blocks to solve the equation made from the number cards.
- Player 1 find the total on the 100s chart and places his/her cube on the total.
- Player 2 chooses 1 card from the zipper bag.
- Player 2 starts with the number shown on the place-value board and the 100s chart and adds the number he/she chose. Player 2 writes an addition equation on the Adding to Total 99 Equation Sheet.
- Player 2 then adds place-value blocks to the place-value board to solve the new equation.
- Player 2 places his/her cube on the answer to the new equation on the 100s chart.
- Player 1 choses another card and follows the same rules.

Example:

- Player 1 chooses a 9 and a 6. On the Adding to Total 99 Equation Sheet he/she fills in:

| 1st Number | 2nd Number | Addition Equation |
|---|---|---|
| 9 | 6 | 9 + 6 = □<br>9 + 6 = 15 |

- Player 1 then shows 9 and 6 on the place-value board using place-value materials.
- Player 1 composes a group of 10 and completes the addition sentence on the Equation Sheet.
- Player 1 places his/her cube on the number 15 on the 100s chart.
- Player 1 returns the number cards to the zipper bag. The place-value blocks remain on the chart.
- Player 2 chooses a 5. On the Equation Sheet he/she fills in the 15 and the 5 from Player 1's turn.

| 1st Number | 2nd Number | Addition Equation |
|---|---|---|
| **9** | **6** | **9 + 6 = □**<br>**9 + 6 = 15** |
| **15** | **5** | **15 + 5 = □**<br>**15 + 5 = 20** |

- Player 2 adds 5 more place-value blocks to the place-value board to solve the new equation and makes the trade to show 2 tens blocks for a total of 20.
- Player 2 places his/her cube on the number 20 on the 100s.
- The number card is returned to the zipper bag. The place-value blocks are left on the mat.
- Player 1 chooses 1 card from the zipper bag to continue the game.
- Play continues until one of the students' cubes reaches the number 99 on the 100s chart.
- Players must reach exactly 99. If the number chosen takes the total past 99, the player loses his/her turn.

This activity should be placed in a center to allow students to practice adding a 1-digit number to a 2-digit number.

**Activity 12: Ladybug Math (CCSS: 1.OA.1, 1.OA.2, 1.OA.3, MP.1, MP.2, MP.7)**

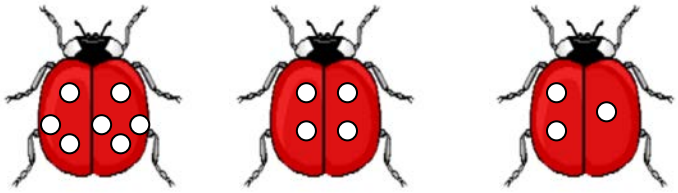
Materials List: Ladybug BLM, counters, plastic sheet protectors, dry-erase markers

Hand out a copy of the Ladybug BLM in a plastic sheet protector, a dry erase marker, and some counters to each student. Students will use the counters to solve addition word problems with three addends.

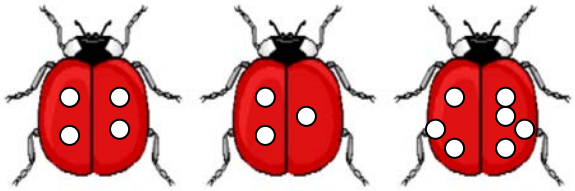
Pose the problem:
I caught some ladybugs. The first ladybug had 4 dots on its wings. The second ladybug had 7 dots on its wings. The third ladybug had 3 dots on its wings. How many dots do the ladybugs have altogether?

Have students solve the problem using their counters on the ladybugs and write a number sentence for the problem on their BLM. Tell them that they can arrange their ladybugs in any order. Allow students to share the strategies they used to solve the problem.

Some students may leave the ladybugs in the order below and say "I can add 7 + 4 and get 11. I then add 11 and 3 and get 14. "



Some students may arrange the ladybugs in the order below and say, "I can add 4 + 3 first to get 7. Then I add 7 + 7 to get 14."



Some students may arrange the ladybugs in the order below and say, "I can add 7 + 3 to get 10 and then add 10 + 4 to get 14."

Discuss the associative property while moving the ladybugs around to show how the addends can be rearranged but the total remains the same. Ask students why they might want to rearrange the numbers (to make the numbers easier to add).

Continue to have students solve three addend story problems using their ladybugs and counters. Have students share the strategies used to solve each problem. Discussion is critical here.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records, as well as student-generated products, may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

**General Assessments**

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction on the weaknesses that continue to persist.

- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student-generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

- Fluency Assessment – At the end of the unit, assess student fluency (for diagnostic or formative purposes only) in addition and subtraction to 10. Individually assess each student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the time it takes for the student to complete the sheet and the number of errors. Check for possible repeated error patterns. Use the data to plan further instruction for individual students or small groups.

- Assess that the student is using appropriate mathematical language in speaking and recording.

**Activity-Specific Assessments**

- Activity 1: Assess the Missing Card BLM for accuracy. Have students explain the strategies used for at least 2 of the problems.

- Activity 3: Give each student a word problem card from the BLM. Have students work to solve the problem using any strategy they choose

- Activity 4: Use the following rubric to assess at least one of the story problems created by each groups.

  * 2 points---All components of the activity are completed and correctly done.
  * 1 point----The activity was attempted, effort was evident, parts of the project were correct.
  * 0 points---No component of the activity was completed.

- Activity 11: Assess student's ability to use place-value manipulatives to add 2-digit and 1-digit numbers, both with and without composing a new ten, by playing a few rounds of Adding to Total 99 with the student.

