SECTION 1

Standards and Activities for Kindergarten

Counting and Cardinality: K.CC.1

"Know number names and the count sequence."

1. "Count to 100 by ones and by tens."

BACKGROUND

When young children are learning to count, they may count some numbers more than once, skip numbers, and count numbers in the wrong order. Such instances are signs that they do not think of numbers as having any specific order or any relationship to other numbers. To count accurately, children need to understand that numbers are related to other numbers and that order matters.

ACTIVITY 1: READING A COUNTING BOOK

The teacher reads *Richard Scarry's Best Counting Book Ever* to the class and discusses numbers and counting.

MATERIALS

Richard Scarry's Best Counting Book Ever by Richard Scarry (Sterling, 2010).

PROCEDURE

1. Gather your students around you so that you will be able to share the illustrations with them as you read. Explain that you are going to read a book about Willy Bunny and counting.
2. As you read, pause often and encourage your students to count along with the story. Show the illustrations that will help them to associate numbers with objects.
3. Explain the order of the numbers. For example, 1 comes before 2 and 1 + 1 makes 2; 2 comes before 3 and 2 + 1 makes 3; 3 comes before 4 and 3 + 1 makes 4; and so on. Explain that 10 ones make 10, and that groups of 10 make 20, 30, and so on.

CLOSURE

Discuss the book with your students and review the relationships between numbers. Ask your students to recall numbers and relate them to objects in the book. Turn to specific pages to reinforce numbers and objects.

ACTIVITY 2: COUNTING FLOOR TILES

This activity may be divided into sessions over a few days. Students count off tiles as they walk, first by ones and then by tens.

MATERIALS

A floor with at least 100 tiles; for example, a hallway or gymnasium floor.

PROCEDURE

1. Explain to your students that they will count to 100, using floor tiles as a guide.
2. Take your students into the hallway or gym, or similar area where the floor is covered with tiles. Select a place that will not disturb others as your students count.
3. You may conduct the activity by having your students follow each other in a long line and walk on the same tiles, or you may divide them into groups and have them walk along tiles in separate lines.
4. To begin the activity, instruct your students to step forward, one tile at a time, and as a group count in order: 1, 2, 3, … 100. You may count with them, your voice serving as a guide. If necessary, correct students to ensure that they count accurately. Repeat this activity a few times to make certain that all your students understand the sequence of counting to 100. An option here is to have your students count tiles (quietly, of course) as they walk through the halls to gym, art, music, or other special classes.
5. After counting to 100 as a class, explain to your students that they will now count by tens to 100. (Note: You may prefer to complete this part of the activity on another day.) Lead the class in counting by tens so that all students know what they are to do. Depending on the abilities of your students, you may explain that 10 is a group of 10 ones; 20, therefore, is made up of two groups of 10 ones, or 2 tens, and other tens are similarly made up of groups of 10 ones.
6. Working as a whole class, or in groups, have your students walk and count tiles by tens. They should silently count by ones and then say every interval of 10.

CLOSURE

Upon returning to class, discuss that counting by ones from 1 to 100 includes some of the same numbers as when counting by tens from 10 to 100 (the multiples of ten). Ask your students to name these numbers. For reinforcement, and also to allow you to check for understanding, have groups of students count while you listen.

ACTIVITY 3: PASS THE CRITTER AND COUNT

Sitting in a circle, students pass a stuffed animal from one student to another and count from 1 to 100. The first student says 1, the second student says 2, the third students says 3, and the procedure continues to 100. After counting by ones, students pass the critter in the same fashion and count by tens from 10 to 100.

MATERIALS

A small stuffed animal.

PROCEDURE

1. Have your students sit in a circle, either on the floor or in their chairs.
2. Introduce the stuffed animal who will help them count. Explain that they will pass the stuffed animal along, from one student to another, and count. Upon receiving the stuffed animal, each student will say the number that follows the number that the student before her said, and then pass the stuffed animal to the next student who says the next number. The class will count from 1 to 100. Encourage your students to count silently to themselves as the stuffed animal is passed, as this will help to reinforce the counting sequence for them. Correct students if they make mistakes in counting. (A variation of this exercise is to allow students to pass the stuffed animal to whomever they wish. In this case, you must make sure that every student gets a chance to count and that some students do not get significantly more chances than others.)
3. After students have counted by ones to 100, repeat the activity by having them pass the stuffed animal around and count by tens to 100.

CLOSURE

Lead the class in counting by ones to 100 and then in counting by tens to 100. Ask for volunteers to count by tens from 10 to 100.

Counting and Cardinality: K.CC.2

"Know number names and the count sequence."

> 2. "Count forward beginning from a given number within the known sequence (instead of having to begin at 1)."

BACKGROUND

Cardinal numbers, such as 1, 12, and 57, indicate quantity. A cardinal number does not indicate order. Only when we count do cardinal numbers become part of a sequence.

ACTIVITY 1: PICK A NUMBER AND COUNT

Working in groups, students draw a card from two separate sets of cards. Each card in the first set contains a number from 1 to 9. Each card in the second set contains a number from 0 to 9. Together, the numbers on the cards will form a two-digit number, from which students are to count to 100.

MATERIALS

Reproducibles, "Number Set, I" and "Number Set, II," for each group of students; scissors or paper cutter for the teacher.

PREPARATION

Make 1 copy of each reproducible for each group. (Copying each reproducible on a different color of paper will make it easy to keep the two sets of cards separate. It will also allow you to make a distinction between tens and ones, should you choose to reinforce this concept.) After making copies, cut the cards out but keep the sets separate so that you may give one of each set to each group.

PROCEDURE

1. Distribute both sets of number cards to each group. Caution students to keep the cards in separate piles, with the numbers from "Number Set, I" being in the first pile and the numbers from "Number Set, II" being in the second pile. Note that the second pile should contain a zero.
2. Instruct your students to turn the two sets of cards face down and mix up the cards in each set. One student then picks a number from each set. Explain that the first card should be

selected from the first pile and represents the first number of a two-digit number (or the tens), and the second card, picked from the second pile, represents the second number (or the ones.) The two-digit number made up of both cards is the number that the group starts counting from as they count to 100. For example, if the first card picked was 5 and the second was 8, the group would start counting from 58. You may want to point out that the number 6 and the number 9 are underlined. Ask your students why this might be. Even at this age students might realize that the underlining is to make sure that the numbers are not mistakenly turned upside down so that the 6 and 9 are misread.

3. Explain that the student who picked the cards should place them aside and then start counting by saying the number. The other students in the group follow, one after the other, each student stating the next number in sequence, counting until they reach 100. As a student states a number, if a member of the group believes that the number is incorrect, he should raise his hand. The counting sequence stops and the group members discuss what the next number should be. You should then verify that the number they agree on is correct, and the counting sequence continues.

4. Explain that after counting to 100, another student in the group chooses two new cards, one from each set. The two-digit number made from the numbers on the cards is the new starting number and the counting exercise is repeated. The activity goes on until all group members pick numbers. If time remains, you may have students do another round.

CLOSURE

Discuss some of the numbers groups counted from. Ask questions such as the following: Which, if any, numbers did you find to be harder to count from than others? Which numbers, if any, were easiest to count from? Why?

ACTIVITY 2: A RANDOM NUMBER GENERATOR

The teacher uses a random number generator from a Web site to generate numbers from 1–100. Students will count from the generated number to 100.

MATERIALS

Computer with Internet access; digital projector for the teacher.

PROCEDURE

1. Explain to your students that a random number generator is a computer program that finds numbers in no particular order. A person cannot know what the number will be until it appears.

2. Go to http://www.random.org and project the Web site onto a screen. (Note: There are many Web sites that have random number generators; a simple search with the term "random number generator" will list several.)
3. Once at the Web site, enter a 1 for "Min" and 100 for "Max." Click on "Generate" and the program will generate a number randomly between 1 and 100.
4. Announce the number to your students. You may have the class, together, count from the number to 100, or you may instead call on a student, ask her to count the next five numbers, then call on another student to count the next five and so on until the count reaches 100. Correct students, if necessary, as they count.
5. After counting to 100 from the first number, generate another number and repeat the exercise. Continue the process with more numbers.

CLOSURE

Still using the random number generator, generate numbers and ask volunteers to count the next ten numbers (or the next numbers to 100 if the generated number is 91 or more). You may find it helpful to prompt students to stop counting at the tenth number.

NUMBER SET, I

1	2
3	4
5	6
7	8
9	

NUMBER SET, II

0	1
2	3
4	5
6	7
8	9

Counting and Cardinality: K.CC.3

"Know number names and the count sequence."

> 3. "Write numbers from 0 to 20. Represent a number of objects with a written numeral 0–20 (with 0 representing a count of no objects)."

BACKGROUND

Representing numbers with objects provides children with visual models. Such models help children to recognize a quantitative difference between numbers. For example, 2 is clearly represented by fewer objects than 9, and 9 is represented by fewer objects than 10. Representing numbers with objects can also help children understand that when counting, each number is 1 more than the number preceding it.

ACTIVITY 1: MINIATURE MATH BINGO

Students receive a bingo board on which they will randomly write the numbers 0 to 20. As the teacher says a number, students find the number on their bingo board and cover it with a counter. The first student to cover five squares in a row, column, or along a diagonal wins.

MATERIALS

25 counters; reproducible, "Miniature Math Bingo," for each student.

PROCEDURE

1. Explain that students are to play a game called bingo. But this game is a little different from the standard game of bingo. In this game, students will match numbers that you call with numbers on their boards.
2. Hand out the materials. Explain that the "Miniature Math Bingo" board contains spaces and free spaces. At the bottom of the board is the Number Bank, with numbers from 0 to 20. Students are to randomly write each number in a space on their board, except the free spaces. Be sure to explain that "randomly" means no special order. As they write a number in a space, they should cross it out on the bottom of the page so that they do not mistakenly use it again. All numbers will be used.
3. After students have written numbers in the spaces, instruct them to place one counter on each of the four free spaces.

4. Explain the rules of the game. You will call out a number from 0 to 20, which you will select from a list. You may create your own list or use the following one: 9, 0, 13, 5, 11, 19, 2, 16, 14, 10, 3, 7, 20, 17, 6, 18, 12, 4, 1, 15, and 8. As you say a number, students are to find the number on their bingo board and place a counter on its space. The first student who has five spaces covered in a row, column, or along a diagonal is the winner. (Be sure your students understand what "row," "column," and "diagonal" mean.) The student should raise his hand and say "Bingo!" Check his answers to make certain that they are correct. If, after you have announced all of the numbers, there is no winner, you may declare the student who has the most consecutively covered numbers in a row, column, or along a diagonal the winner. (There may be more than one winner.) Play more games by presenting the numbers in a different order.

CLOSURE

Discuss the game. Ask your students if anyone else was close to getting bingo. If yes, what number, or numbers, did they yet need?

ACTIVITY 2: NUMBERS AND OBJECTS

Students are given the numbers 0 to 20, one at a time. They are to use counters to represent the numbers and then write each number and draw objects to represent it. (Note: You may prefer to divide this activity into two or three sessions.)

MATERIALS

20 counters; crayons; unlined paper for each student.

PROCEDURE

1. Hand out the materials. Explain that students will use the counters to represent numbers. They will then write the numbers and draw objects to represent the numbers on unlined paper.
2. Start with 0. Ask your students how many objects are represented by zero. Because zero represents no objects, instruct your students to write 0 on their unlined paper without any objects because zero means none.
3. Say the number 1. Ask your students to use their counters to represent 1. Scan the counters to check that students are correct before you move on. After they show 1 with one counter, they should write the numeral 1 on their paper and then draw one object to represent 1. Objects need not be complicated; dots, circles, squares, and so on are fine. Students may color their objects.

4. Say the number 2 and instruct your students to follow the same procedure. They should first represent the numeral with counters. Then they should write the numeral and draw objects that represent it on their unlined paper. Give your students time to work and then move on to the number 3. You should have students draw objects to represent all of the numbers from 0 to 20.

CLOSURE

Have students share their work with a partner. It is likely that students used different objects to represent numbers. Explain that although the objects may be different, the number of objects that represent a particular number should be the same. Display the work of your students.

MINIATURE MATH BINGO

Bingo Board				
	Free Space			
				Free Space
Free Space				
			Free Space	

Number Bank

0 1 2 3 4 5 6

7 8 9 10 11 12 13

14 15 16 17 18 19 20

Counting and Cardinality: K.CC.4

"Count to tell the number of objects."

4. "Understand the relationship between numbers and quantities; connect counting to cardinality.

a. "When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.

b. "Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.

c. "Understand that each successive number name refers to a quantity that is one larger."

BACKGROUND

When children realize the connection between counting numbers and the quantities those numbers represent, they begin to understand numbers in terms of order, sequence, and value. They recognize that when counting, each number is one more than the number that came before it and one less than the number that comes after it.

ACTIVITY 1: PAIRING NUMBERS AND OBJECTS

Working in pairs or groups of three, students will be given 20 cards with pictures of objects that represent numbers. Students will create a poster by writing the numbers 1 to 20 on construction paper and gluing each card next to its matching number. Students will share their work with the class.

MATERIALS

Glue sticks; crayons; large white construction paper; reproducibles, "Numbers-Objects Cards, I" and "Numbers-Objects Cards, II," for each pair or group of students; scissors or paper cutter for the teacher.

PREPARATION

Make 1 copy of each reproducible for each pair or group of students. (Each reproducible contains object cards representing ten numbers. Together, the reproducibles contain object cards representing the numbers from 1 to 20.) Cut out the individual object cards from the

reproducibles, being careful to keep each set of object cards from 1 to 20 separate. Note that the objects are not in numerical order. Optional: A poster you create as an example for your students.

PROCEDURE

1. Hand out the materials. Explain that the 20 object cards represent the numbers from 1 to 20. The cards are not in numerical order.
2. Explain that students are to first arrange the cards in the correct sequence, 1 to 20. After arranging the cards in order, students are to write the numbers, 1 to 20, on their construction paper. Suggest how your students might write the numbers on their posters—perhaps going across the paper from left to right, or up and down, leaving enough space between numbers so that they have room to place an object card next to each number. If you created a poster of your own, show it to your students as an example.
3. After students have written the numbers on their paper, explain that they are to glue each object card next to its matching number. Suggest that students color the objects.

