Using Hands-On Activities, Games, and Literacy Connections to Reach Diverse Student Needs
Using Hands-On Activities, Games, and Literacy Connections to Reach Diverse Student Needs

I. The Problem

II. The Solution
   A. Linking objectives, tests, and instruction
   B. The three stages of learning
   C. Scaffolding logical structures
   D. Teaching conceptual underpinnings

III. Hand-On Activities

IV. Conclusion
Objective: To order the numbers 1 to 10.

Materials: Interlocking cubes, number stair, Numeral Cards 1-10, cubes and margarine tubs
One Bear with Bees in His Hair, Wood, Jacki
Fish Eyes, Ehler, Lois
One Gorilla, Morozumi, Atsuko
Ten Flashing Fireflies, Sturges, Philomon (Activity 75)

1 Introductory Activity

Review: Towers of 1 More

On page 58, children used the pattern of “1 more” to make towers for the numbers 1 to 5. On this page, the activity is continued for the numbers 6 through 10. If available, a plastic number stair should be used at the end of the activity to store the towers.

In an earlier chapter, we built towers to 5 following a special pattern. The special pattern was that each new tower was made by matching the old tower and making the new tower 1 story more. Today we continue the activity and make towers up to 10 stories. First, build a tower 1 story high. Now, build a new tower by matching your old tower and making the new tower 1 story more. (Repeat 9 times.)

Now, build a new tower by matching your old tower and making the new tower 1 story more. How many stories are in your tower? (10)

Touch your shortest tower and say aloud the number of stories. Count the number of stories in each tower from your shortest tower to your tallest tower.
(1, 2, 3, 4, 5, 6, 7, 8, 9, 10)

Counting from a Tower

After children can touch and count from 1 to 10, have them begin to count forward from a number.

Today we are going to count up to 10, starting from a tower other than the 1 tower. Touch your 2 tower. Count aloud from 2 to 10. (3, 4, 5, 6, 7, 8, 9, 10) Remind the children that they should not say aloud the tower they are starting from; rather, they are to count forward from that tower. This activity of counting from a number is an important readiness activity for success with addition where students should learn to count up from a number rather than having to count by ones from 1 to the number.

2 Connections Activity

Place your towers on the matching picture. Color the pictures of cubes the same color as the cubes in your tower. Write the number of stories in each tower inside the highest cube of each tower.

3 Follow-Up Activities

A STAIRCASE OF TOWERS

This game is for 2 children. Each pair will need 100 interlocking cubes and 2 sets of numeral cards 1-10. Shuffle the cards and place them face down between the 2 players. Players take turns selecting a card and building a tower to match the number selected. After each play, the card is returned to the bottom of the deck.

The object of the game is to build the towers from 1 to 10 in order. The first player to complete the staircase is the winner. If a card is selected for a tower the child has already built, the child loses that turn. After all cards have been selected once, the cards in the pile may be shuffled and used again.

ONE MORE

Hide from 1 to 9 cubes in random order under margarine tubs. Hold up 1 tub and ask the students to write the number of cubes they see under the tub.

Place 1 more cube under the tub. Ask the students to write the number of cubes under the tub now. Lift up the tub. Ask a volunteer to count the cubes. If children make a mistake, have them erase their answer and write the correct answer.
Book:  *Ten Flashing Fireflies* by Philemon Sturges

Summary: A young boy is proud of having caught a jar full of fireflies which seems to him like owning a piece of moonlight.

Activity: Use this story to introduce the “Towers of One More” activity. Give each student ten interlocking cubes and tell them that these will be their “fireflies.” As you read the story have them show the number of fireflies that they have caught. Before you turn each page to find the number, have them add one cube to their tower and tell how many fireflies they have as one is added each time. Students will delight in being able to check their answers by reading the next page in the story.
Objective:
To explore and name base ten blocks. To match the blocks with their place value names.

Materials:
Base ten blocks, Place Value Mats (Masters 1 and 2)
Note: Before class, make copies of Master 20 (Vocabulary Cards). Make copies of Master 21 (My Math Glossary) and distribute to each student.

Vocabulary:
different, place value names, same

One Hundred Is a Family, Ryan, Pam Munoz
(Activity 2)

Introductory Activities

Introducing Base Ten Blocks

The main reason students make errors with whole number algorithms is that they do not understand multidigit numeration. They do not know that 43 means 4 tens and 3 ones or $40 + 3$.