# Grade 1
# Mathematics
# Unit 8: Understanding Operations through Place Value

**Time Frame:** Approximately three weeks

## Unit Description

This unit continues to focus on understanding place value and properties of operations to add and subtract.

## Student Understandings

Students develop an understanding that in adding two-digit numbers, one adds tens and tens, ones and ones, and sometimes it is necessary to compose a ten. Students subtract multiples of 10 in the range of 10-90 from multiples of 10 in the range of 10-90 and find 10 more and 10 less than a given two-digit number. Students will use concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to add and subtract. Students will relate the strategy to a written method and explain the reasoning used. Students will compare two two-digit numbers based on the meaning of the tens and ones values.

## Guiding Questions

1. Can students use addition and subtraction within 20 to solve word problems?
2. Can students solve problems for addition of three whole numbers?
3. Can students use strategies based on place value, properties of operations, and/or the relationship between addition and subtraction to add within 100?
4. Can students relate the strategy used to add or subtract to a written method and explain the reasoning used?
5. Do students understand that in adding two-digit numbers, one adds tens and tens, ones and ones, and sometimes it is necessary to compose a ten?
6. Can students, when given a two-digit number, mentally find 10 more or 10 less than the number, without having to count, and explain the reasoning used?
7. Can students subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero difference) using various strategies and relate the strategy to a written method and explain the reasoning used?
8. Can students compare two, two-digit numbers using the symbols >, =, and < based on the meaning of the tens and ones digits?

**Unit 8 Common Core State Standards**

| **CCSS for Mathematical Content** | |
|---|---|
| **CCSS #** | **CCSS Text** |
| **Operations and Algebraic Thinking** | |
| 1.OA.1 | Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |
| 1.OA.2 | Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. |
| **Numbers and Operations in Base Ten** | |
| 1.NBT.3 | Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <. |
| 1.NBT.4 | Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones, and sometimes it is necessary to compose a ten. |
| 1.NBT.5 | Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. |
| 1.NBT.6 | Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero difference), 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. |
| **Standards for Mathematical Practice (MP)** | |
| MP.1 | Make sense and persevere in solving problems. |
| MP.2 | Reason abstractly and quantitatively. |
| MP.5 | Use appropriate tools strategically. |
| MP.6 | Attend to precision. |
| MP.7 | Look for and make use of structure. |

| CCSS for ELA Content | |
|---|---|
| **CCSS#** | **CCSS Text** |
| **Reading Standards for Informational Text** | |
| RI.1.1 | Ask and answer questions about key details in a text. |
| **Speaking and Listening** | |
| SL.1.1 | Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussion (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). |

## Sample Activities

Note: The first 3 activities from Unit 1 (Straw Count, Number Path Math, and Counting Activities) and first activity from Unit 4 (Daily Professor) should be part of the daily routine in every unit and should be used each day that students are in school.

Additionally, students will need continued practice with addition and subtraction facts and strategies within 20 throughout this unit. Students should review the facts and strategies learned in Units 2 and 3 using triangle flashcards, dominos, and number bonds. Addition and subtraction practice should be done daily in small groups or centers.

### Activity 1: How Many Points? (CCSS: 1.OA.2, MP.1, MP.2)

Materials List: Balloon Pop Points Chart BLM, Balloon Pop Word Problems BLM, Balloon Pop Word Problems with Answers BLM

Display a copy of the Balloon Pop Points Chart BLM. Hand out a copy of the Balloon Pop Points Chart BLM and a Balloon Pop Word Problems BLM to each student. Pose the situation:

> A group of students went to a fair. They all took turns playing Balloon Pop. For each balloon the students popped they earned points. Each student popped three balloons. Use the Balloon Pop Points Chart to solve the word problems to find out which student earned the most points.

Have students work in pairs to solve the word problems on the Balloon Pop Word Problems BLM. Remind students that they can add the numbers in any order to make the addition easier. Observe students as they work the problems. Discuss with students their chosen strategies and why they decided to use the strategies. Some students may simply add the numbers in the order that they are given. Some may look for doubles and others may use the "make a ten" strategy.

After the pairs have solved the problems, challenge the students to write their own Balloon Pop word problems for partners to solve.

**Activity 2: First Grade Mascot (CCSS: 1.OA.1, MP.1, MP.2, SL.1.1a)**

Materials List: Mascot Results Chart BLM, Mascot Results Chart with Answers BLM, Mascot Word Problems BLM, Mascot Word Problems with Answers BLM, counters

Display a copy of the Mascot Results Chart BLM. Hand out a copy of the Mascot Results Chart BLM, a Mascot Word Problems BLM and counters to each student. Pose the situation:

> The first graders at Blue Lake Elementary were asked to choose a mascot for their grade. They were asked to vote for one of the animals on the chart to be the mascot. Solve the word problems to find out how many votes each animal received and complete the chart to find out which mascot had the most votes.

Place students in groups of 4. Have students solve the word problems using *discussion* (view literacy strategy descriptions) in the form of Think-Pair-Square-Share.

In Think-Pair-Square-Share, students first think about a problem or discussion topic on their own. The students then pair up with partners to share their thoughts on the posed topic or problem. Each pair then joins with another pair to form a square. In this square, the students share their thoughts again, coming to a group consensus.

- Think: Students work to solve the word problems independently, using any strategy/tools they choose. Students record their answers on the Mascot Word Problems BLM.
- Pair: Students in the group form 2 pairs. Each person in the pair shares his/her answer and the strategy used to solve each problem. The pair decides if the answers are the same and, if not, decides which answer is correct.
- Square/Share: All 4 students in the group share with each other the answers they got and the strategies used. Students come to a consensus about the answer to each problem. As a group, students write the missing numbers on the Mascot Results Chart BLM. The students complete the final statement on the Mascot Results Chart naming the winner of the mascot vote.