CLOSURE

Check your students' posters and have them share their posters with the class. They might simply stand by their seats and hold their posters up. To reinforce number names, have a volunteer from each pair or group recite the numbers on their posters. Perhaps partners or the members of a group would like to say the numbers together. Be sure to discuss that a specific number of objects—no matter what the objects are—always represents the same number. Display your students' posters.

ACTIVITY 2: FILLING IN NUMBERS AND OBJECTS

Students will complete a worksheet on which they must write missing numbers and supply missing objects.

MATERIALS

Crayons; reproducible, "Missing Numbers and Objects," for each student.

PROCEDURE

1. Hand out the materials. Explain that the reproducible contains four lines of numbers; each line of numbers is written in order, but the lines do not follow each other sequentially. Below each number are objects in the form of darkened circles that represent the number. But some numbers and objects in the line are missing.

2. Explain that students are to write the missing numbers in the blank spaces and draw the correct number of objects that represent them.
3. Do the first missing number in the first line as an example. Ask your students: What is the first missing number? They should realize that 3 is missing. Instruct them to write the numeral 3 in the space between 2 and 4. Ask: How many objects should you draw below the 3? Students should realize that they should draw 3 objects. Suggest that they draw 3 small darkened circles with a crayon. Students are to finish the worksheet in the same manner.

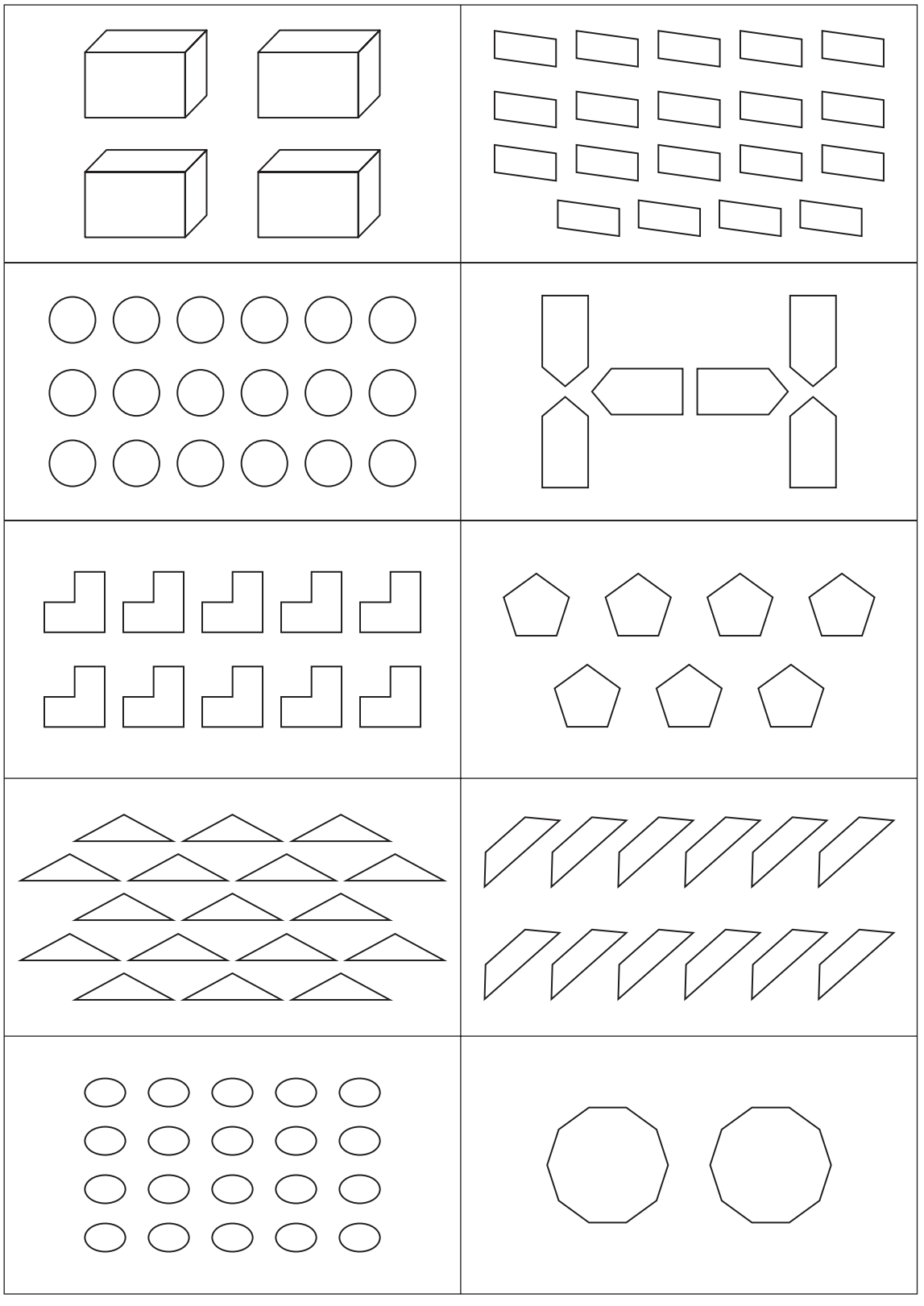
CLOSURE

Discuss students' results. Ask for volunteers to provide the missing numbers in each row. Also discuss that each number is one more than the number before it. For example, in the first line, 3 is one more than 2, 4 is one more than 3, and 5 is one more than 4.

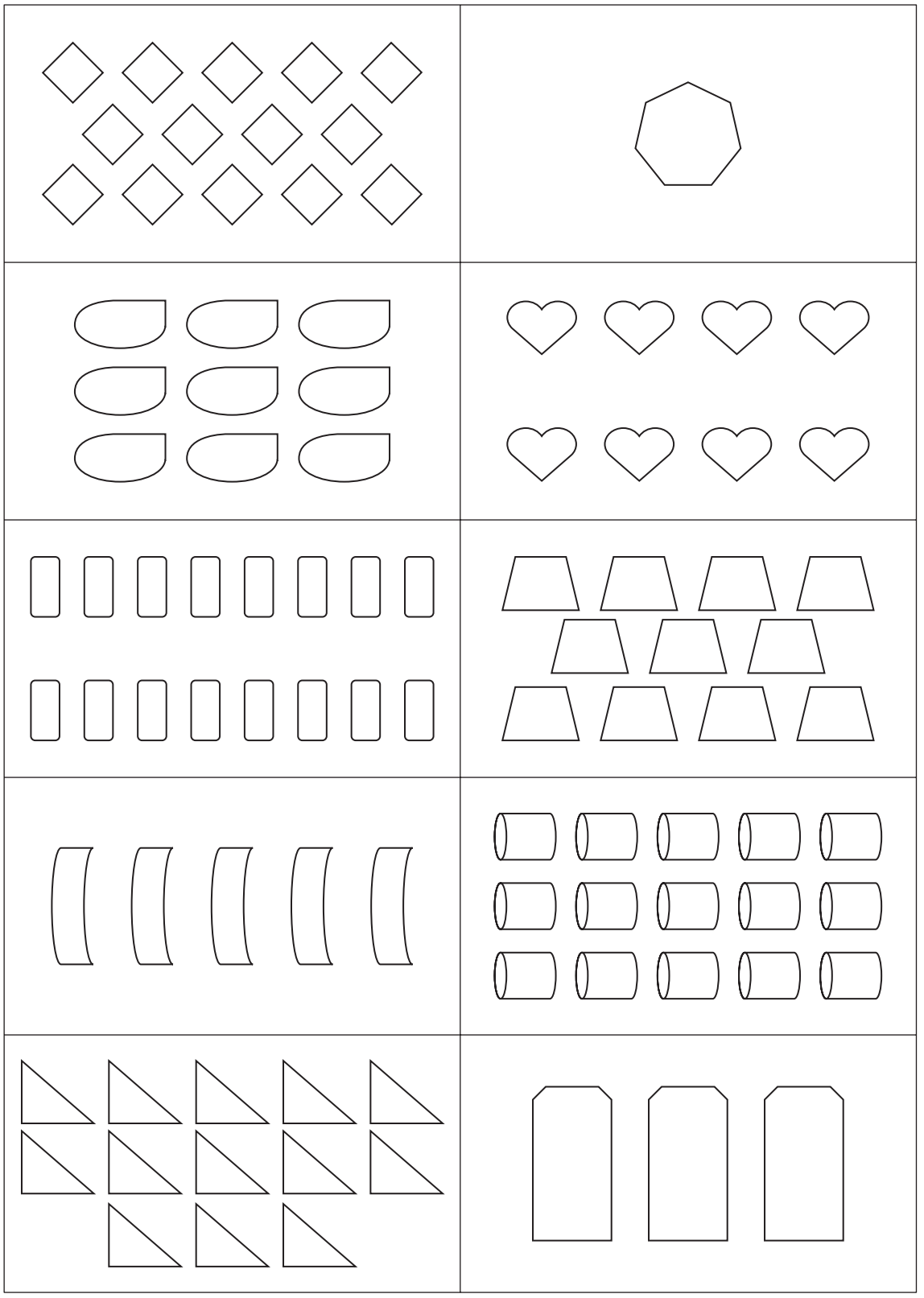
ANSWERS

Note that the objects beneath each number should equal the number. (**1**) 3, 5 (**2**) 12, 14 (**3**) 7, 8 (**4**) 18, 20

NUMBERS-OBJECTS CARDS, I



NUMBERS-OBJECTS CARDS, II



Name _____

MISSING NUMBERS AND OBJECTS

Directions: Fill in each space with the missing numbers. Draw objects that show each missing number.

1) 1 (•) 2 (• •) ____ 4 (• • • •) ____

2) 11 (• • • • • • • • • • •) ____ 13 (• • • • • • • • • • • • •) ____ 15 (• • • • • • • • • • • • • • •)

3) 6 (• • • • • •) ____ ____ 9 (• • • • • • • • •) 10 (• • • • • • • • • •)

4) 16 (• • • • • • • • • • • • • • • •) 17 (• • • • • • • • • • • • • • • • •) ____ 19 (• • • • • • • • • • • • • • • • • • •) ____

Counting and Cardinality: K.CC.5

"Count to tell the number of objects."

> 5. "Count to answer 'how many?' questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects."

BACKGROUND

Using objects to represent numbers when counting can help children recognize the relationship between counting and quantity. This naturally leads to the question of "how many?"

ACTIVITY 1: COUNTING OUT

Working in groups, students will each receive a small cup containing up to 20 objects. (The numbers of objects in the cups will vary.) Students are to individually count the objects in their cup, and then record their results using a number and a drawing. They are to then check how many objects the other members of their group found.

MATERIALS

1 small plastic cup (or similar container); enough objects—perhaps counters, buttons, paperclips, and so on—to fill each cup with between 9 and 20 objects; crayons; 1 sheet of unlined paper for each student.

PREPARATION

Fill plastic cups—1 for each student—with one kind of object but with varying numbers of objects. For example, one student's cup might have 9 paperclips, another student's cup might have 13 counters, and a third student's cup might have 18 buttons. No cup should contain more than 20 objects.

PROCEDURE

1. Hand out the materials. Explain that each student's cup contains a number of one kind of object. The number of objects in the cups varies from student to student in each group.
2. Explain that students are to count the number of objects in their cups. Suggest that they arrange the objects in a line to make them easier to count.
3. After they are finished counting, they are to write the number of objects on their paper and then draw and color the correct number of objects.

4. After students have finished drawing their objects, ask them to compare how many objects each member of the group counted. (You may want to emphasize the question "How many?") They should also share their drawings.

CLOSURE

Ask the members of each group to report how many objects they counted. Who, in each group, counted the most? Who counted the least?

ACTIVITY 2: TOSS THE DIE

Each student receives a container that has 20 objects. Each student tosses 1 die and then counts out the number of objects that equals the number on his or her die. Each student rolls the die three times and records his or her results.

MATERIALS

1 die (with the numbers 1–6); a plastic cup (or similar container); 20 objects, such as counters, beads, or buttons for each cup; crayons; unlined paper for each student.

PREPARATION

Fill each cup with 20 objects.

PROCEDURE

1. Hand out the materials.
2. Explain that students are to toss their die. They are to count out the same number of objects from their cup as the number that appears on their die. For example, if they rolled a 4, they must count out 4 objects from their cup. They are to record their results by writing a number and drawing the objects on their paper. They are to toss their die two more times, counting out a matching number of objects for each toss and recording their results two more times. Suggest that students color the objects they draw.
3. Explain that after the third time, they are to count up the total number of objects they rolled (for all three times). They should record this number and draw objects to represent it on their paper.

CLOSURE

Discuss students' results. Ask for volunteers to explain the numbers they rolled and the objects they took from their cup with the first roll of their die, the second, and the third. Ask: Who had the highest number after the first roll? After the second? After the third? Who had the highest number after counting all three rolls together? Who had the lowest number?

Counting and Cardinality: K.CC.6

"Compare numbers."

> 6. "Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies."

BACKGROUND

A significant step in understanding numbers occurs when children are able to recognize when the number of one group of objects is greater than, less than, or equal to the number of objects of another group. Once children make this connection, they are able to compare numbers and the quantities the numbers represent.

ACTIVITY: COMPARING OBJECTS AND NUMBERS

Working in pairs or groups of three, students will each be given a suit from a standard deck of playing cards, from ace (representing 1) to 10. They will each mix their suits of cards up, pick one card, and then compare the objects on their cards to the objects on their partner's card to find which is larger, smaller, or if the cards are equal. Students will individually record their results.

MATERIALS

1 suit of standard playing cards, ace to 10; reproducible, "Comparing Numbers," for each student.

PREPARATION

Select the ace through 10 cards from standard decks of playing cards. Each student should have his or her own suit of cards.

PROCEDURE

1. Hand out the materials. (Providing students who are working together with suits of different colors will help them to keep their sets of cards separate.) Instruct students to mix up the cards, but be sure to keep each suit separate.
2. Instruct your students to each pick one card from their suits at a time. They are to compare the objects on their cards—hearts, spades, diamonds, or clubs—by counting the objects

to find which card has the greater number of objects. Point out that the number of objects they count on each card should be the same as the number on the card.