Base ten blocks are ideal for teaching numeration concepts because students can see the abstract concept of place value each time they pick up a block. One tens block is always seen both as 1 ten and 10 ones.

Each pair or small group should have 20 ones blocks, 10 tens blocks, 10 hundreds blocks, and a place value mat.

Explain the benefits and proper use of manipulatives. Set ground rules for using them and discuss take-out and clean-up routines.

We are going to begin using base ten blocks. See what you can discover about your blocks. Allow exploratory time. Students might make buildings, roads and parking ramps.

Encourage students to look for patterns. We can find important patterns if we ask ourselves how these blocks are the same, or alike, and how they are different, or not alike.

Write 2 columns on the board:
How are the blocks the same?
How are the blocks different?

What is one way the blocks are the same? (e.g., same material) After a period of time, ask students to share.

<table>
<thead>
<tr>
<th>Same</th>
<th>Different</th>
</tr>
</thead>
<tbody>
<tr>
<td>made of wood</td>
<td>sizes</td>
</tr>
<tr>
<td>natural color</td>
<td>shapes</td>
</tr>
<tr>
<td>points &amp; corners</td>
<td>volumes</td>
</tr>
<tr>
<td>solids</td>
<td>weight</td>
</tr>
<tr>
<td>made of 1 cm cubes</td>
<td>made of 1 cm cubes</td>
</tr>
<tr>
<td>10 of 1 block = 1 of the next larger block</td>
<td></td>
</tr>
</tbody>
</table>

How many different sizes do you have? (3) Put 1 of each size in front of you. We call the smallest block the “ones” or “units” block. How many ones does it take to make the next-sized block? (10) We name this block the “tens” or “long” block.

How many of the ones blocks are the same as the largest block? (100) We name this block the “hundreds” or “flat” block.

The words “ones,” “tens,” and “hundreds” are place value names.

Display 1 hundred, 2 tens, 5 ones. Place the blocks correctly on a Place Value Mat. Then say the words for the blocks, one hundred twenty-five.

About This Page

Work through the example together. Look at problem 1. What blocks are shown? (1 hundred, 5 tens, 3 ones) Write the number in the correct place on the chart. (153)

To say this number aloud, touch the biggest block and say its value. (100) Now touch the next biggest blocks and say their value. (50) Then touch the smallest blocks and say their value. (3) Now say the number together as you touch the blocks. (one hundred fifty-three)

Have students complete problems 2 and 3 on their own or with a partner.
Objective:
To build models and draw pictures of numerals. To write numbers in expanded notation.

Materials:
Base ten blocks, Place Value Mats (Masters 1 and 2), 6-sided dice

Vocabulary: expanded notation

Introductory Activities

Matching Models, Pictures and Numerals

Students develop a deeper understanding of multi-digit numeration when they see numbers represented in different ways. In this activity, students will match numbers to blocks, words, pictures and expanded notation. Each small group of students will need 20 ones blocks, 10 tens blocks and 10 hundreds blocks. Provide practice with the following activities:

1. Writing numerals from blocks.
   Display 3 hundreds, 5 tens, 4 ones. Ask students to say the words for the blocks and then write the numbers for the blocks. (three hundred fifty-four)

2. Building blocks from numerals.
   Write a 3-digit numeral on the board. Ask students to explain what each digit in the numeral means. Ask how to read this number. Then ask them to build the number with base ten blocks on Place Value Mats. This activity can be practiced in pairs.

3. Building blocks and writing numerals from an oral presentation.
   Say a 3-digit numeral. Students build the number with base ten blocks and then record it.

4. Drawing pictures from numerals.
   Write a numeral on the board. Have students draw a picture, using small squares for hundreds, vertical lines for tens and dots for ones.

   Example: $243 = \square \square \square \square \ldots$

5. Writing numbers in expanded notation.
   Display 3 hundreds, 5 tens and 4 ones. What is the value of the hundreds blocks? (300) What is the value of the tens blocks? (50) What is the value of the ones blocks? (4) We can write the number in a way that shows the value of each digit. This is called expanded notation.

   Write on the board:
   
   \[
   3 \text{ hundreds} + 5 \text{ tens} + 4 \text{ ones} = 300 + 50 + 4 = 354
   \]

   Repeat with another example.
Place Value Bingo

Players: The entire class
Students: write each of the digits 1-9 in random order on the squares on each card

Teacher prepares 27 index cards for each of the 4 bingo cards as follows:

**Card 1:** 1 one, 2 ones, ... 9 ones; 1 ten, 2 tens, ... 9 tens; 1 hundred, 2 hundred, ... 9 hundred.

**Card 2:** 1 one thousand, ... 9 one thousands; 1 ten thousand, ... 9 ten thousands; 1 hundred thousand, ... 9 hundred thousands.