Observe students as they work the given problems. Discuss with students their chosen strategies and why they decided to use the strategies. This activity includes various types of word problems, some of which can be interpreted as addition or subtraction. Possible equations are shown on the BLM with Answers. Allow students the freedom to interpret each problem in the way that is most comfortable for them.

**Activity 3: Greater or Less (CCSS: 1.NBT.3, MP.2, MP.6, MP.7, SL.1.1a)**

Materials List: Place-Value Board BLM, index cards, number cards 1 to 99, clipboard

Give each student a number card. Distribute the Place-Value Board BLM to the students. Have two students draw representations of their numbers on separate place-value boards for the class to see. Have them draw sticks for tens and small circles for ones. A third student will be *professor know-it-all* (view literacy strategy descriptions). Give the *professor-know-it-all* a clipboard holding index cards showing the symbols for greater than and less than. The *professor-know-it-all* will show the symbols for both greater than and less than and poll the class to see which symbol the class would use between the two numbers. The *professor-know-it-all* will then determine which comparison symbol to place between the two numbers and explain why.

Example: Compare the numbers: 36 ___ 17

36 ||| ○○○○○ ○

17 | ○○○○○ ○○

Possible explanation: 36 is greater than 17 because there are 3 tens in 36 and only 1 ten in 17. 3 tens is more than 1 ten. Also, when I count, I say 17 before I say 36, so 36 is greater than 17.
36 > 17

Have students state a second comparison statement about the two numbers using the less than sign.
17 < 36 (The more practice with this, the more confident students will become.)

If needed, ask the professor guiding questions to help clarify the explanation of which symbol was used. Possible guiding questions: Which digit did you compare first, the tens or the ones? Why? How many tens are in the first number? How many tens are in the second number? Did you need to look at the ones place? Have the *professor know-it-all* use the same two numbers using **both** the > and < to show how the numbers are related.

Have the *professor-know-it-all* choose the next two students to draw representations of their numbers and choose the next *professor-know-it-all*. Continue until every student has had the chance to draw a representation of their numbers. Be sure to provide students with numbers that have the same number of tens but different and/or equal numbers of ones.

**Activity 4: Finding 10 More (CCSS: 1.NBT.5, MP.7)**

Materials List: Place-Value Board BLM, place-value blocks, 100s Chart BLM, plastic page protectors, dry erase markers, Two-digit Number Cards BLM, zipper bags, 10 More Chart BLM

Prior to the activity run off the Two-digit Number Cards BLM, cut out cards, and place in a zipper bag. Each student will need a zipper bag of number cards.

Warm Up: Have students count by tens starting at a given number (not a multiple of ten). Say, "I am going to call out a start number and you are going to count by tens." Call out 27. Students will count 27, 37, 47, 57, 67, 77, 87, 97. Allow students to use a 100s chart for support, if needed.

Have students show the number 7 on their Place-Value Board using place-value blocks. Ask, "What do you think will happen if you add ten to your board?" Have students share their thoughts. Have students add ten to the board. Ask, "What is the new number?" (17) "What if you add another ten to this number?" Have students do so and name the new number. (27) Ask the students if they notice any pattern on their board. Have students discuss with a neighbor what happens when another 10 is added to a number. Discuss the pattern with the entire class. Begin to call out other random two-digit numbers and have students add 10 more to the given amount using the base-ten blocks and name the new number.

Give each student a copy of the 100s Chart BLM, which has been inserted in a plastic page protector, and a dry erase marker. Have students circle the number 9 on the 100s chart. Have students find the number that is 10 more than 9 and circle it on the 100s chart. (19) Have students find the number that is 10 more than 19 and circle it on the 100s chart. (29) Ask the students if they notice any pattern on their 100s chart. Have students discuss with a neighbor what happens when 10 is added to a number. Discuss the pattern with the entire class. Begin to call out other random two-digit numbers and have students find the number that is 10 more on the 100s chart.

Hand out a copy of the 10 More Chart BLM and a zipper bag of number cards to each student. Have students choose a number card from the bag and write the number in the first column on the 10 More Chart. Have them write the numeral that is 10 more than the card in the second column on the chart. Have students continue to choose new number cards from the bag and write the numeral that is 10 more.

Example:

| **10 More** | |
|---|---|
| Number Card | 10 More |
| 67 | 77 |
| 23 | 33 |
| 35 | 45 |

Observe and question students about the strategy they are using to find 10 more while they are completing the chart.

Quick Review: Call out a two-digit number and have students quickly name the number that is 10 more. This can be done frequently while waiting to go to a recess or lunch, etc. It can also be used to get students' attention before launching the next lesson.

**Activity 5: Finding 10 Less/Fewer (CCSS: 1.NBT.5, MP.6, MP.7)**

Materials List: Place-Value Board BLM, place-value blocks, 100s Chart BLM, plastic page protectors, dry erase markers, 10 Less Chart BLM, Two-digit Number Cards from Activity 4

Warm Up: Have students count back by tens starting at a given number (not a multiple of ten). Say, "I am going to call out a start number and you are going to count back by tens. Call out 62." Students will count 62, 52, 42, 32, 22, 12, 2. Allow students to use a 100s chart for support if needed.