3. After they compare the two cards, explain that students are to record their results on their reproducible, writing the number of the objects on their cards in the correct spaces. For example, assume the first card Student A picks is 7 and the first card Student B picks is 3. Student A will fill in the blanks for his first "is greater than" statement—7 is greater than 3. Student B will fill in the blanks for his first "is less than" statement—3 is less than 7. If the cards are equal, both students fill in an "is equal to" statement. Make sure that students understand the terms "is greater than," "is less than," and "is equal to." Note that not all spaces on their reproducibles will be filled. However, depending on the comparisons, students may need another sheet to record all their results. (For groups of three, consider this procedure: Student A and Student B pick and compare cards and then record their results. Student C and Student A pick, compare, and record their cards. Student C and B pick, compare, and record their cards. The exercise continues in this way until no cards are left.)
4. After students have used all of their cards, you may instruct them to mix their cards up again and repeat the exercise.

CLOSURE

Discuss your students' results. Ask questions such as the following: Who picked the most "greater than" cards? Who picked the most "less than" cards? How many times did you and your partner pick cards that were equal? In each case, students should provide examples.

Name _____

COMPARING NUMBERS

Directions: Compare the numbers of objects and fill in the blanks.

_____ is greater than _____.	_____ is less than _____.
_____ is greater than _____.	_____ is less than _____.
_____ is greater than _____.	_____ is less than _____.
_____ is greater than _____.	_____ is less than _____.
_____ is greater than _____.	_____ is less than _____.
_____ is equal to _____.	_____ is equal to _____.
_____ is equal to _____.	_____ is equal to _____.

Counting and Cardinality: K.CC.7

"Compare numbers."

7. "Compare two numbers between 1 and 10 presented as written numerals."

BACKGROUND

Recognizing that a number is greater than, less than, or equal to another number—without having to count objects that represent the numbers—indicates that children have begun to acquire number sense. They no longer view a number as merely representing a specific quantity, but understand the quantity represented by a number in relation to quantities represented by other numbers.

ACTIVITY: COMPARING NUMBERS

Working in pairs or groups of three, students will use a spinner to generate numbers that they will compare. They will individually record their results.

MATERIALS

1 spinner with the numbers 1 to 10 for each pair or group of students (number cards, without objects on them, can be substituted for spinners); reproducible, "Comparing Numbers," found in the activity for Standard K.CC.6 for each student.

PREPARATION

Because spinners usually are not available with the numbers 1 through 10, you may need to alter spinners with the numbers 0 through 9 by writing a 1 before the 0 to make 10. (Note: If you prefer to make spinners of your own, many online sites offer instructions. A search using a phrase such as "making a spinner for the classroom" will result in helpful Web sites.)

PROCEDURE

1. Hand out the spinners to each pair or group of students and a copy of the reproducible to each student.
2. Explain that each student is to spin the spinner and then compare the numbers, finding which number is greater than, less than, or equal to the other.

3. Instruct your students to record their results after each spin on their reproducible. They should write whether the number they spun was greater than, less than, or equal to the number spun by their partner. Make sure that students understand the terms "is greater than," "is less than," and "is equal to" on the reproducible. (For groups of three, consider this procedure: Student A and Student B spin and compare numbers and then record their results. Student C and Student A spin, compare, and record their numbers. Student C and B spin, compare, and record their numbers. The exercise continues in this way.)
4. Instruct your students to spin at least 10 times each and compare 10 pairs of numbers. Note that not all spaces on the reproducible will be filled. However, depending on the comparisons, they may need another sheet to record all their results.

CLOSURE

Discuss students' comparisons. Have volunteers give examples of some numbers that were greater than others, some that were less than others, and some that were equal. Ask your students: Why do you think other students had different results from yours?

Operations and Algebraic Thinking: K.OA.1

"Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from."

1. "Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations."

BACKGROUND

Before children can add or subtract, they must realize that addition is a process of putting together and adding to and that subtraction is a process of taking apart and taking from. Representing addition and subtraction with objects, drawings, and equations can help students acquire this fundamental understanding.

ACTIVITY 1: REPRESENTING ADDITION AND SUBTRACTION

This is a two-day activity. The first day focuses on addition and the second day focuses on subtraction. Working in pairs or groups of three, students will roll dice to make addition and subtraction problems, and then represent each problem with counters, a drawing, and an equation.

MATERIALS

1 die; 12 counters; crayons for each pair or group of students; reproducibles, "Addition Equations" and "Subtraction Equations," for each student.

PROCEDURE

Day One

1. Hand out the materials to each pair or group of students and a copy of the reproducible "Addition Equations" to each student. Explain that the reproducible contains blank spaces for numbers that will make equations for ten addition problems. As they complete the activity, each student will fill in the spaces on his or her own sheet with numbers.
2. Explain that addition is the process of putting numbers together or adding one number to another number. Provide an example that models 2 + 3 using counters. Start with 2 counters and then add 3 counters for a sum of 5 counters.
3. Explain the activity and do the first addition equation on the reproducible together as a class. Ask a volunteer to throw a die. Now ask another volunteer to throw a die. Explain

that using counters, the students are to represent the numbers that appear face up on their die. For example, assume that the first student threw a 4 and the second student threw a 1. The numbers can be represented by 4 counters and by 1 counter, respectively. By combining and counting the counters, students can find the sum of the two numbers, which is 5. They are to then use these numbers to complete the first addition equation on their reproducible, writing 4 in the first blank, 1 in the second blank, and 5 in the third blank. After they have written the numbers in the correct spaces, they are to draw and color objects—small circles, squares, or simple check marks—under each number. Students are to follow this process for all of the addition problems. (For groups of three, Student A and Student B both throw a die for the first problem. For the second problem, Student C throws a die with Student A throwing the second die. For the next problem, Student C throws a die with Student B throwing the second die. Students take turns in this fashion.)

Day Two

1. Hand out the materials to each pair or group of students and a copy of the reproducible "Subtraction Equations" to each student. Explain that the reproducible contains blank spaces for numbers that will make equations for ten subtraction problems. As they complete the activity, each student will fill in the spaces on his or her own sheet with numbers.
2. Explain that subtraction is the process of taking apart or taking a number away from an equal or larger number. Provide an example that models 4 – 1. Start with 4 counters and then take away 1 counter, leaving 3 counters.
3. Explain how students are to complete the subtraction problems. Students are to each toss one die. In subtraction, because they will be taking a smaller number away from an equal or larger number, students must begin the equation with the larger number that appears on the dice. For example, if the first student tossed a 3 and the second student tossed a 5, students must start the equation with the 5. (If the two numbers tossed are equal, it does not matter whose number they start with.) Students should represent the problem with counters. In the example of tossing a 3 and 5, they would count out 5 counters and then take 3 counters away from the 5, leaving 2 counters, which is the difference. After they have represented their problem with counters, students are to record their results on their reproducible and complete the equation. They are to draw the larger group of objects (for example, 5 circles) and then cross out the number of objects that are being subtracted (for example, 3 circles). They may then color the remaining objects (for example, 2 circles).

CLOSURE

Discuss your students' results. Ask for volunteers to share some of the equations they wrote. Review the fact that addition is a process of putting numbers together or adding one number to another, and that subtraction is a process of taking apart or taking a number away from an equal or larger number.

ACTIVITY 2: MINI-MATH SKIT

Working in groups, students will act out mini-scenes that represent addition and subtraction.

MATERIALS

Scissors or paper cutter; one copy of reproducible, “Ideas for Mini-Math Skits.”

PREPARATION

Make one copy of the reproducible. Cut out the six scenes, one scene for each group of students. Note that numbers are not included in the scenes. You may write in numbers so that the numbers of characters in each scene match the number of students in the group. You may, of course, add your own scenes to this activity.

PROCEDURE

1. Explain that each group will act out a short skit that represents addition or subtraction.
2. Hand out a skit to each group and explain the skit that each group receives.
3. Explain that students are to think about how they may act out the scene to show addition or subtraction. Here is an example for a group of four students acting out a scene that shows addition: Two birds are sitting on a tree limb and two more birds join them. Students can act this out by having two students sit on a desk or table (tree limb), and two other students flap their arms (wings) and join them.
4. Provide a few minutes for students to brainstorm ideas. It is likely you will need to provide some guidance and suggestions to the groups. Visit with each group and ask them about their skit. What will they do? What role will each student play? Encourage students to use their imaginations.

CLOSURE

Introduce each skit to the class and have each group perform their mini-math skit. Discuss the addition or subtraction that was shown. Write an equation on the board that represents the math that students were acting out, and have each group tell “how many” are at the conclusion of their skit.

Name _____

ADDITION EQUATIONS

Directions: Write numbers in the equations. Draw objects under each number.

1) _____ + _____ = _____	2) _____ + _____ = _____
3) _____ + _____ = _____	4) _____ + _____ = _____
5) _____ + _____ = _____	6) _____ + _____ = _____
7) _____ + _____ = _____	8) _____ + _____ = _____
9) _____ + _____ = _____	10) _____ + _____ = _____

Name _____

SUBTRACTION EQUATIONS

Directions: Write numbers in the equations. Draw objects below each equation. Cross out the number of objects being subtracted.

1) _____ – _____ = _____	2) _____ – _____ = _____
3) _____ – _____ = _____	4) _____ – _____ = _____
5) _____ – _____ = _____	6) _____ – _____ = _____
7) _____ – _____ = _____	8) _____ – _____ = _____
9) _____ – _____ = _____	10) _____ – _____ = _____

IDEAS FOR MINI-MATH SKITS

_____ fish swimming in a river. _____ fish join them.

_____ bunnies hopping. _____ bunnies join them.

_____ birds flying. _____ birds land on a rooftop.

_____ ducks paddling on a pond. _____ ducks fly away.

_____ kittens are playing. _____ more kittens come to play.

_____ squirrels sitting on a fence. _____ squirrels leave.

Operations and Algebraic Thinking: K.OA.2

"Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from."

2. "Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem."

BACKGROUND

To solve word problems, students must utilize skills in both reading and math. If students do not possess the required skills, they will find working with word problems to be frustrating, an experience that may lead to negative feelings about math. Possessing prerequisite skills is essential.

ACTIVITY: ADDITION AND SUBTRACTION WORD PROBLEMS

Students are to solve six word problems. They are to use counters and drawings to represent the problems.

MATERIALS

10 counters; crayons; reproducible, "Word Problems with Adding and Subtracting," for each student.

PROCEDURE

1. Hand out the materials. Explain that the reproducible contains six word problems that students are to solve. You might find it helpful to your students if you read the problems with them.
2. Instruct your students to do the following when solving the problems:
   - Read the problem carefully.
   - Ask what the problem is asking you to find.
   - Decide whether you must add or subtract.
   - Use counters to represent the problem.
   - Solve the problem.
   - Double-check your work.

3. Explain that students should use their counters to help them solve each problem. For example, to represent 5 + 2, students should count out 5 counters, then count out 2 more. Combining the counters results in the sum, which is 7. To represent 3 – 2, students should count out 3 counters, and then take 2 counters away, leaving 1.
4. Explain that after students have used counters to represent a problem, they are to draw and color objects—small circles, squares, or other figures—under the problem on the reproducible to represent the problem and its solution. To represent addition, suggest that students draw objects that represent the two addends and then show the sum. To represent subtraction, suggest that students draw the total number of objects and then cross out the number of objects that represent the number that is subtracted, showing the difference.

CLOSURE

Go over the answers to the problems as a class. Read each problem with your students, and ask volunteers to explain how they represented it and what its solution was. Show the representations and solutions on the board.

ANSWERS

Drawings should represent the equations. (**1**) 4 – 1 = 3 (**2**) 5 + 2 = 7 (**3**) 6 – 2 = 4
(**4**) 7 + 3 = 10 (**5**) 4 + 2 = 6 (**6**) 8 – 6 = 2

Name _____

WORD PROBLEMS WITH ADDING AND SUBTRACTING

Directions: Solve each problem. Create a drawing for each problem.

1. 4 kittens were sleeping. 1 kitten woke up and walked away. How many kittens were still sleeping?

2. 5 deer were in the yard. 2 more deer came. How many deer were there in all?

3. 6 cookies were on a plate. Maria ate 2 cookies. How many cookies were left?

4. 7 goldfish were in a fish tank. Joe put 3 more goldfish in the tank. How many goldfish were in the tank?

5. It snowed 4 inches yesterday. It snowed 2 inches today. How much did it snow in all?

6. There were 8 pieces of pie. The family ate 6 pieces. How many pieces were left?

Operations and Algebraic Thinking: K.OA.3

"Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from."

3. "Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation."

BACKGROUND

Decomposing numbers into pairs helps students to understand that numbers can be broken down into other numbers. Conversely, students learn that two numbers can be combined to make another number.

ACTIVITY 1: GETTING TO 11

The teacher reads the book *12 Ways to Get to 11* by Eve Merriam to the class, highlighting and discussing math facts and concepts as she reads. (Note: Although this Standard requires students to decompose numbers less than or equal to 10, this book which includes the number 11 offers excellent examples of how numbers make up other numbers.)

MATERIALS

12 Ways to Get to 11 by Eve Merriam (Aladdin, 1996).

PROCEDURE

1. Have your students sit near you in a semi-circle so that you may share the illustrations as you read the book to them. Explain that you are going to read a book about different things that add up to 11.
2. As you read, pause often, show the pictures, and point out the objects that appear on the pages to get to 11.
3. Explain that 11 can be made from many different numbers. Expand this idea to include other numbers. For example, 4 can be made from $4 + 0, 0 + 4, 3 + 1, 1 + 3$, and $2 + 2$. Ask your students what numbers can make up other numbers. For example, what can 3 be made from? $(3 + 0, 0 + 3, 2 + 1,$ and $1 + 2)$ What can 5 be made from? $(5 + 0, 0 + 5, 4 + 1, 1 + 4, 3 + 2,$ and $2 + 3)$

CLOSURE

Discuss the story with your students. Review some of the ways to get to 11, as well as ways to get to the numbers from 2 to 10.