**Card 3:** 1 one million, ... 9 one millions; 1 ten million, ... 9 ten millions; 1 hundred millions, ... 9 hundred millions.

**Card 4:** 1 tenth, ... 9 tenths; 1 hundredth, ... 9 hundredths; 1 thousandth, ... 9 thousandths.

Teacher selects and reads aloud 1 index card at a time, e.g. “6 hundreds” from Card 1. Every player having a 6 written in one of the hundreds squares covers the space. The first player to have 3 in a row in any direction is the winner.

www.movingwithmath.com
Objective:
To act out addition problems. To develop understanding of addition as combining or putting things together.
To draw pictures and write number sentences involving addition.

Vocabulary:
addition, plus sign, addition words... altogether, joining, coming together, in all

Read to Me
Every Buddy Counts, Murphy, Stuart J.
(Activity 3)

Introductory Activities

Acting Out a Problem
Have students act out the following problem. Describe the problem and show the correct way to record the action after the problem is acted out.

Today we are going to act out a number problem and find how to write the action in a number sentence. Be ready to answer questions about what you see.

(Student’s Name) and (Student’s Name), please stand by the door.

(Student’s Name), (Student’s Name) and (Student’s Name), please stand by the window.

Have the students by the door and by the window come together and stand by the teacher’s desk. How many students altogether are standing by my desk? (5)

Think about what happened first in this problem and then what happened next. Tell the story to your partner. (Some students stood by a door and some students stood by a window. Then they came together and stood at the desk.) How many stood by the door? (2) Write 2 on the chalkboard. How many stood by the window? (3) Write 3 under the 2. How many altogether were at my desk? (5)

What are the words that describe the action in this problem—what is happening? (coming together or joining). We call joining or coming together addition. We use the plus sign to show addition. I will write the plus sign here to show the complete sentence.

2 + 3 = 5

The word altogether means “how many in all” and tells us to add. Sometimes we will just use the words in all to mean addition. Now I am going to act out another problem, only this time I will see if you can write the problem correctly on your paper the same way I did on the chalkboard.

Tell another addition story using different numbers. Pause after each step to have the students record the action. When you see a problem with a plus sign, it may help you to think about the problems we acted out.

About This Page
Read over the first story. Ask the students to retell the story to a partner. Then go through the story step by step as the students write in the numbers. Have students work in pairs to complete the page on their own.

What words tell you there should be a plus sign? (in all, altogether)

Follow-Up Activities

Drawing a School Story
Re-enact the first story in Introductory Activities. We can draw a picture of the story to help us remember what happened. Show the students how they could draw a picture of the action using simple stick figures. For example, this problem could be drawn as below.

Now make your own addition story. Draw a picture of the story and write a number sentence. Have students share completed stories.
Addition and Subtraction
Read To Me Activity

Book: *Every Buddy Counts* by Stuart J. Murphy

Summary: A little girl goes through the day counting her “buddies,” which include her pets, family members and neighbors.

Activity: Together as a class write the “buddies” that you can count around school. For example, 1 principal, 2 P.E. teachers, 3 janitors, etc. Have each student draw one set of the “buddies.” When finished with the pages, put them in a class book titled, “Every Buddy at School Counts!”

Students can also write addition sentences using the class list. For example, “We have 1 principal and 3 P.E. teachers. How many buddies in all?” Have one student come to the board and write the addition sentence that goes with each problem.
Objective:
To use a Number Line and a Hundred Board to add a 2-digit number and a 1-digit number with regrouping.

Materials:
Classroom Number Line to 100, interlocking cubes, Blank Hundred Board (Master 12), Number Tiles (Master 6), small plastic bag, pennies and dimes, 10-sided dice

12 Ways To Get to 11, Merriam, Eve (Activity 30)

Introductory Activities

Addition on a Number Line and Hundred Board
Write on the board:
You have 28¢. You earn 5¢. How much do you have?
Put 9 dimes and 20 pennies in a small bag or coin purse. Ask a volunteer to show 28¢ with the fewest number of coins. (2 dimes 8 pennies)
Ask another student to show how much money they would have after they earned 5¢ more. Discuss the meaning of the word “earn” and different ways to find the answer. Ask students which way seems easier and why.
Two possible solutions:
1. I put 5 pennies with the rest of the money and then I counted how much money in all. (10, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33¢)
2. I started with 28 and added by counting 1 penny at a time from 28. (29, 30, 31, 32, 33¢)

We can also show this on a number line. Have a student count out 28 cubes and place them on the number line. Have another student add 1 cube at a time and count forward as many steps as the number on the die. She marks the landing point with a yellow cube and writes the number sentence on paper.