Have students show the number 84 on their Place-Value Board using place-value blocks. Ask, "What do you think will happen if you take a ten off your board?" Have students share their thoughts. Have student take away a ten. "What is the new number?" (74) Ask, "What if you take away another ten from this number?" Have students do so and name the new number. (64) Continue to give other two-digit numbers as starting numbers. Ask the students if they notice any pattern on their board. Have students discuss with a neighbor what happens when a 10 is taken away from a number. Discuss the pattern with the entire class. Begin to call out other random two-digit numbers and have students remove a 10 from their set of base-ten blocks and name the new number.

Give each student a copy of the 100s Chart BLM, which has been inserted in a plastic page protector, and a dry erase marker. Have students circle the number 79 on the 100s chart. Have students find the number that is 10 less/fewer than 79 and circle it on the 100s chart. (69) Have students find the number that is 10 less/fewer than 69 and circle it on the 100s chart. (59) Ask the students if they notice any pattern on their 100s chart. Have students discuss with a neighbor what happens when 10 is taken away from a number. Discuss the pattern with the entire class. Begin to call out other random two-digit numbers and have students find the number that is 10 less/fewer on the 100s chart.

Hand out a copy of the 10 Less/Fewer Chart BLM and a zipper bag of two-digit number cards to each student. Have students choose a number card from the bag and write the numeral in the first column on the 10 Less/Fewer Chart. Have them write the numeral that is 10 less/fewer than the card in the second column on the chart. Have students continue to choose new number cards from the bag and write the numeral that is 10 less/fewer.

Example:

| 10 Less/Fewer | |
|---|---|
| Number Card | 10 Less Than Number Card |
| 67 | 57 |
| 23 | 13 |
| 35 | 25 |

Observe and question students about the strategy they are using to find 10 less/fewer while students are completing the chart.

Quick Review: Call out a two-digit number and have students quickly name the number that is 10 less/fewer. This can be done frequently while waiting to go to a recess or lunch, etc. It can also be used to get students' attention before launching the next lesson.

**Activity 6: More and Less/Fewer (CCSS: 1.NBT.5, MP.7)**

Materials List: More and Less/Fewer Board BLM, 0-9 Number Cards BLM, plastic page protectors, dry erase markers, zipper bags

Run two copies per student of the 0-9 Number Cards BLM on cardstock, cut them out, and store in zipper bags. Copying this page twice and placing two of each numeral except zero in the zipper bag will provide opportunities for students to turn over two of the same digit (e.g., 22) to place in the center of the board. Create a bag for each student. Each student will need a copy of the More and Less BLM. Have students place the More and Less BLM in a plastic page protector.

These are the rules for the activity:

- Spread out the 0-9 cards face down.
- Turn over 2 cards and make a two-digit number between 10 and 90.
- Write the number in the center square on the board.
- Fill in the missing numbers on the board.
- Erase the board and play again.

Have students write in their *learning log* (view literacy strategy descriptions) how to quickly find 10 more than and 10 less than a given number. Have students share their writing with a neighbor.

**Activity 7: Subtract Multiples of 10 using Various Tools (CCSS: 1.NBT.6, MP.1, MP.5, MP.6, SL.1.1a)**

Materials List: place-value blocks (tens only), 100s Chart BLM, 10 Frame Cards BLM (3 pages), zipper bags

Run the 10 Frames Cards BLM on cardstock. Cut the cards (or have students cut the cards) and store in zipper bags. Each student will need a set to use throughout the unit. Have the students take out the frames with 10 dots as those will be the only frames that are needed in this activity. The other frames should remain in the zipper bag. Students will also need a set of place-value blocks, a copy of the 100s chart BLM, and a set of 10 Frame Cards.

Pose this situation:

> There are 80 children in first grade. Thirty children are going on a field trip. How many students are not going on the field trip?

Ask students to write a number sentence that would help them find the number of students not going on the field trip. (80 – 30 = ___.) Ask students what they notice about the numbers in the equation. (The numbers are decade numbers. The numbers are made only of groups of 10. Both numbers have a zero in the ones place.)

Divide students into 3 different groups. Assign each group a different tool to use to solve the equation. Group 1 will use base-10 blocks. Group 2 will use ten frames. Group 3 will use a 100s chart. Allow each group sufficient time to solve the problem using the tool provided. Monitor and provide guidance as needed.

Next, have students engage in a fishbowl *discussion* (view literacy strategy descriptions). A small group of students are asked to discuss a topic while another group of students look on. Those discussing are called the fishbowl group. Those watching are the outer group. The idea of the fishbowl is that the outer group of students must listen to the conversation but not contribute. At some point those in the outer group are given the chance to discuss the conversation in the fishbowl then both groups share their thoughts about the discussion.

Each group will take turns being in the fishbowl. The first group will discuss its answer to the problem and explain how it used their tool. For example, the 10 frame group might say, "We showed 80 children by using 8 ten frames. We took away 3 ten frames to show 30 children. That left 5 ten frames or 50. So, 50 children did not go on the field trip." After the group presents, pose a different problem to the class and have the students solve the problem using the presenting group's tool. Repeat process with groups 2 and 3 being in the fishbowl.

Have students discuss with partners which tool they liked the most and why. Have students share with the class which tool was their favorite and their reason why.

When students have had decided which strategy they liked the most, use *RAFT writing* (view literacy strategy descriptions) with them. *RAFT writing* is used after students have acquired new content information and concepts to help them rework, apply, and extend their understandings. RAFT is an acronym that stands for:

R – Role (role of the writer)
A – Audience (to whom the RAFT is being written)
F – Form (the form the writing will take, as in letter, song, etc.)
T – Topic (the subject focus of the writing)

In this *RAFT*, the student will write a letter to a friend telling which tool for subtracting multiples of ten is their favorite and why.