ACTIVITY 2: DECOMPOSING NUMBERS

Working in pairs or groups of three, students will use counters to decompose the numbers from 1 to 10. They will then represent the decompositions by drawings and equations. (Note: You may prefer to present this activity over two or three sessions.)

MATERIALS

10 counters; crayons for each student; 1 large sheet of drawing paper for each pair or group of students.

PROCEDURE

1. Hand out the materials and explain that numbers can be decomposed—broken down—into other numbers. For example, 3 can be decomposed into $3 + 0, 0 + 3, 2 + 1$, and $1 + 2$ because $3 = 3 + 0; 3 = 0 + 3; 3 = 2 + 1$; and $3 = 1 + 2$.
2. Explain that students are to break the numbers 1 to 10 into at least two pairs of numbers. Students are to decompose each number, using their counters to represent the decomposition. Use 3 as an example again. Students can use their counters to represent $3 + 0, 0 + 3, 2 + 1$, and $1 + 2$.
3. After students have decomposed a number using counters, they are to write the number on their paper, then write an equation and make a drawing that show the decomposition. Remind them that they are to decompose each of the numbers from 2 to 10 with at least two pairs of numbers. Provide 3 as an example for how their equations and drawings might look. Of course, they may use other objects in their drawings.

   $3 = 3 + 0$ ▲▲▲ = ▲▲▲ + 0 $3 = 2 + 1$ ▲▲▲ = ▲▲ + ▲

   Mention that 3 is now done for them. Note that there are other ways to decompose 3: $0 + 3$ and $1 + 2$. While for this activity students are only required to decompose each number into two pairs of numbers, you may encourage them to provide more pairs.

CLOSURE

Check your students' work. Discuss the decompositions they found. It is likely, especially with the larger numbers, that students decomposed numbers in various ways.

ANSWERS

Note that the drawings should represent the numbers in each equation. The equations are provided in one form. For example, although 1 can be decomposed into $1 + 0$ and $0 + 1$, only one of the equations is shown. (**1**) $1 = 1 + 0$ (**2**) $2 = 2 + 0; 2 = 1 + 1$ (**3**) $3 = 3 + 0; 3 = 2 + 1$ (**4**) $4 = 4 + 0; 4 = 3 + 1; 4 = 2 + 2$ (**5**) $5 = 5 + 0; 5 = 4 + 1; 5 = 3 + 2$ (**6**) $6 = 6 + 0;$ $6 = 5 + 1; 6 = 4 + 2; 6 = 3 + 3$ (**7**) $7 = 7 + 0; 7 = 6 + 1; 7 = 5 + 2; 7 = 4 + 3$ (**8**) $8 = 8 + 0;$ $8 = 7 + 1; 8 = 6 + 2; 8 = 5 + 3; 8 = 4 + 4$ (**9**) $9 = 9 + 0; 9 = 8 + 1; 9 = 7 + 2; 9 = 6 + 3;$ $9 = 5 + 4$ (**10**) $10 = 10 + 0; 10 = 9 + 1; 10 = 8 + 2; 10 = 7 + 3; 10 = 6 + 4; 10 = 5 + 5$

Operations and Algebraic Thinking: K.OA.4

"Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from."

4. "For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation."

BACKGROUND

As children learn basic addition facts, their general understanding of numbers expands. They gain an important insight once they realize that numbers can be formed by adding other numbers.

ACTIVITY: MAKING 10

Using number cards and counters, students will combine the numbers from 1 to 9 to make 10. They will record their answers with drawings and equations.

MATERIALS

10 counters; scissors; glue stick; crayons; reproducibles, "Adding Numbers to Make 10" and "Numbers 1 to 9," for each student. Optional: Scissors or paper cutter for the teacher.

PREPARATION

By this point of the school year, you may feel that your students are capable of cutting out number cards by themselves. However, if you feel that they are not yet ready, you must cut out the numbers on reproducible "Numbers 1 to 9" for them, providing each student with his or her own set of numbers.

PROCEDURE

1. Distribute the materials. Explain that the reproducible "Adding Numbers to Make 10" contains nine equations. The reproducible "Numbers 1 to 9" contains number cards, 1 to 9. Students are to cut out the number cards.
2. Explain that students are to complete the equations on the reproducible "Adding Numbers to Make 10." They are to use their counters to find the missing number in each equation and then glue the correct number card in the space to complete the equation. Finally, they are to draw objects under the numbers in each equation to represent the addition.

3. You may find it helpful to your students if you do the first equation, 1 + _____ = 10, together. Ask what number should be glued in the blank space. By using 1 counter to represent 1, students can count out 9 more counters to make a total of 10. Students should then glue the 9 card in the blank to complete the equation. They are then to draw objects, such as large dots or small circles, under the numbers to represent the numbers in the equations. Note that 6 and 9 each have a line beneath them so that these number cards are not confused.
4. Explain that students are to complete the other equations in the same manner.

CLOSURE

Discuss your students' work as a class. Ask volunteers to share their equations with the class, which you can write on the board. You may wish to draw objects to represent the numbers to clarify the concepts.

ANSWERS

Objects should match the numbers in each problem. (**1**) 9 (**2**) 5 (**3**) 2 (**4**) 6 (**5**) 8 (**6**) 4 (**7**) 1 (**8**) 7 (**9**) 3

Name _____

ADDING NUMBERS TO MAKE 10

Directions: Glue the correct number card in each equation. Draw objects under each number that show the number.

1) **1** + _____ = **10**	2) **5** + _____ = **10**
3) **8** + _____ = **10**	4) **4** + _____ = **10**
5) **2** + _____ = **10**	6) **6** + _____ = **10**
7) **9** + _____ = **10**	8) **3** + _____ = **10**
9) **7** + _____ = **10**	

NUMBERS 1 TO 9

Directions: Cut out each number card.

8	5	9
4	2	7
3	1	6

Operations and Algebraic Thinking: K.OA.5

"Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from."

5. "Fluently add and subtract within 5."

BACKGROUND

Being able to fluently add and subtract within 5 sets the foundation for adding and subtracting larger numbers quickly and accurately. Students who are fluent in these math facts no longer need objects to represent numbers.

ACTIVITY 1: PILES OF CARDS

Working in groups, students sort cards containing equations and place those that have the same sums and differences in the same pile.

MATERIALS

Scissors; 6 small index cards (or small pieces of paper); reproducibles, "Addition and Subtraction Cards, I" and "Addition and Subtraction Cards, II," for each group of students. Optional: Scissors or paper cutter for the teacher.

PREPARATION

If you feel that your students are not yet ready to cut out cards from reproducibles, you must cut out the cards on reproducible "Addition and Subtraction Cards, I" and "Addition and Subtraction Cards, II." Combine the cards so that each group receives a total of 42 cards.

PROCEDURE

1. Hand out the materials. Instruct each group to write the numbers 0 to 5, one number on each index card. The cards represent the answers to the problems they must solve. They should place the index cards in order across a desk or table, leaving a little space between each one. Explain that each reproducible contains 21 cards that have addition and subtraction problems, one problem per card. Students are to cut out all 42 cards.
2. Explain that students are to solve the addition and subtraction problems. They are then to place each problem card by the index card whose number is the same as the card's

answer. For example, if the answer to a problem is 2, students would place that card by the index card with the number 2 on it. After students have solved all of the problems, they should double-check the piles to make certain that all of the answers in each pile are the same.

CLOSURE

Go over students' answers as a class. Ask for volunteers to say what cards they have in a pile. How many cards are in each pile? Students should correct the cards in their piles, if necessary.

ANSWERS

Answers	Sums and Differences
5	$0+5; 5+0; 1+4; 4+1; 2+3; 3+2; 5-0$
4	$0+4; 4+0; 1+3; 3+1; 2+2; 5-1; 4-0$
3	$0+3; 3+0; 1+2; 2+1; 5-2; 4-1; 3-0$
2	$0+2; 2+0; 1+1; 5-3; 4-2; 3-1; 2-0$
1	$0+1; 1+0; 5-4; 4-3; 3-2; 2-1; 1-0$
0	$0+0; 5-5; 4-4; 3-3; 2-2; 1-1; 0-0$

ACTIVITY 2: COLORING SUMS AND DIFFERENCES

Students will solve addition and subtraction problems contained in shapes. They will color the shapes according to the answers to the problems.

MATERIALS

Red, blue, green, yellow, and orange crayons; reproducible, "Coloring Addition and Subtraction Problems," for each student.

PROCEDURE

1. Distribute the materials. Explain that the reproducible contains addition and subtraction problems that students are to solve. The problems appear in triangles. Students are to color all the triangles that have the same answer with the same color. At the bottom of the sheet is a color code, showing how the triangles should be colored. Triangles that contain

problems with the answer of 5 are to be colored red, triangles that contain problems with the answer of 4 should be colored blue, and so on.

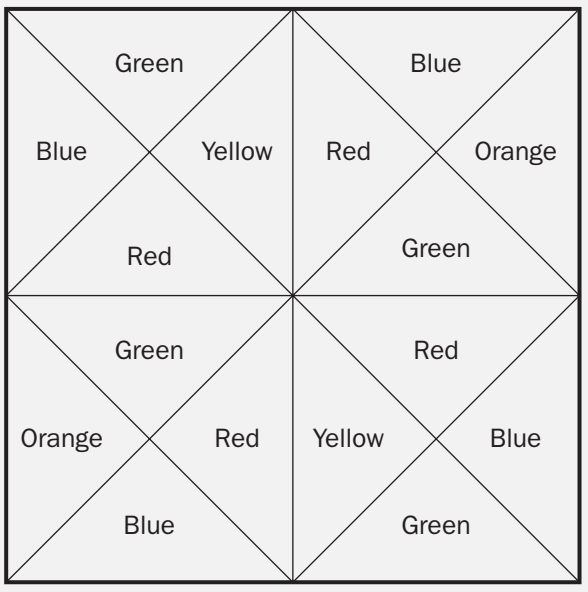
2. To make sure that your students understand what colors they are to use, tell them to place a red mark under 5, a blue mark under 4, a green mark under 3, a yellow mark under 2, and an orange mark under 1.
3. Instruct your students to solve the problems and write the answer to each problem in the same triangle as the problem. They should then color the triangles.

CLOSURE

Check your students' work and discuss problems they found confusing.

ANSWERS

The correct colors for the triangles are shown below.



ADDITION AND SUBTRACTION CARDS, I

0 + 5	5 – 1	0 + 1
5 – 2	1 + 2	1 + 4
5 – 4	4 – 1	3 – 0
3 + 0	2 + 3	2 + 0
5 – 5	2 + 2	4 – 2
1 + 0	4 – 3	4 + 0
3 + 1	4 – 4	1 – 0

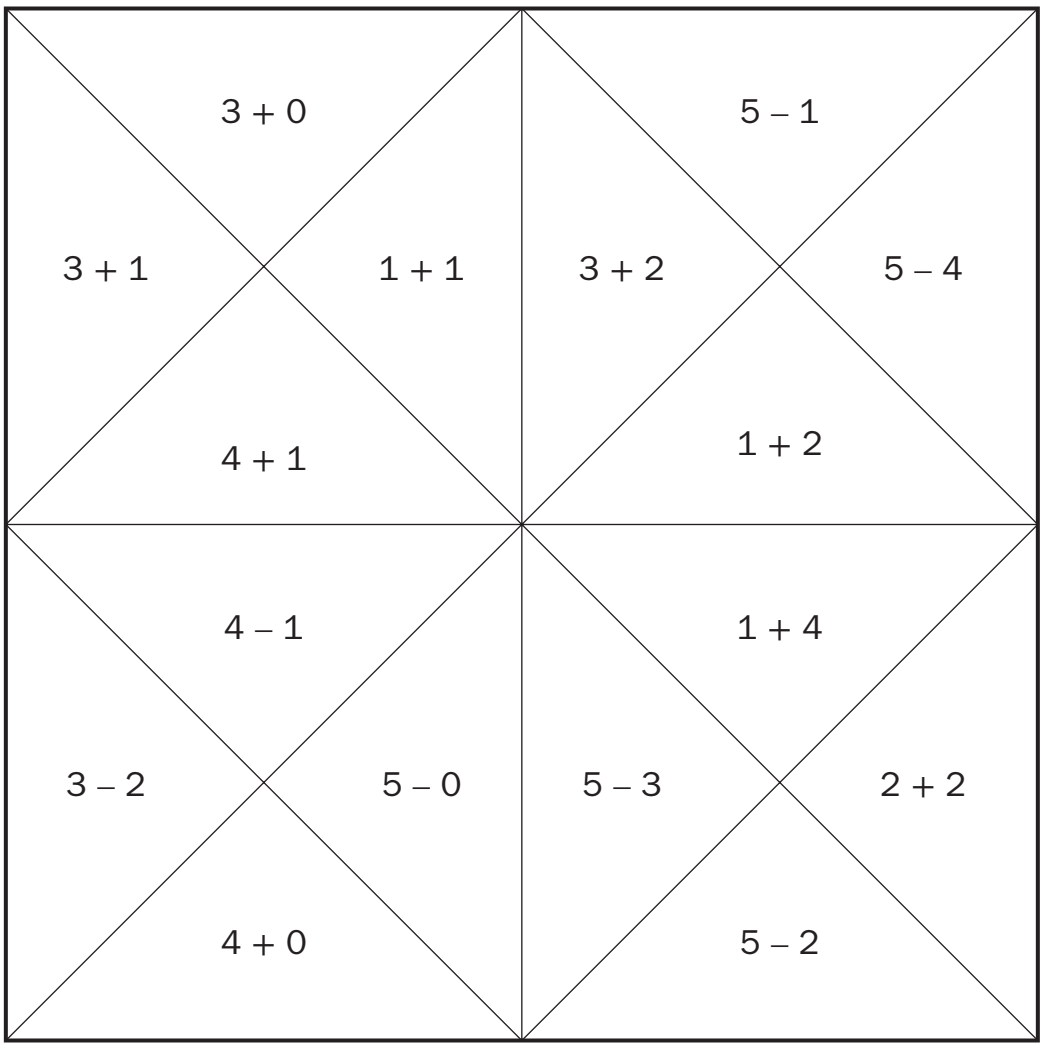
ADDITION AND SUBTRACTION CARDS, II

$2 - 0$	$0 + 4$	$0 + 0$
$1 + 1$	$1 + 3$	$3 - 1$
$3 - 3$	$2 - 2$	$3 + 2$
$4 + 1$	$0 + 3$	$5 - 0$
$1 - 1$	$0 - 0$	$3 - 2$
$2 + 1$	$5 - 3$	$2 - 1$
$4 - 0$	$0 + 2$	$5 + 0$

Name _____

COLORING ADDITION AND SUBTRACTION PROBLEMS

Directions: Solve each problem. Color the space the problem is in. Use the color code below.