We can also find the answer on a Hundred Board. Have a student show how to count 5 steps up from 28 on a Hundred Board.

About This Page

Direct attention to the story and number line at the top of the page. Have a student use dimes and pennies to solve the problem, a second student show the problem on the Number Line and a third student show the problem on the Hundred Board.

Have students use a number line or Hundred Board to add. Students should complete the page on their own.

Follow Up Activities

Hundred Board Game
Each pair or small group should have a blank Hundred Board and Number Tiles (Master 6), yellow interlocking cubes and a 10-sided die. Player 1 selects a Number Tile and places it on the correct space on the Hundred Board. She then throws the dice and counts forward as many steps as the number on the die. She marks the landing point with a yellow cube and writes the number sentence on paper.

Play rotates around the group. Players earn 1 point for each correct addition fact. If a player lands on a space with a Number Tile on it, she loses that turn.

Play continues for a designated period of time or until one player gets 10 points.

Writing Word Problems
Have students make up a story related to adding a 2-digit number and a 1-digit number with and without regrouping, e.g., 34 + 5 or 34 + 8.

Have students write each problem on a page titled “Different Ways to Solve a Problem,” to be saved in the class word problem file. Review different ways. Have students explain 2 or 3 different ways to solve the problem.
Objective:
To use base ten blocks to subtract 2-digit numbers, no regrouping. To find a pattern for subtracting 2-digit numbers.

Materials:
Place Value Mats (Masters 1 and 2), base ten blocks (tens and ones)

Introductory Activities

Subtracting 2-Digit Numbers

Each student, pair or group should have a Place Value Mat and base ten blocks. **Today I will tell you stories.** Listen for the question and needed facts. Discuss with your partner or group how to solve the problem.

Use the Place Value Mat and base ten blocks to solve the problem.

After you have found the answer with blocks, think of a way to record the story with paper and pencil. Be prepared to explain your method.

Story 1: You buy a box of 78 peanuts at the circus. You eat 34 peanuts. How many peanuts do you have left?

Students might record by drawing a picture,

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

Start by building 7 tens and 8 ones.

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Then remove 3 tens and 4 ones.

4 tens 4 ones

by marking sticks or dots for tens and ones,

or they might record a number sentence:

78 – 34 = 44

Tell me a pattern for subtracting two 2-digit numbers.

(There are four possible patterns:
1. I subtracted 30 from 70 and 4 from 8
2. 78 – 30 is 48 and 48 – 4 is 44
3. 70 – 30 is 40 and 8 – 4 is 4, 44
4. Subtract the number in the ones place, then subtract the numbers in the tens place.)

Story 2: You have 79 hot dogs. You sell 28 hot dogs. How many hot dogs do you have?

Story 3: You have 75 peanuts. Your friend Bill has fewer peanuts than you do. How many fewer peanuts does Bill have? (not enough information)

About This Page

Work the example at the top of the page together. Have students use base ten blocks.

What is the pattern for subtracting 2-digit numbers? (subtract the ones, then subtract the tens) Have students complete the page with a partner.

Follow Up Activities

Subtraction Bingo

Skill Builders 15-19

Skill Builders 15-5
Subtraction Bingo

Players: 2 or more

You Need: 9 small objects to cover your card. Cut out the CALLER CARDS from one of the sheets.

Choose a caller. Everyone else needs a blank bingo card. Write the problems above on your card in any order. The caller draws a CALLER CARD from the pile and says a number. Cover the problem on your card that would equal the number called. Yell “Bingo!” when you get 3 in any row, column, or diagonal.
Objective:
To multiply by 5 using pictures and models.

Materials:
Paper, crayons, interlocking cubes, tape,
100 Multiplication Facts (Master 35), Certificate of
Achievement (Master 45)

Vocabulary:
product, factor

How did you get your answer of 15? (counting by 1 or
counting by 5). This is a story about a 5 and a 3 that
become 15.