Have students share their letters with a friend. For homework, have them share their letter with two people in their home.

**Activity 8: How Much Is Left? (CCSS: 1.NBT.6, MP.7)**

Materials List: dimes (real or plastic), How Much Is Left? BLM, zipper bags

Prior to the activity, fill zipper bags with 9 dimes. Each student will need a zipper bag.

Explain that during this activity the class is going to use a new manipulative that represents groups of ten. Give a zipper bag to each student. Ask the students what is in the bag. (dimes) Ask if anyone knows how much a dime is worth in cents. (10 cents) Explain that a penny is worth one cent and a dime is worth 10 cents. Compare pennies and dimes to place-value blocks. Pennies are counted by ones like the ones blocks and dimes are counted by tens like the tens rods. Have students take out 4 dimes. Count by tens to determine that the dimes are worth 40 cents. Continue to have students count different amounts of dimes.

Pose this question:

> Mom gave me 60 cents. I spent 20 cents. How much money do I have left?

Have students use their dimes while solving this story problem. Work through the problem by asking the class the following questions: "How much money did you start with?" (60 cents) "How many dimes do you need to show 60 cents?" (6 dimes) "What does it mean to spend 20 cents?" (Money is being taken away.) "How many dimes do you need to subtract?" (2 dimes) "How many dimes do you have now?" (4 dimes) "How much money is that?" (40 cents) Have students write the subtraction equation for the story problem. (60¢ - 20¢ = 40¢) Have the students explain how they used their dimes to solve this subtraction equation. Give other problems using dimes.

Hand out a copy of the How Much Is Left? BLM to each student. Have students work in pairs to solve the story problems. Have students write the subtraction equation for each problem. While students are working, observe and provide guidance as needed. Have students explain how they solved the problems.

**Activity 9: Adding Two-Digit Numbers with 10 frames (CCSS: 1.NBT.4, MP.2, MP.6)**

Materials List: 10 Frame Cards from Activity 7

*Note: To limit the number of 10 frame cards needed during this activity, keep sums under 80.*

Give each student a set of 10 frame cards from the 10 Frame Cards used in Activity 7.

Pose this problem:

> There are 23 children eating in the lunchroom. Thirty-four (34) more children come to the lunchroom. How many students are in the lunchroom?

Guide the students through solving the word problem. Ask, "Who can describe what is happening in this word problem?" (Some children are eating lunch and some more children come

in.) "What kind of number sentence can you write for this problem?" (addition) "Write the addition sentence for this problem." (23 + 34 = □) "How can you use your 10 frames to solve this problem?" Allow students to work on solving the problem. Observe and question while students work.

Below are some questions to use to help students in solving the problem.

- How many children are eating in the lunchroom? How can you show 23 students using 10 frames? (2 filled 10 frames and a 10 frame that shows 3)
- How many children join them? How can you show 34 more children using the 10 frames? (3 filled 10 frames and a 10 frame that shows 4)
- What should you do to show the total number of students that are now in the lunchroom? (Add these two amounts together.)
- How can you do this using the 10 frames? (Count all the filled 10 frames.)
- How many tens is this? (5 tens)
- What should you do next? (Count the ones.)
- How many ones is this? (7 ones)
- How many children are in the lunchroom now? (I have 5 tens and 7 ones. This is 57. There are 57 children in the lunchroom now.)

Some students may count the ones in the 10 frames first. Either method is acceptable.

Pose other problems which require adding two-digit plus two-digit without composing (regrouping) the ones to the class. Have students solve the problem using their 10 frame cards.

**Activity 10: Addition without Composing (CCSS: 1.NBT.4, MP.2, MP.6)**

Materials List: Place-Value Board BLM, place-value blocks, Place-Value Cards BLM (2 pages), zipper bag

Prior to the activity create a set of place-value cards for each student. Run off the Place-Value Cards BLM, cut apart the cards, and place in a zipper bag.

Give each student a Place-Value Board and a set of place-value blocks.

Pose this problem:

> Fifty-one (51) people are watching a baseball game. Twenty-six (26) people join them to watch the game. How many people are watching the baseball game now?

Guide the students through solving the word problem. Ask, "Who can describe what is happening in this word problem?" (Some people are watching a baseball game and some more come to watch.) "What kind of number sentence can you write for this problem?" (addition) "What addition sentence can be used for this problem?" (51 + 26 = □) "How can you use your place-value materials to solve this problem?" Allow students to work on solving the problem. Observe and question while students work.

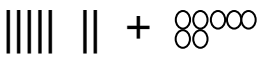
Below are some questions to use to help students in solving the problem.

- How many people are watching the game? How can you show 51 students using the base-ten blocks? (use 5 rods and 1 units block)
- How many people join them? How can you show 26 more people using the base-ten blocks? (use 2 rods and 6 unit blocks)
- What should you do to show the total number of people that are now watching the game? (Add these two amounts together.)
- How can you do this using the blocks? (Add the rods to the other rods and the unit blocks to the other unit blocks)
- How many tens is this? (7 rods or 7 tens)
- How many ones is this? (7 ones)
- How many people are watching the game now? (I have 7 tens and 7 ones. This is 77. There are 77 people watching the game now.)

Have students draw a picture and explain how they used the blocks to add.

51 + 26

(I drew 5 tens and 1 unit for 51. I drew 2 tens and 6 ones for 26.)



(I added 5 tens and 2 tens to get 7 tens. Then I added 5 ones and 2 ones to get 7. Other students may say, I added 50 and 20 and got 70 and then I added 6 and 1 and got 7.)