Color the spaces of problems with the answers of:

5 – red 4 – blue 3 – green

2 – yellow 1 – orange

Number and Operations in Base Ten: K.NBT.1

"Work with numbers 11–19 to gain foundations for place value."

1. "Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., $18 = 10 + 8$); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones."

BACKGROUND

Our number system is a base-10 system. One-digit numbers denote ones. 10 means a group of 10 ones with no further ones. 11 means 1 ten and 1 one; 12 means 1 ten and 2 ones, and so on. This pattern continues to 19, which is 1 ten and 9 ones. Understanding the basics of our number system is fundamental to understanding numbers greater than 10.

ACTIVITY: TENS AND ONES

Students will use counters to compose the numbers 11 to 19. They will then decompose the numbers with drawings and by writing equations. (Note: You might prefer to present this activity in two or three sessions.)

MATERIALS

19 counters; crayons; reproducibles, "Numbers: Tens and Ones, I," "Numbers: Tens and Ones, II," and "Numbers: Tens and Ones, III," for each student.

PROCEDURE

1. Hand out the materials. Explain that the reproducibles contain frames for the numbers 11 to 19. The numbers are not in order. (If you decide to present the activity in three sessions, hand out only the first reproducible on the first day, the second reproducible on the second, and the third reproducible on the third.)
2. Explain that students are to use their counters to compose the numbers 11 to 19 as they are presented on the reproducibles. They are to then color in the correct number of frames to show the number as a ten and some further ones. Finally, they are to write an equation that shows the decomposition of the number into 10 ones and additional ones.

3. For an example, do the number 11 on the first reproducible as a class.
   - Instruct your students to use their counters to represent the number 11, first by counting out 10 counters. Ask: How many more counters will you need to make 11? Students should realize that they will need 1 more counter. Explain that 10 ones and 1 one make 11. This is the same as 1 ten and 1 one.
   - Next tell your students to color 10 frames to represent 10 ones (or 1 ten), and then 1 more frame to represent 1 more.
   - After they have colored the frames representing 11, ask: What equation can you write to show the frames that you colored? The equation is $11 = 10 + 1$. Instruct students to write the equation on the line under the frames.
   - Explain that students are to follow this procedure for the other numbers.

CLOSURE

Check your students' work. Discuss how each of the numbers 11 to 19 is composed of one ten and a specific number of ones. Also, remind your students that each number can be decomposed into tens and ones. Ask for volunteers to share some equations showing decompositions, for example, $16 = 10 + 6$.

ANSWERS

The colored frames for each number should match the following equations.
$11 = 10 + 1; 14 = 10 + 4; 17 = 10 + 7; 15 = 10 + 5; 18 = 10 + 8; 12 = 10 + 2; 13 = 10 + 3; 19 = 10 + 9; 16 = 10 + 6$

Name _____

NUMBERS: TENS AND ONES, I

Directions: Color the frames to show each number. Write an equation to show the frames you colored.

11

_____

14

_____

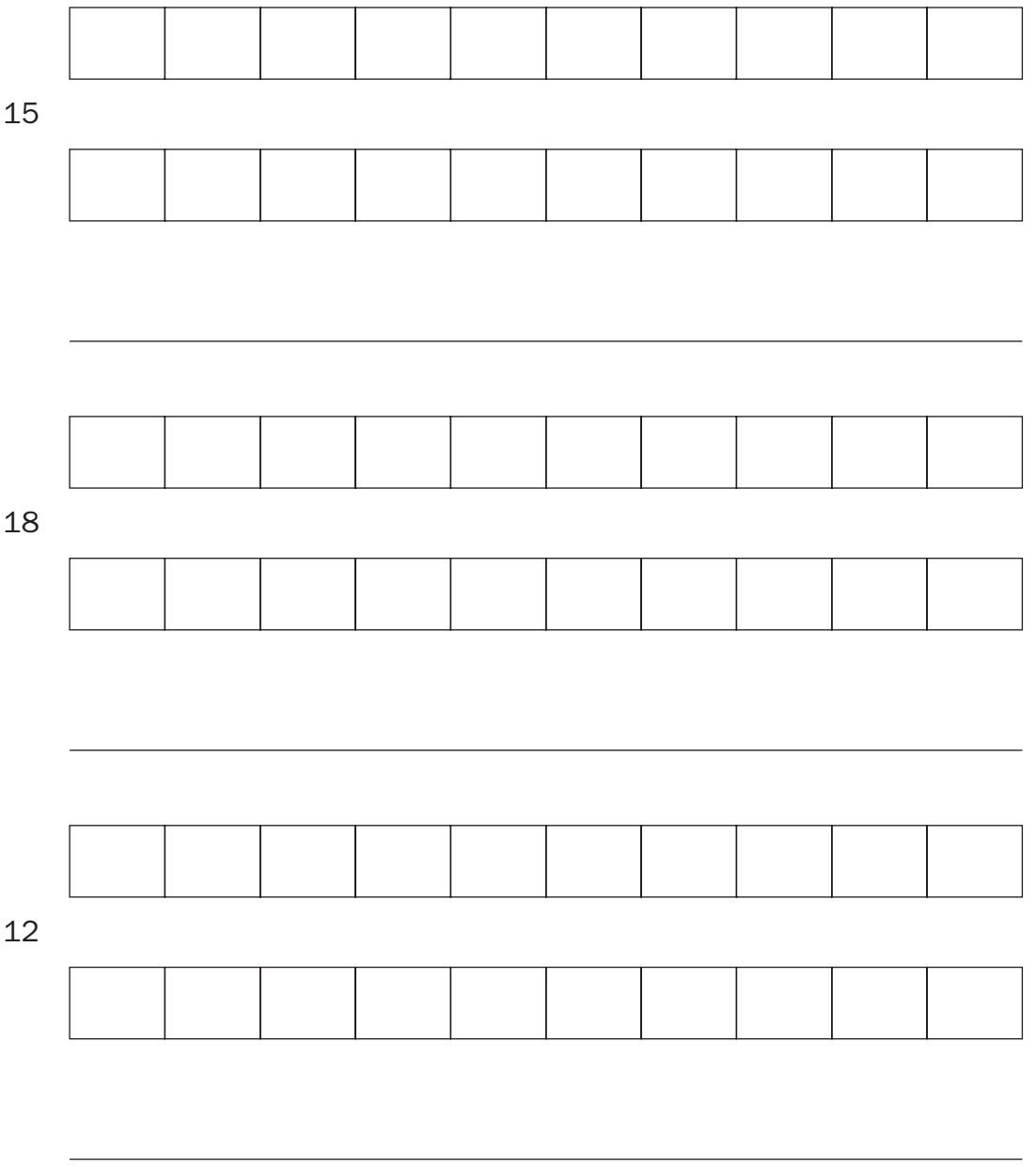
17

_____

Name _____

NUMBERS: TENS AND ONES, II

Directions: Color the frames to show each number. Write an equation to show the frames you colored.



15

_____

18

_____

12

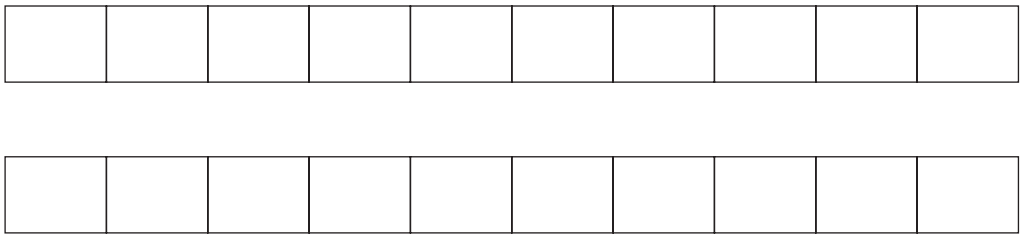
_____

Name _____

NUMBERS: TENS AND ONES, III

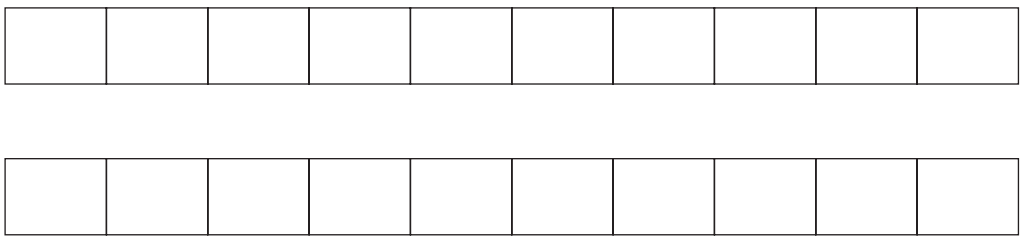
Directions: Color the frames to show each number. Write an equation to show the frames you colored.

13



_____

19



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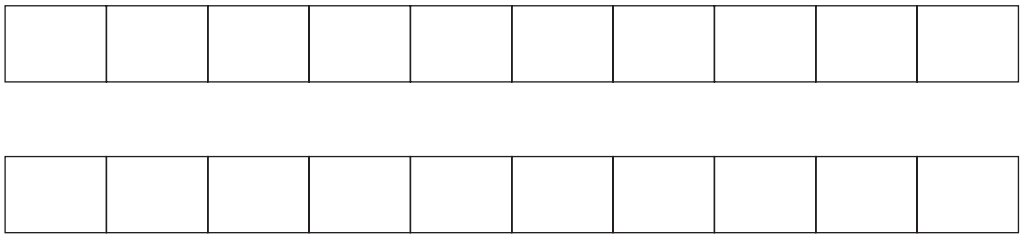
16



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Measurement and Data: K.MD.1

"Describe and compare measurable attributes."

1. "Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object."

BACKGROUND

Objects may be described by their measurable attributes. Common measurable attributes include length, width, height, and weight. Developing an intuitive sense of size is a prerequisite skill for conducting actual measurement.

ACTIVITY: DRAW, SHOW, AND TELL

For this activity, students will first work individually and then in groups. Working individually, students will draw pictures of objects of their choice. In groups they will discuss the attributes of the pictures they drew. Groups will share their drawings and the attributes they found with the class.

MATERIALS

Crayons; drawing paper for each student.

PROCEDURE

1. Explain to your students that objects have measurable attributes. An object may be described by how long it is, how wide it is, how high it is, or how much it weighs. For example, a telephone pole might be described as being high or long. A big truck might be described as being very heavy. Your classroom might be long and wide. Its ceiling might be high. Ask your students to offer examples of other things and describe their measurable attributes. Emphasize that most objects have several measurable attributes.
2. Hand out the materials. Explain that students are to choose something they would like to draw. For example, they might decide to draw a house, an airplane, a boat, a car, a truck, a skyscraper, a desk, a book, a pencil—their possible choices are limited only by their imaginations. Ask your students to name other possible objects to draw. This will help those students who might be having trouble finding an idea for drawing.
3. Explain that after they have drawn and colored their picture, students are to work in their group. They are to discuss the measurable attributes of the things they have

drawn, including length, width, height, and weight. For example, a student might say, "The building I drew is very high and very wide."

4. As your students are working, visit with the various groups to provide guidance and answer any questions they might have about measurable attributes.

CLOSURE

Have your students sit in a circle as a class. Ask for volunteers to hold up their drawings and explain the object they drew, including its measurable attributes. Be sure to point out any attributes students might have overlooked.

Measurement and Data: K.MD.2

"Describe and compare measurable attributes."

2. "Directly compare two objects with a measurable attribute in common, to see which object has 'more of'/'less of' the attribute, and describe the difference."

BACKGROUND

Once students can identify common measurable attributes of objects and are able to compare attributes, they can determine differences between objects. For example, a side of one object might have "more" length than a side of another object. In such a case, one side is longer than the other. Conversely, if a side of one object has "less" length than a side of another object, one side may be described as being shorter than the other.

ACTIVITY: COMPARING ATTRIBUTES OF OBJECTS

Working in pairs or groups of three, students will directly compare a measurable attribute in pairs of objects. They will describe the differences and share their results with the class.

MATERIALS

Various items in the classroom, including typical materials such as pencils, crayons, books, paper, as well as desks, tables, doors, windows, and so on.

PROCEDURE

1. Explain that measurable attributes of objects include such things as length, width, height, and weight. These attributes can be compared and the differences between them can be easily seen. Provide some examples. One bookshelf might have more length than another; one room might be wider than another; one chair might be higher than another; one knapsack might weigh less than another.
2. Explain that students are to work with their partner or partners, and find objects that have measurable attributes in common. Ask your students to name some objects that have measurable attributes in common. Along with ideas they might offer, following are some you might suggest:
   - The length of a pencil to the length of a crayon
   - The length of a student's arm to the length of her index finger

- The width of a large sheet of construction paper to the width of a small sheet of construction paper
- The width of the screen of a large TV to the width of a computer screen
- The height of the door to the height of a teacher
- The heights of different plants around the room
- The weight of a dictionary to the weight of a small paperback
- The weight of a sheet of paper to the weight of a ream of paper

3. Explain that partners or group members are to discuss and compare measurable attributes of at least one pair of objects. They may choose the objects that they wish to compare and describe the attributes in terms of one being longer, shorter, higher, wider, heavier, or lighter than the other, or one having more of or less of an attribute than the other.

CLOSURE

Have each pair or group of students report to the class the objects and measurable attributes they compared. Discuss the attributes and point out any attributes that students did not mention.

Measurement and Data: K.MD.3

"Classify objects and count the number of objects in each category."

3. "Classify objects into given categories; count the numbers of objects in each category and sort the categories by count."

BACKGROUND

Sorting, classifying, and counting objects are basic skills that most of us use every day. Sorting the laundry; making sure there is enough food, plates, and utensils for the annual family picnic; and packing luggage for vacation are just some tasks that are dependent on the ability to sort, classify, and count objects. For young children, acquiring such skills is an important achievement.

ACTIVITY: SORTING, CLASSIFYING, AND COUNTING OBJECTS

Working in pairs or groups of three, students will be given a container filled with various objects. The number and types of objects will vary by pair or group. Students will sort, classify, and count the objects and then record their findings with drawings and numbers.

MATERIALS

Three different kinds of objects (6 to 10 of each item), such as counters, beads, buttons, paper clips, and so on; a small plastic cup (or similar container) for each pair or group of students; crayons; drawing paper for each student.

PREPARATION

Place the three kinds of objects into plastic cups, one cup for each pair or group of students. The number of each kind of objects should vary between 6 and 10. For example, one cup may contain 7 counters, 9 beads, and 10 buttons; another cup may contain 6 counters, 10 beads, and 8 buttons.

PROCEDURE

1. Hand out the materials. Explain that the cup each pair or group of students received contains three different kinds of objects. The number of each kind of object is different.
2. Explain that students are to empty their cups. They are to sort and classify the objects into separate groups. They are then to count the number of items of each group.

3. Explain that after students have sorted, classified, and counted the objects, they are to record their findings by drawing an example of the objects in each group and writing the number of the objects. Although students worked together in sorting, classifying, and counting, each student is to make his or her own drawing.

CLOSURE

Discuss your students' results. Ask pairs or groups of students what kinds of objects they sorted, and how many objects of each kind they counted. Display your students' drawings.

Geometry: K.G.1

"Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres)."

1. "Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*."

BACKGROUND

Geometric shapes are found everywhere. Identifying the shapes of objects and describing their relative positions to other objects helps to develop students' awareness of the relationships of objects around them.

ACTIVITY: FINDING SHAPES

Working in groups, students will identify geometric shapes in the classroom and place sticky notes on selected objects. Groups will share the objects they selected with the class by naming them and describing the relative positions of the objects.

MATERIALS

5 sticky notes for each group of students (a different color for each group); poster paper; ruler; markers for the teacher. (Note: If you do not have different colors of sticky notes, you may simply label the notes with numbers—Group 1, Group 2, and so on.)

PREPARATION

Create a poster of geometric shapes, showing the word names and examples. The poster should show a square, circle, triangle, rectangle, hexagon, cube, cone, cylinder, and sphere. Display the poster in the classroom for your students. (Note: Keep this poster for use with following Standards and activities.)

PROCEDURE

1. Review the shapes and their names on the poster you made. Encourage students to refer to the poster if they are not sure of a shape or its name. Also discuss the terms *above, on top of, under, below, beside, in front of, behind,* and *next to,* providing examples that show how they may be used to describe an object's relative position.

2. Hand out the sticky notes. Explain that each group has 5 sticky notes and that each group's sticky notes are a different color. For example, group 1 might have red notes, group 2 might have blue notes, and so on.
3. Explain that each group is to go around the classroom and find examples of shapes that are displayed on the poster you made. When they find one of the shapes, they are to place a sticky note on the shape. For example, the surface of a table may be a rectangle, a bulletin board may be a square, a globe is a sphere, and a marker is a cylinder. Note that each group of students has only 5 sticky notes and will not be able to label each shape on the poster. They should, however, label 5 different shapes.
4. Tell your students to look closely at the many different objects in the classroom, because sometimes the shapes they are looking for are "hidden" in plain sight. The long, narrow legs of a chair, for instance, might be cylinders.
5. Explain that students should be prepared to share their results with the class. They should be able to describe the relative position of each shape by using the terms *above, on top of, below, under, in front of, behind, beside,* and *next to*. For example, the globe (a sphere) is on top of the table (a rectangle).

CLOSURE

One at a time have each group go to their sticky notes, identify the shape, and describe its relative position in regard to other objects.

Geometry: K.G.2

"Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres)."

2. "Correctly name shapes regardless of their orientations or overall size."

BACKGROUND

Even though they may know the names of shapes, students may be unable to recognize the shapes if the shapes are presented in a different position or size. For example, they may not recognize a square if it is tipped on its side. Similarly, students might not recognize a triangle if it has a large obtuse angle and long sides. Being able to recognize shapes, regardless of orientation, is a sign that students have mastered this concept.

ACTIVITY 1: IDENTIFYING AND MATCHING

Students will be given a reproducible with various geometric shapes. They will cut the shapes out, identify them, and glue them under their correct name.

MATERIALS

Scissors; glue stick; 1 sheet of large construction paper; reproducibles, "Names and Shapes, I" and "Names and Shapes, II," for each student. Optional: Document camera; computer; digital projector; transparencies; overhead projector for the teacher.

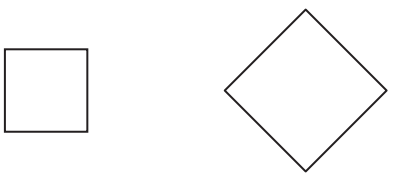
PREPARATION

Display the poster that you made for the activity for Standard K.G.1.

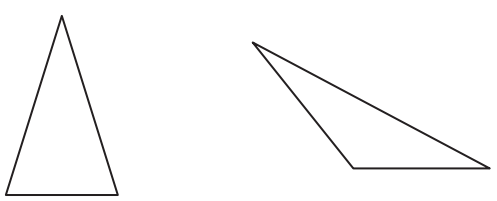
PROCEDURE

1. Review the names and examples of squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres.
2. Explain that all of these shapes can come in different sizes. Different kinds of triangles may appear to be different shapes entirely because of the degrees of their angles, but they are still triangles. Shapes may also be positioned differently. This is called a shape's orientation.

3. Provide an example of a square with two sizes and two orientations, such as the example below.



4. Explain that both shapes are squares. The one on the left is smaller than the one on the right, which is turned (rotated). Ask your students to imagine turning the square on the right so that it has the same orientation as the square on the left. (You may find it helpful to use a document camera or an overhead projector, and rotate squares to show different orientations.) It will now be easier for students to see that both shapes are squares. Provide some other examples, such as an obtuse triangle and an acute triangle as shown below. Explain that although they may appear to be different, the shapes are triangles. Each has three corners (vertices) and three sides.



5. Hand out the materials. Explain that students are to cut out the names of the shapes and the shapes on the reproducibles.
6. Explain that they should place their construction paper lengthwise on their desk or table, and then place the names of the shapes across the top, leaving some space between each name. After spacing out the names of the shapes, they are to glue the names to the paper. Your students will no doubt find it helpful if you demonstrate this.
7. Explain that students are to now identify the shapes. Some of the shapes have different sizes and orientations, so students must look at them closely. Suggest that turning the shapes and changing their orientation may help students to recognize them. After they have identified a shape, students are to glue it under its name on their construction paper. There is at least one example of every shape, but there is more than one for some shapes.

CLOSURE

Check your students' work. Ask for volunteers to report how many examples of a shape they found. Point out the different sizes and orientations of the shapes. Ask students how they were able to identify the shapes.

ANSWERS

The number of shapes is provided for each name. Squares, 3; Circles, 2; Triangles, 3; Rectangles, 2; Hexagons, 1; Cubes, 1; Cones, 1; Cylinders, 1. Spheres: 1

ACTIVITY 2: A VIRTUAL GEOBOARD

Using a virtual geoboard at a Web site, the teacher will project various geometric shapes of different sizes and orientations. Students are to name the shapes.

MATERIALS

Computer with Internet access; digital projector for the teacher.

PROCEDURE

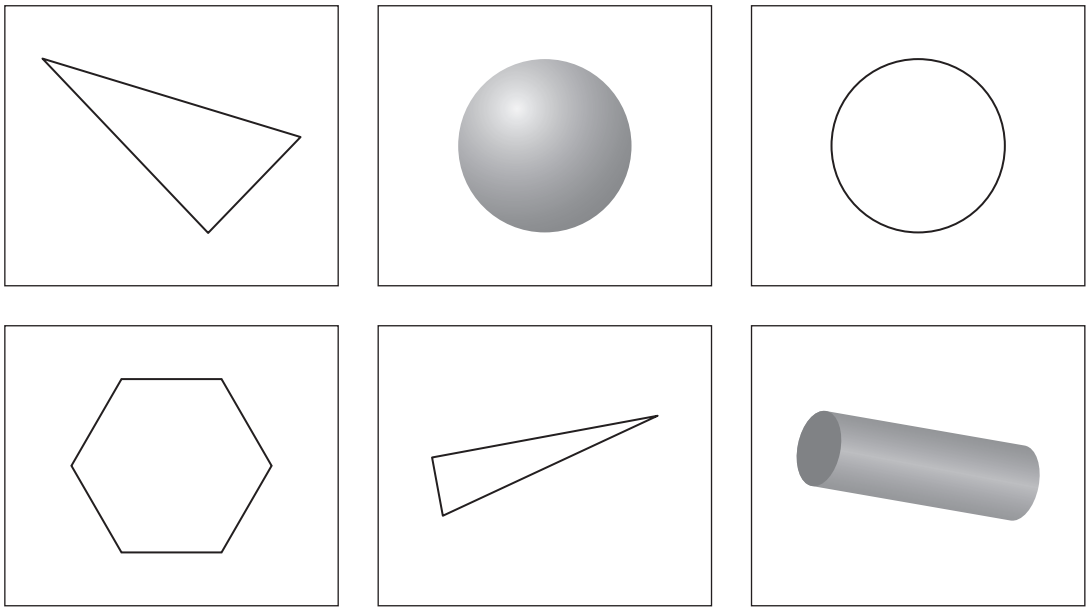
1. Explain that shapes come in different sizes and orientations. Review the names and examples of shapes, including squares, rectangles, triangles, and hexagons. (Note: You will not be able to make circles, cubes, cones, cylinders, or spheres on the virtual geoboard because they are either curved lines or three-dimensional shapes.)
2. Go to http://nlvm.usu.edu/. Click on "Pre-K–2," "Measurement," and then click on "Geoboard." Explain to students that you are going to make some shapes, and that students are to name the shapes. The shapes will be in different sizes and orientations.
3. To create a shape, click on a virtual rubber band under "Bands," and drag the band to the board. Place it on a peg on the board. By clicking on the band again, you can stretch it to another peg. By clicking on it once more, you can stretch it to make a triangle. You can use the bands to make squares, rectangles, triangles, and hexagons of various sizes and orientations. You can make several figures on the same screen. To delete a specific figure, highlight it by clicking on a line of the figure and click on "Delete." To clear all figures from the screen, click on "Clear." To color a figure, highlight it and then click on a color.
4. Create several shapes of different sizes and orientations and ask your students to name the shapes.

CLOSURE

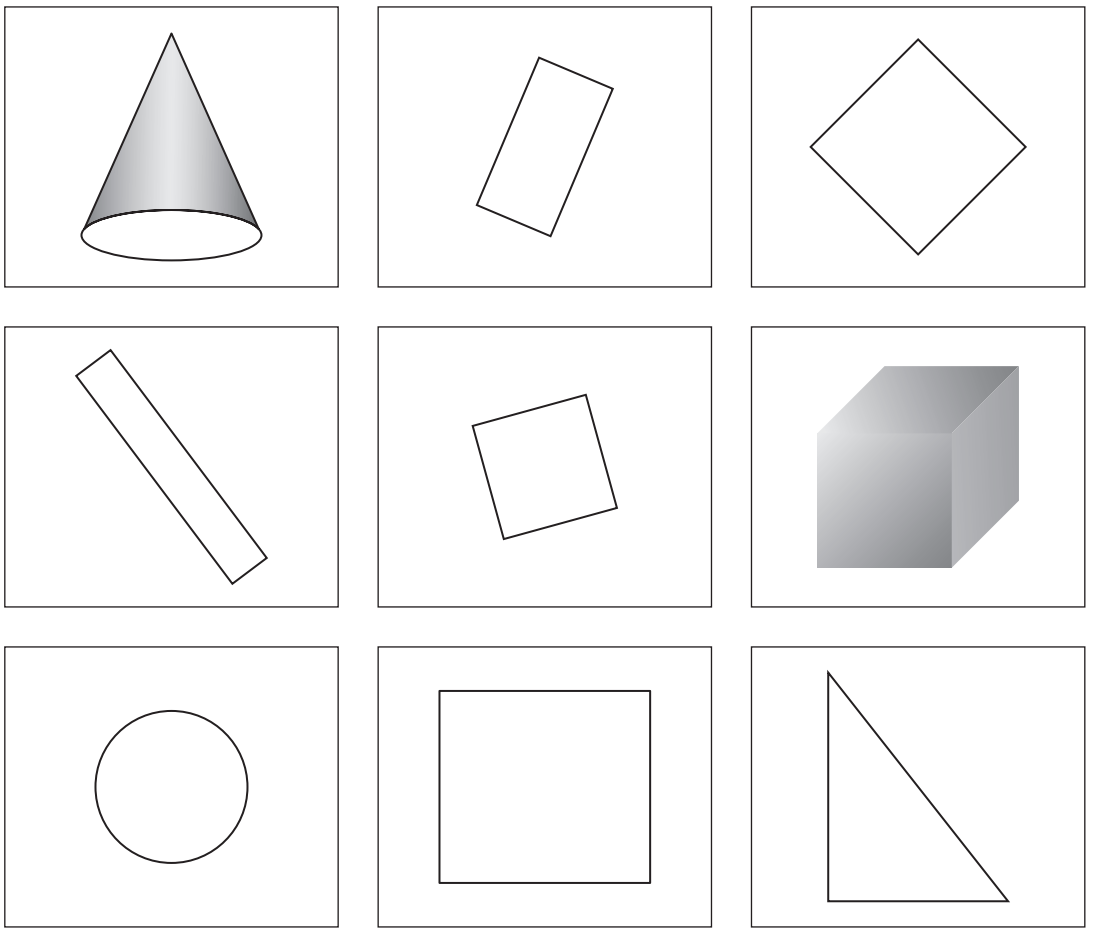
Review the shapes. Place one example of each on the geoboard at the same time: a square, a rectangle, a triangle, and a hexagon. Ask students to name each one.