51 + 26 = 77

(7 tens and 7 ones is 70 plus 7 which is 77.)

Pose this problem:

> There were 42 students on the playground and 45 students in the cafeteria. How many students were in both places?

Have students use the base-ten blocks or draw pictures to add the 2 numbers. As students explain how they solved the problems, show them different ways to record the addition.
On the next page are some methods that students may use.

**Method 1: Some students may record combining tens and ones on different lines.**
This strategy allows adding digits in the same place value, either from left to right or from right to left. The sums for each place are recorded below the problem on separate lines. These sums are then added together to get the total.

| | | |
|---|---|---|
| 42 | |||| oo | |
| + 45 | |||| ooooo | |
| 80 | |||| |||| | (sum of 4 tens and 4 tens) |
| 7 | ooooo oo | (sum of 2 ones and 5 ones) |
| 87 | | |

In the example above, the numbers are added left to right. Left to right addition is natural for students because reading is also done from left to right. Adding left to right also allows students to make closer approximations for sums earlier in the addition process.

The example below shows addition from right to left.

| | | |
|---|---|---|
| 42 | |||| oo | |
| + 45 | |||| ooooo | |
| **7** | ooooo oo | (sum of 2 ones and 5 tens) |
| 80 | ||||| ||| | (sum of 4 tens and 4 tens) |
| 87 | | |

Pose other problems (two-digit plus two-digit without composing) to the class. Have students solve the problem using their place-value materials and record the problem.

**Method 2: Thinking about Tens and Ones**
Some students may break the numbers into tens and ones as is shown below.

| | |
|---|---|
| 42 | 4 tens and 2 ones |
| + 45 | + 4 tens and 5 ones |
| | 8 tens and 7 ones or 87 |

Possible explanation: I know that 42 is the same as 4 tens and 2 ones and that 45 is the same as 4 tens and 5 ones. I add tens to tens and ones to ones. So 4 tens and 4 tens is 8 tens and 2 ones and 5 ones is 7 ones. My answer is 8 tens and 7 ones or 87.

**Method 3: Using Place Value Cards**
Give students a set of Place-Value Cards. Have students use the cards to model the following problem. Place-Value Cards were used in Unit 7, Activity 10 to model adding two-digit and one-digit numbers. Review with the students how to represent the parts of the equation by

overlapping the place-value cards to show the whole number and separating the cards to show the value of each digit.

Pose the following problem:

> The class drew 26 pictures yesterday and 32 pictures today. How many pictures did the class draw on the 2 days?

Have students use the Place-Value Cards to model the problem. To show 26, they should use the 20 card and the 6 card. To show 32, they should use the 30 card and the 2 card. 20 + 30 is 50 and 6 + 2 is 8. When they place the 8 card over the 50 card, they find the sum of 58.

| | |
|---|---|
| 26 | 20 + 6 |
| + 32 | 30 + 2 |
| | 50 + 8 is 58 |

Provide additional problems to students for practice of addition of two two-digit numbers using the place value cards.

**Activity 11: Tic-Tac-Toe (CCSS: 1.NBT.4, MP.2)**

Materials List: Tic-Tac-Toe BLM (3 pages), 2 different color counters, calculator

Students will work in pairs. Give each pair one Tic-Tac-Toe BLM and 2 different colored counters. Students will play a game of Tic-Tac-Toe. Model the game with a student. As the teacher plays the game, he/she should "think aloud" so that students can learn the strategy of playing the game. Since students don't often consider choosing a box to block their opponent, this may help some students to understand blocking as a strategy to win the game.

Player 1 chooses an expression on the Tic-Tac-Toe board.
Player 1 solves the expression using any strategy. The player must explain how they solved the expression.

Player 2 checks the answer using a calculator. If player 1 is correct, he/she places one of his/her counters on that box. If player 1 is incorrect no counter is placed in that box.

Player 2 then chooses an unmarked expression on the Tic-Tac-Toe board.
Player 2 solves the expression using any strategy. The player must explain how they solved the expression.

Player 1 checks the answer using a calculator. If player 2 is correct, he/she places one of his/her counters in that box. If player 2 is incorrect no counter is placed in that box.

The winner is the player who correctly solves three equations in a row. The three correct equations can be in a row horizontally, vertically, or diagonally. There are three different Tic-Tac-Toe sheets. After students finish one game, give them another sheet.

**Activity 12: Where Am I? (CCSS: 1.NBT.4, MP.1, MP.2)**

Materials List: 100s Chart BLM, Where Am I? Task Cards BLM, plastic page protector, dry erase markers

Each student needs a 100s chart, a plastic page protector, and a dry erase marker.

Display a class 100s chart. Mark the number 27 on the 100s chart. Ask, "What number is 14 more than 27?" Have students use their 100s chart to answer the question. Have students share the methods they used to find the next number. (I counted on 14 more. I counted 3 more to get to 30 and then 11 more to 41. I thought, 27 plus 10 is 37, plus 4 more is 41.) Have students use their 100s charts to solve the following problems:

- 18 more than 36
- 25 more than 68
- 9 more than 42

Say, "I am thinking of a certain number. I am going to lead you to my number using addition clues. Follow along on your 100s chart and see if you can find my number." Choose one of the task cards from the Where Am I? Task Cards BLM. Guide students through the addition problems, having students solve the problem and color in each stop on the 100s chart. Model each step using a class 100s chart.

Example:

- Start on the number 5. (Students color in the number 5 on the 100s chart.)
- Find the number than is 13 more. (Students add 13 to the number 5.)
- Where are you now? (Students color in the number 18.) Ask students to share strategies/methods used to find the total.
- Find the number that is 16 more than 18. (Students add 16 to the number 18.)
- Where are you now? (Students color in the number 34.) Ask students to share strategies/methods used to find the next number.
- Find the number that is 11 more than 34. Stop. (Students add 11 to the number 34.)
- Where did you end up? What is the mystery number? (Students color in the number 45.) Ask students to share strategies/methods used to find the final number.

Choose additional task cards to solve as a class.

Centers: Place task cards and 100s charts in a center. Have students work together to solve the task cards.

**Activity 13: Adding Two-Digit Numbers using 10 frames with Composing (CCSS: 1.NBT.4, MP.2, MP.6)**

Materials List: 10 Frame Cards from Activity 7

*Note: During this activity, keep to sums under 80.*

Give each student a set of cards from the 10 Frame Cards used in Activity 7.

Pose this problem:

> There are 36 children riding the bus. 17 more children get on the bus. How many children are on the bus?

Guide the students through solving the word problem. Ask, "Who can describe what is happening in this word problem?" (Some children are on the bus and some more children get on.) "What kind of number sentence can you write for this problem?" (addition) "What addition sentence can be used to represent this problem?" (35 + 17 = □) "How can you use your 10 frames to solve this problem?" Allow students work on solving the problem. Observe and question while students work.

Below are some questions to use to help students in solving the problem:

- How many children are riding the bus? How can you show 35 students using the 10 frames? (3 filled 10 frames and a 10 frame that shows 5)
- How many children get on? How can you show 17 more children using the 10 frames? (1 filled 10 frame and a 10 frame that shows 7)
- What should you do to show the total number of students that are now on the bus? (Add these two amounts together.)
- How can you do this using the 10 frames? (Count all the filled 10 frames.)
- How many tens is this? (4 tens)
- What should you do next? (Count the ones.)
- How many ones is this? (12 ones)
- You have 12 ones. What is another way to show 12 ones? (1 group of 10 and 2 ones)
- How many tens do you have now? (5 tens)
- How many ones do you have now? (2 ones)
- How many children are on the bus now? (I have 5 tens and 2 ones. This is 52. There are 52 children on the bus now.)

Some students may start with the ones first; either method is acceptable.

Pose other problems (two-digit plus two-digit with composing) to the class. Have them solve the problem using their 10 frame cards.

**Activity 14: Addition with Composing (CCSS: 1.NBT.4, MP.2, MP.6)**

Materials List: Place-Value Board BLM, place-value blocks, Place-Value Cards from Activity 10

Give each student a Place-Value Board and a set of place-value blocks.

Pose this problem:

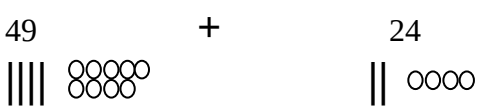
> Sally has 49 stickers. Her mom gives her 24 more. How many stickers does Sally have now?

Guide the students through solving the word problem. Ask, "Who can describe what is happening in this word problem?" (Sally has some stickers and her mom gives her more.) "What kind of number sentence can you write for this problem?" (addition) "What addition sentence can be used to represent this problem?" (49 + 24 = □) "How can you use your place-value materials to solve this problem?" Allow students to work on solving the problem. Observe and question while students work.

Below are some questions to use to help students in solving the problem:

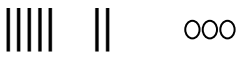
- How many stickers does Sally have? How can you show 49 stickers using the base-ten blocks (use 4 rods and 9 units blocks)
- How many stickers does mom give her? How can you show 24 more stickers using the base-ten blocks? (use 2 rods and 4 unit blocks)
- What should you do to show the total number of stickers? (Add these two amounts together.)
- How can you do this using the blocks? (Add the rods to the other rods and the unit blocks to the other unit blocks)
- How many tens is this? (6 rods or 6 tens or 60)
- How many ones is this? (13 ones)
- What is another way to show 13 ones? (1 ten and 3 ones)
- How many tens do you have now? (7 tens)
- How many ones do you have now? (3 ones)
- How many stickers does Sally have now? (I have 7 tens and 3 ones. This is 73. Sally has 73 stickers now.)

Have students draw a picture and explain how they used the blocks to add.




Possible explanation: I showed 49 using 4 ten sticks and 9 ones. I showed 24 using 2 ten sticks and 4 ones.

I added 4 tens and 2 tens and got 6 tens. This is 60. I combined 9 ones and 4 ones and got 13 ones. I can make 1 ten and 3 ones from 13 ones.



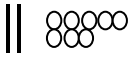
I added the 1 ten stick to the 6 ten sticks. This gave me 7 ten sticks and 3 ones which is the same as 70 + 3 = 73

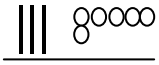
Another student might say, I added 4 tens and 2 tens and got 6 tens. I added 9 ones and 4 ones and got 13 ones. I took 10 of the thirteen ones and made another ten. So I now have 6 tens and 1 ten and 3 ones. I have 73. Still another might say, I added 40 and 20 and got 60. I added 9 and 4 and got 13. 13 is the same as 10 and 3. So now I have 60 + 10 + 3 or 73.

49 + 24 = 73

Pose the problem 28 + 36 = ____. Have students use the base-ten blocks and draw pictures to add the 2 numbers. As students explain how they solved the problems, show them different ways to record the addition. The following show some of the methods that students may use:

**Method 1: Combining tens and ones on lines**
This strategy allows adding the same place value either from left to right or from right to left. The sums for each place are recorded below the problem on separate lines. These sums are then added together to get the total.