NAMES AND SHAPES, I

Squares	Circles	Triangles
Rectangles	Cubes	Cylinders
Hexagons	Cones	Spheres



NAMES AND SHAPES, II



Geometry: K.G.3

"Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres)."

3. "Identify shapes as two-dimensional (lying in a plane, 'flat') or three-dimensional ('solid')."

BACKGROUND

We live in a three-dimensional world where shapes have length, width, and height. Because they have three dimensions, these shapes are often described as being solid. Examples include dice (cubes) and a can of soup (cylinder). Flat shapes have two-dimensions: length and width. Examples include the side of a box (rectangle) or the top of a cylinder (circle). Recognizing the difference between two- and three-dimensional shapes lays the foundation for working with plane and solid figures in later grades.

ACTIVITY: FLAT OR SOLID

Working in groups of three or four, students play a game in which they pick cards that show pictures of two-dimensional or three-dimensional shapes. Students are to decide whether the shapes on the cards are flat or solid. Students receive one point for each correct answer, and the student with the most points at the end of the game wins.

MATERIALS

Scissors; reproducibles, "Flat or Solid Picture Cards, I" and "Flat or Solid Picture Cards, II," for each group of students; reproducible, "Flat or Solid Score Sheet," one full page for every two students. Optional: Scissors or paper cutter for the teacher.

PREPARATION

Make enough copies of the reproducible "Flat or Solid Score Sheet" so that each student has his or her own score sheet. Cut out the individual score sheets. (Note: Depending on your students, you may prefer to cut out the picture cards as well.)

PROCEDURE

1. Hand out the materials. Explain that students will play a game called "Flat or Solid." Each group has two reproducibles that contain picture cards. The picture cards are numbered. Each student has a score sheet. Instruct students to write their name on their score sheet.
2. Explain that students are to cut out the picture cards and place them face down in a pile. The cards do not have to be in order.
3. Explain the rules of the game. Students will take turns picking cards. The first student picks a card and presents the card to the other students in the group. All members of the group individually decide whether the shape on the card is flat or solid. Then, on their score sheet, they find the number of the card and circle whether the shape is flat or solid. The next student picks a card and the same procedure continues. Caution students to make sure that they circle their answers according to a card's number.
4. Explain that the game ends after all of the cards have been picked. For every correct answer, a student receives 1 point. The student with the most points in the group at the end of the game wins.

CLOSURE

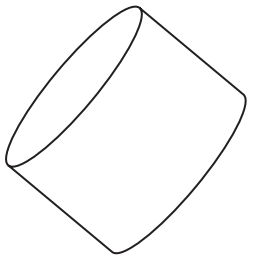
Starting with number 1, announce whether the cards contain a picture that represents a flat or solid shape. Have students correct their answers and then count the number of answers they got correct. Ask: Who had the most points in each group? Who had the most points in the class? Discuss any shapes that students had trouble identifying as being flat or solid.

ANSWERS

(**1**) Solid (**2**) Flat (**3**) Solid (**4**) Flat (**5**) Flat (**6**) Flat (**7**) Solid (**8**) Flat (**9**) Solid (**10**) Solid (**11**) Flat (**12**) Solid (**13**) Flat (**14**) Flat (**15**) Flat (**16**) Solid (**17**) Solid (**18**) Flat

FLAT OR SOLID PICTURE CARDS, I

1.



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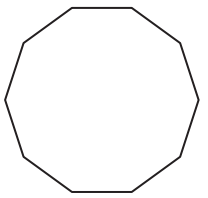

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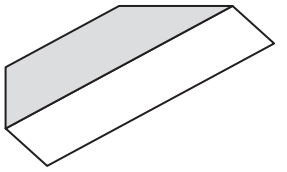

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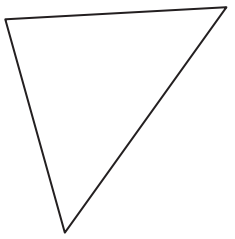

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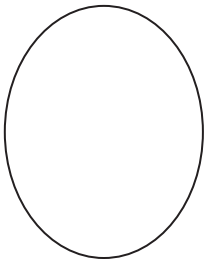

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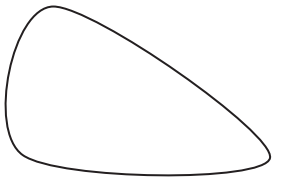

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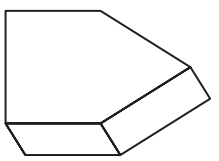

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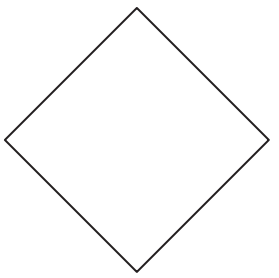

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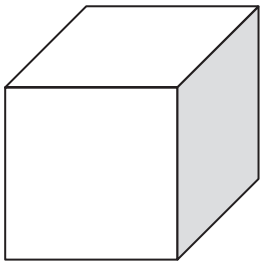
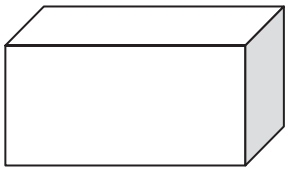


FLAT OR SOLID PICTURE CARDS, II

10.



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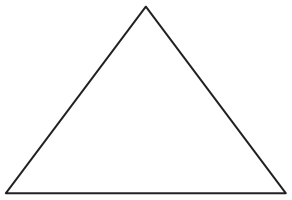

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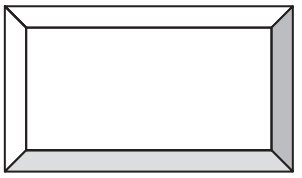

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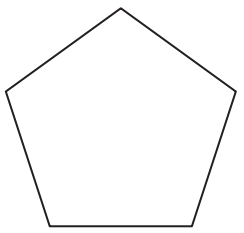

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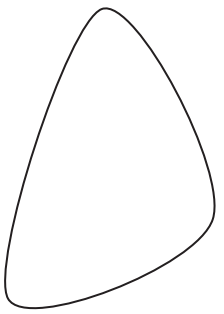

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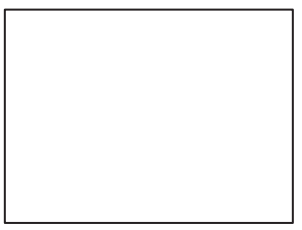

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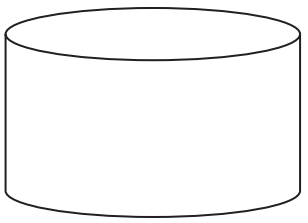

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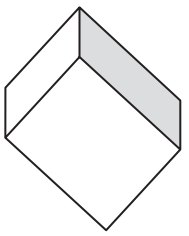

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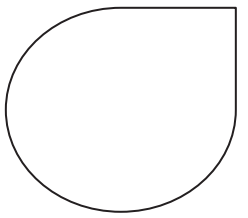


FLAT OR SOLID SCORE SHEET

Name _____

1) Flat or Solid	2) Flat or Solid	3) Flat or Solid
4) Flat or Solid	5) Flat or Solid	6) Flat or Solid
7) Flat or Solid	8) Flat or Solid	9) Flat or Solid
10) Flat or Solid	11) Flat or Solid	12) Flat or Solid
13) Flat or Solid	14) Flat or Solid	15) Flat or Solid
16) Flat or Solid	17) Flat or Solid	18) Flat or Solid

FLAT OR SOLID SCORE SHEET

Name _____

1) Flat or Solid	2) Flat or Solid	3) Flat or Solid
4) Flat or Solid	5) Flat or Solid	6) Flat or Solid
7) Flat or Solid	8) Flat or Solid	9) Flat or Solid
10) Flat or Solid	11) Flat or Solid	12) Flat or Solid
13) Flat or Solid	14) Flat or Solid	15) Flat or Solid
16) Flat or Solid	17) Flat or Solid	18) Flat or Solid

Geometry: K.G.4

"Analyze, compare, create, and compose shapes."

4. "Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/'corners') and other attributes (e.g., having sides of equal lengths)."

BACKGROUND

In order to analyze and compare two- and three-dimensional shapes, students must be able to recognize the shapes and their attributes. Being familiar with the similarities, differences, and parts of shapes enables students to make accurate comparisons between them. Following are descriptions of common shapes:

- A square has four sides of equal length and four right angles. (You might want to mention that right angles are like the corners of a standard sheet of paper.)
- A rectangle has four right angles and four sides. Opposite sides have the same length.
- A triangle has three sides and three vertices (corners).
- A pentagon has five sides and five vertices (corners).
- A hexagon has six sides and six vertices (corners).
- A circle is round. It has no sides or vertices (corners).
- A cube is a solid figure that has six square faces.
- A cone is a solid figure that has a flat round base and a point (vertex).
- A cylinder is a solid (or hollow) object in the shape of a can.
- A sphere is a solid figure like a ball.

ACTIVITY 1: ANALYZING AND COMPARING TWO-DIMENSIONAL SHAPES

Working individually first, students will identify two-dimensional shapes of different sizes and orientations by coloring the same types of shapes the same color. They will then work in a group to analyze and compare the shapes.

MATERIALS

Blue, red, green, orange, and yellow crayons; reproducibles, "Two-Dimensional Shapes" and "Describing Two-Dimensional Shapes," for each student.

PROCEDURE

1. Explain that two-dimensional shapes lie flat in a plane. Review examples of two-dimensional shapes, comprising squares, rectangles, triangles, circles, and hexagons. Note the descriptions of each shape, as provided in the Background.
2. Distribute the materials. Explain that the first reproducible, "Two-Dimensional Shapes," contains various two-dimensional shapes in different sizes and orientations. A color code for coloring the shapes is on the bottom of the sheet. The second reproducible, "Describing Two-Dimensional Shapes," contains guidelines that will help students to describe the shapes.
3. Explain that students are to first work individually and color the shapes according to the color code at the bottom of the reproducible. For example, squares should be colored blue, rectangles should be colored red, and so on.
4. Explain that after they have colored the shapes, they are to compare their work with the work of the other members of their group. Students are to check that all group members have colored the shapes correctly.
5. Next, instruct your students to work in their group and analyze and compare the shapes, and then complete the reproducible "Describing Two-Dimensional Shapes." (Depending on your students, you might find it helpful to work through this part of the activity as a class. You might read the information for each shape, one at a time, and then allow students to discuss the answers in their groups and complete the reproducible together as a group.)

CLOSURE

Discuss students' results. Ask for volunteers to describe each of the shapes in informal terms, as was provided in the Background.

ANSWERS

There are 3 squares, 3 rectangles, 4 triangles, 3 circles, and 2 hexagons.

ACTIVITY 2: VIRTUAL TWO-DIMENSIONAL SHAPES

Using a Web site, the teacher will lead an activity in which students must identify, analyze, and compare two-dimensional shapes.

MATERIALS

Computer with Internet access; digital projector for the teacher.

PROCEDURE

1. Explain that two-dimensional shapes may appear in different sizes, orientations, and colors. You will present various shapes on a Web site, and students must identify the shapes according to shape, size, and color.
2. Go to http://nlvm.usu.edu/. Click on "Pre-K–2," "Measurement," and then click on "Attribute Blocks." You will find an oval containing shapes with other shapes outside the oval. The shapes are squares, rectangles, triangles, circles, and pentagons.
3. Explain to your students that the shapes inside the oval have something in common. For example, they might all be triangles; they might all be big shapes; or they might all be the same color. Your students' task is to decide which shapes outside the oval should be moved to the inside. Clicking on a shape allows you to drag the shape inside the oval.
4. Ask for volunteers to suggest which shapes to move inside the oval, based on their shape, size, or color. Encourage students to refer to the shapes by name. Move the shapes your students suggest one at a time. To see if they are correct, click on "Check." If the "Try again" message appears, ask your students to reconsider what shapes should be placed in the oval. Clicking on "New Problem" provides a new set of shapes.

CLOSURE

Discuss the various shapes that were on the Web site. Ask students to informally describe a square, rectangle, triangle, pentagon, and circle.

ACTIVITY 3: ANALYZING AND COMPARING THREE-DIMENSIONAL SHAPES

Working in groups, students will use interlocking centimeter cubes to create, analyze, and compare three-dimensional shapes. They will share their results with the members of their group and the class.

MATERIALS

16 interlocking cubes for each student.

PREPARATION

Use interlocking cubes to create an example of a three-dimensional shape to show to your students.