28 

+ 36 

50  (sum of 2 tens and 3 tens)

14  (sum of 8 ones and 6 ones is 14 or 1 ten and 4 ones)

64 (sum of 5 tens and 1 ten and 4 ones or 6 tens and 4 ones)

In the example above, the numbers are added left to right – tens added to tens and then ones to ones. Left to right addition is natural for students because reading is also done from left to right. Adding left to right also allows students to make closer approximations for sums earlier in the addition process.

The example below shows addition from right to left - ones added to ones and then tens added to tens.

28
+ 36
14 (sum of 8 ones and 6 ones)
50 (sum of 2 tens and 3 tens)
64 (sum of 5 tens and 1 ten and 4 ones **or** 6 tens and 4 ones)

**Method 2: Thinking about tens and ones**
Some students may see

28 2 tens + 8 ones
+ 36 3 tens + 6 ones
5 tens + 14 ones (5 tens + 1 ten + 4 ones **or** 6 tens + 4 ones)

**Method 3: Using place value cards**
Have students use the place value cards from Activity 10 to find the total.

28 20 + 8
+ 36 30 + 6
50 + 10 + 4 is 64

Students may have other ways of recording the problems.

Pose other problems (two-digit plus two-digit with composing) to the class. Have them solve the problem using the strategy of their choice. Students should use manipulatives and/or drawings to support their written methods.

**Activity 15: Two-digit Addition Problems (CCSS: 1.NBT.4, MP.1, MP.6, RI.1.1)**

Materials List: Place-Value Board BLM, place-value blocks, Two-digit Addition Process Guide

This activity uses a modified *process guide* (view literacy strategy descriptions). A *process guide* scaffolds students' comprehension of text or a series of steps needed to complete a process. *Process guides* stimulate student thinking during a lesson. Guides help students focus on important steps within the process.

Pose this problem:

Bill has 38 toy cars. He buys 26 more cars. How many toy cars does he have altogether?

Have students use the Two-digit Addition Process Guide to solve the problem. Students will use a Place-Value Board and place-value blocks to solve the problem. Explain to students that the *process guide* will lead them through the steps needed to solve this problem. Lead the students through the guide, asking questions as the students work each step of the process. After the activity, have students explain the process in their own word to table partners. Observe as students solve the problem, questioning students about their strategies and decisions.

Early Finishers: Give students different addition word problems (two-digit plus two-digit with composing) to solve using a new process guide.

**Activity 16: Grab and Compare (CCSS: 1.NBT.3, 1.NBT.4, MP.2, MP.6)**

Materials List: beans or other small manipulative, small brown paper bags, Grab and Compare Game Board BLM, Grab and Compare Symbols BLM, Grab and Compare Recording Sheet BLM, pencil, plastic page protectors, dry erase marker

Students will play this game in pairs. Each pair will need a small brown paper bag filled with 90 – 100 beans, a Grab and Compare Game Board BLM in a plastic page protector, a dry erase marker, and a set of symbols from the Grab and Compare Symbols BLM. Each student will need a Grab and Compare Recording Sheet and a pencil.

Rules of the game:

- Have Player 1 reach into the brown bag and grab a handful of beans.
- Player 1 counts the number of beans, writes the numeral, and draws a place value representation of the number (draw lines to represent the amount/number of tens and circles to represent the amount/number of ones) under Player 1 on the game board. Player 2 reaches into the brown bag and grabs a handful of bean.
- Player 2 counts the number of beans, writes the numeral, and places the beans under Player 2 on the game board.
- The players decide together which symbols makes the sentence true and place that symbol on the game board.
- Both players record the game information on their own Grab and Compare Recording Sheet.
- In the last column, students write an addition equation for the total number of beans on the game board and solve the equation.
- All beans are placed back in the brown bag and play continues. Have students play at least 10 rounds (play can continue to 14 rounds).
- After the 10th round have students look over their Grab and Compare Recording Sheet to determine the winner of the game.
- The student with the most rounds of having the greater number is the winner.

## Sample Assessments

### General Guidelines

Documentation of student understanding is recommended to be in the form of portfolio assessment. Teacher observations, teacher interviews, anecdotal records as well as student-generated products may be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

### General Assessments

- Unit 1, General Assessments, Personal Interview: Review the interviews from Unit 1 and target students who did not score well. Interview these students again to determine if they still have some weaknesses, and if so, provide them with more instruction.

- Fluency Assessment – Using the Fluency Assessment pages from Unit 2, individually assess each student using the Addition Fact Fluency Assessment BLM and the Subtraction Fact Fluency Assessment BLM. Record the time it takes for the student to complete the sheet and the number of errors.

- Keep documentation of student understanding in the form of portfolios. Teacher observations and records as well as student- generated products will be included in the portfolio. All items should be dated and clearly labeled to effectively show student growth over time.

- The student will use appropriate mathematical language in speaking and recording an addition or subtraction equation.

### Activity-Specific Assessments

- Activity 6: Have students complete a More and Less/Fewer Board, explaining the strategies they used.

- Activity 7: Use the following rubric to assess each student's RAFT.

  * 2 points---All components of the activity are correctly completed.
  * 1 point----The activity was attempted, effort was evident, parts of the project were correct.
  * 0 points---No component of the activity was completed.

- Activity 11: Give each student a Tic-Tac-Toe Board. Have students solve 3 problems that make a Tic-Tac-Toe. Assess students' work for accuracy.

- Activity 12: Have students complete a Where Am I? task card independently

- Activity 15: Have students solve an addition word problem containing two two-digit numbers using a process guide.