PROCEDURE

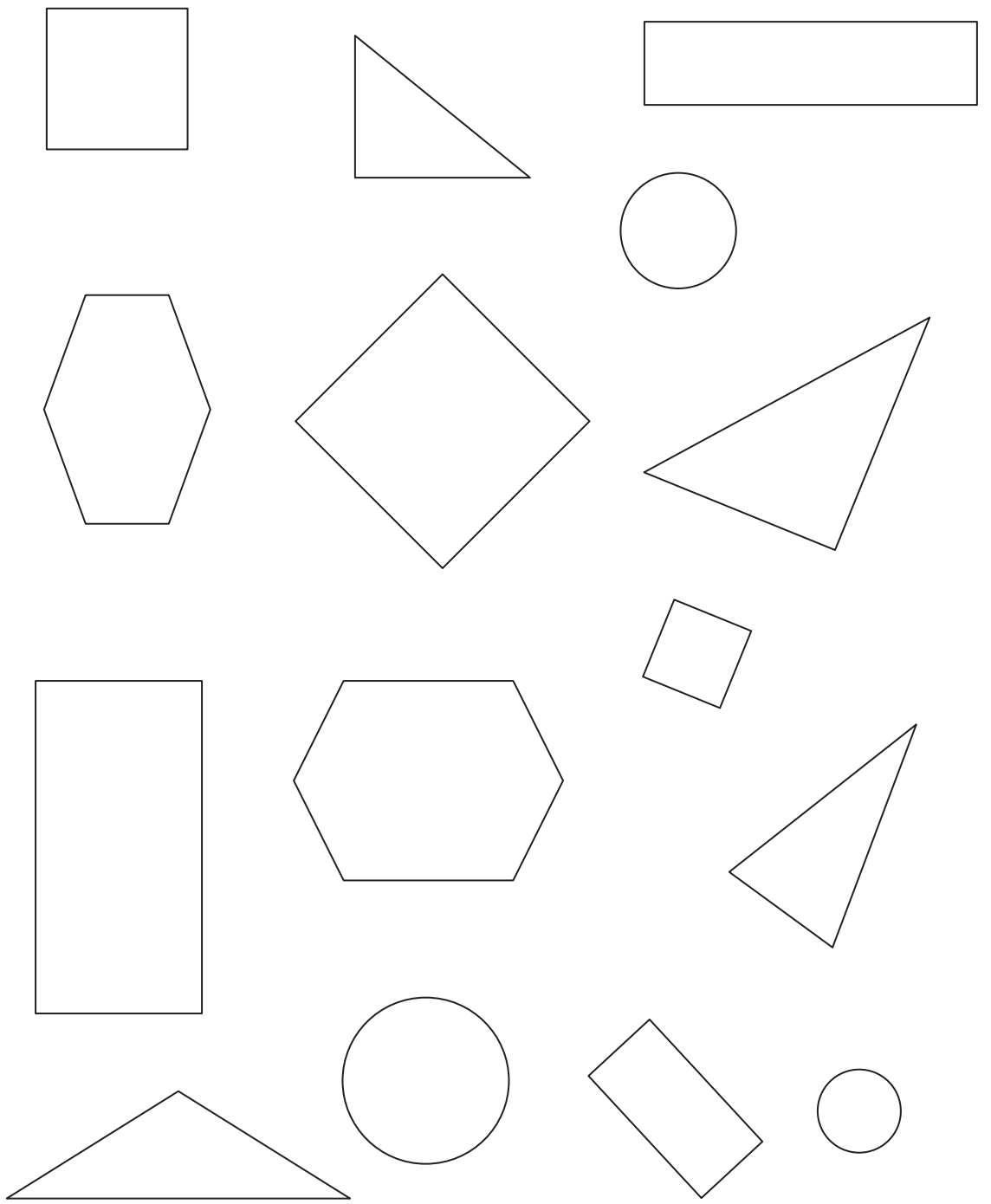
1. Review three-dimensional shapes. Emphasize that three-dimensional shapes have length, width, and height. They may be described as being solid as opposed to being flat. Show your students the shape you made and point out its dimensions.
2. Hand out the interlocking centimeter cubes.
3. Explain that each student is to use his or her cubes to create a three-dimensional shape. After they have made their shapes, students are to analyze and compare their shapes with the shapes made by the members of their group. They should describe the number of sides a shape has, the number of its vertices (corners), and the length of its sides compared to other shapes.

CLOSURE

Discuss students' results. Ask for volunteers to show and describe the shapes they created to the class. Ask your students if changing the orientation or position of a shape changes the shape in any way.

Name _____

TWO-DIMENSIONAL SHAPES



Squares – blue Rectangles – red Triangles – green

Hexagons – orange Circles – yellow

Name _____

DESCRIBING TWO-DIMENSIONAL SHAPES

Fill in the blanks.

Square

Number of Sides _____ Number of Corners _____

Rectangle

Number of Sides _____ Number of Corners _____

Triangle

Number of Sides _____ Number of Corners _____

Hexagon

Number of Sides _____ Number of Corners _____

Circle

Number of Sides _____ Number of Corners _____

Which shape has sides of equal length? _____

Which shape has no sides or corners? _____

Geometry: K.G.5

"Analyze, compare, create, and compose shapes."

5. "Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes."

BACKGROUND

Models provide visual representation of shapes. Creating models of shapes that occur in the real world helps students to understand how common shapes may be found just about everywhere.

ACTIVITY: MAKING MODELS

In this two-day activity, students will use clay to create models of shapes found in the real world. After they create their clay models, students will draw a picture of their model. They will then compare their model and drawing with the models and drawings of other students.

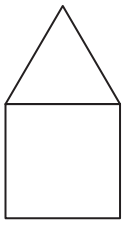
MATERIALS

4 to 6 ounces of modeling clay; drawing paper; rulers; crayons for each student; paper towels for cleanup.

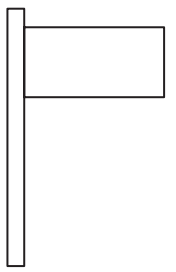
PROCEDURE

Day One

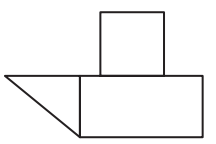
1. Hand out the clay. Explain that students are to use their clay to create shapes that will model objects in the real world. Offer some examples, which you may sketch on the board, such as:
   - A house, using a triangle and a rectangle or square.



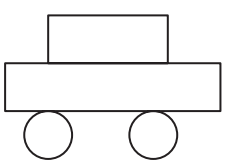
- A flagpole and a flag, using two rectangles.



- A boat, using a triangle, a rectangle, and a square.



- A car, using circles and rectangles.



2. Brainstorm with your students to generate ideas for other shapes they can use for their models.
3. Encourage your students to be neat and accurate with their work, but also creative.
4. At the end of the period, collect students' models and store them for use on Day Two.

Day Two

1. Hand out the drawing paper, rulers, crayons, and the clay models students made previously.
2. Explain that students are to draw pictures of their models. Suggest that they color their pictures.

CLOSURE

Discuss how the models and drawings students made are alike and different. Ask your students: Which—the clay model or the drawing—is three-dimensional and which is two-dimensional? Have students share their models and drawings with a partner. Students should describe the shapes they used to make their models and drawings. Ask for volunteers to show and describe their work to the class.

Geometry: K.G.6

"Analyze, compare, create, and compose shapes."

6. "Compose simple shapes to form larger shapes."

BACKGROUND

Simple and complex geometric figures are found throughout the world. Simple shapes are often combined to make complex shapes. Recognizing how simple shapes combine to form complex shapes is an important skill that leads to the concept that a whole may be made up of many parts.

ACTIVITY: COMBINING SHAPES

Students will be given shapes that they will cut out and then combine to form more complex shapes.

MATERIALS

Scissors; glue stick; crayons; reproducibles, "Cut-Out Shapes, I" and "Cut-Out Shapes, II," for each student; transparent tape for the teacher.

PREPARATION

Use transparent tape to tape two $8\frac{1}{2}$-inch by 11-inch sheets of paper to form an $8\frac{1}{2}$-inch by 22-inch rectangle as a visual aid.

PROCEDURE

1. Explain that many shapes are often formed by combining simpler shapes. Show students the $8\frac{1}{2}$-inch by 22-inch rectangle you made. Explain that this rectangle was made by putting two smaller rectangles together. Point out the two pieces.
2. Hand out the materials. Explain that each reproducible has four rows of shapes, followed by a dotted line and a larger shape. Students are to cut out all of the shapes in a row, and then combine the smaller shapes to make the larger shape. Students should place the smaller shapes so that they fit onto the larger shape without any gaps or overlaps. Once students see that the shapes fit, they should glue the smaller shapes onto the larger shapes. They may color the shapes if they wish.
3. Caution your students to cut out and complete one row at a time to prevent the shapes from different rows getting mixed up.

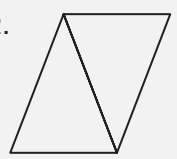
CLOSURE

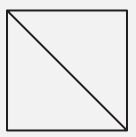
Check your students' work. Discuss any shapes that are the same but may be in a different orientation.

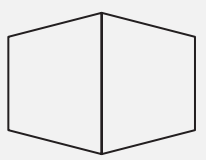
ANSWERS

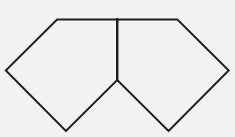
Possible combinations are shown below.

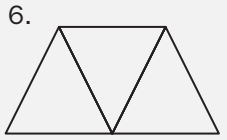
1. 

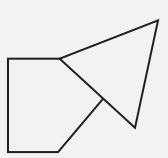
2. 

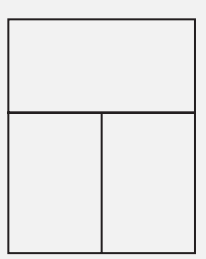
3. 

4. 

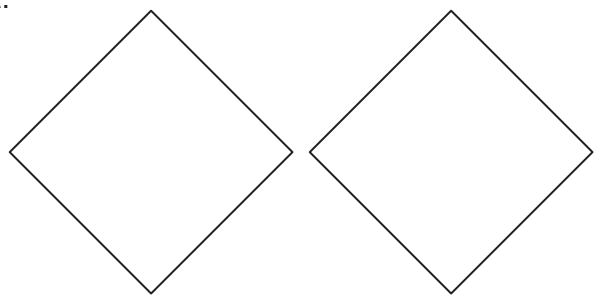
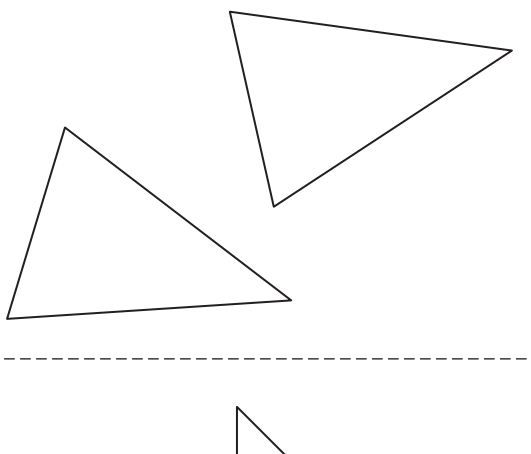
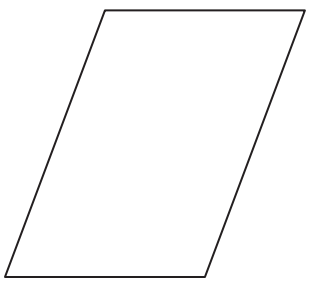
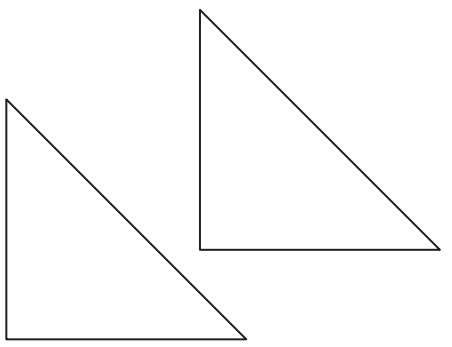
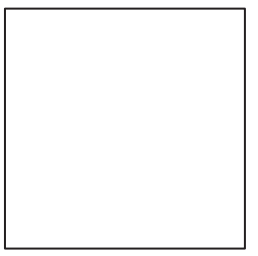
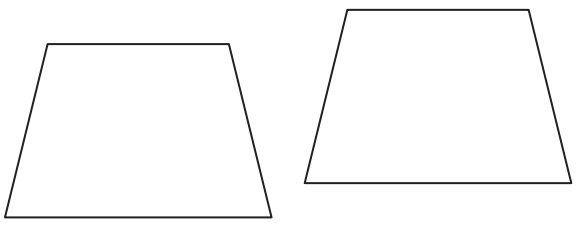
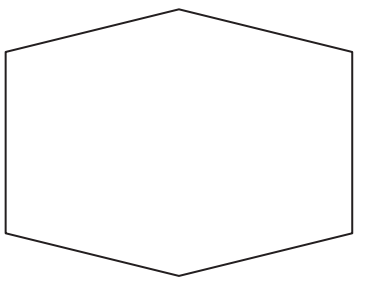
5. 

6. 

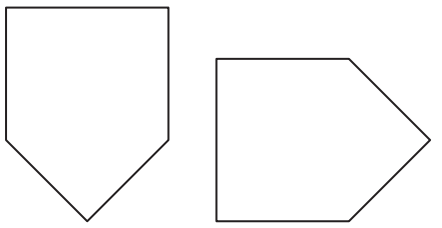
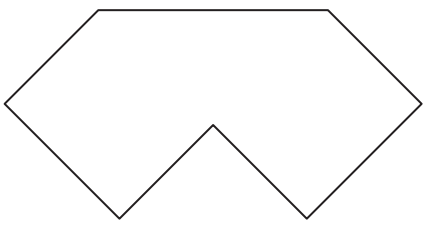
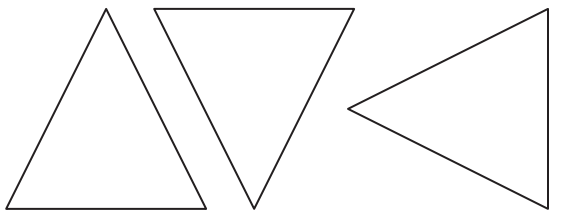
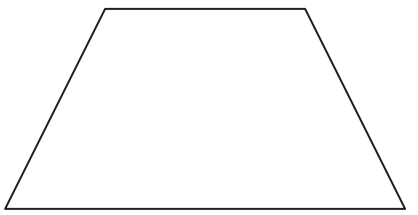
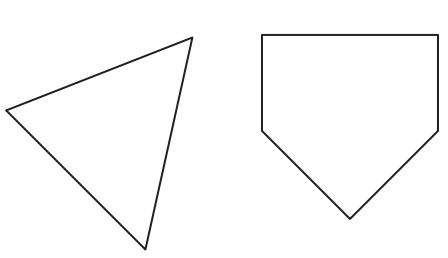
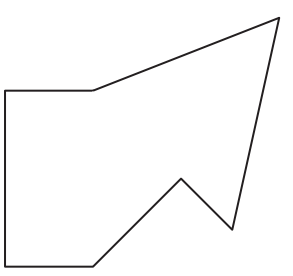
7. 

8. 

CUT-OUT SHAPES, I

Cut These Out	Make These
1. 	
2. 	
3. 	
4. 	

CUT-OUT SHAPES, II

Cut These Out	Make These
5. 	
6. 	
7. 	
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