What was the action in this problem? (We are putting
numbers together.) What is special about the numbers
we are putting together? (They are all the same number.)
Write on the board:

\[ 5 + 5 + 5 = 15 \]
\[ 5 + \frac{3}{15} \]

When we put together numbers of the same size, we are
multiplying. The sign for multiplication is the times
sign.

Write an \( \times \) to the left of the 3 on the board.

\[ \frac{5}{3} \text{ factors} \times \frac{3}{15} \text{ product} \]

The answer in a multiplication problem is called the
product. The numbers being multiplied are called
factors. Add the words “factors” and “product” to the
problem on the board.

Continue to hold up other pictures of hands until you
have 10 pictures of hands, each time writing a new
multiplication fact on the chalkboard.

Can you use your cubes to make a model of a
picture of one hand? (5 cubes) Two hands? (10 cubes)

Have small groups of students continue to build 10 towers
of 5 cubes each. Touch the cubes and count aloud as they
skip count by 5 from 5 to 50.

Multiplying by 5

Give each student a sheet of paper, a crayon, and
interlocking cubes. Outline a picture of one of your
hands. Write your name at the top of your paper.

Hold up one picture. How many hands are on this
picture? How many fingers? (1 hand, 5 fingers) Tape the
picture on a chalkboard. Hold up a second drawing. How
many hands in all? (2) How many fingers in all? (10)

Repeat with a third drawing (3 hands, 15 fingers)

How many fingers in all? (10)

How many starfish arms are there?

5. The Native American tribes multiplied groups of equal size
by 5. The times sign is for multiplication. The numbers being
multiplied are called factors. The answer in a multiplication problem is
called the product. The answer in a multiplication problem is
called the

Write on the board:

\[ 5 \times 3 = 15 \text{ fingers} \]

Factors
Product

Write an addition sentence and a multiplication sentence for each problem.

1. How many fingers are there?

\[ 5 \times 3 = 15 \]

2. How many starfish arms are there?

\[ 5 \times 5 = 25 \]

3. Gardeners must dig 5 holes to
plant trees. Each hole takes 2
hours to dig. How many hours
must they work?

10 hours

4. The Native American tribes followed herds of animals if a
tribe followed one herd 5 miles every day, how many miles would they
travel in 3 days?

45 miles

5. Aladdin empties his 5 pockets after
he escapes from the cave. He finds
8 jewels in each pocket. How many
jewels does he have altogether?

40 jewels

6. Aladdin rubs his lamp 3 times a
day and makes a wish each time.
How many wishes does he make in
5 days?

15 wishes

Multiplication is a shortcut for addition. Do you agree or disagree? Use
an example and explain with words, numbers, and pictures.

About This Page

Read the illustration together at the top of the page. Do
problems 1 and 5 together. Problems 5 and 6 on this page
reference the story of Aladdin and the Magic Lamp. This
is the first of four age appropriate books that may be read
aloud over the course of a week. Remind students that math
will appear in other subjects and in everyday life.

Follow Up Activities

Baseline Test on Multiplication Facts (Optional Activity)

Make copies of the 100 Multiplication Facts
(Master 35) for each student. See how many facts each
student is able to answer correctly in 5 minutes (allow
extra time for students with severe disabilities). Repeat the
test once a week, and give a final test at the end. Write the
number of correct answers on the Certificate of
Achievement to be sent home with each student.
Book: *Arctic Fives Arrive* by Elinor J. Pinczes

Summary: A counting book in which animals in groups of five share a hilltop to view the northern lights.

Activity: As you read the story, ask, “How many groups of 5 animals are there now?” Keep track of how many animals are on the hilltop using repeated addition and multiplication. Since the story only goes to 30 have the students continue with repeated addition and multiplication up to 9 groups of 5.

Have the students vote to pick a place many different animals might go—a tree, a pond, a field an island. Assign a number to each student and tell them that is the number of groups of 2 animals that are going to the destination. Each student will fill in and illustrate the sentence, “Name’s (number) groups of 2 (name of animal) are going to the (place). that is 2 + _____ (number needed) or 2 x _____ = ______ (name of animal) altogether. Ex. John’s 3 groups of 2 blue jays are going to the big oak tree. That is 2 + 2+ 2 or 2 x 3 = 6 blue jays altogether. These pages may be placed on a bulletin board or in a class book titled, “Places Twos Arrive.”
Objective: To skip count on a number line to find multiplication facts with 5.

Materials:
Interlocking cubes, Number Line to 100 (Master 7), counters or marbles, pie tin or empty coffee can

Reese’s Pieces Count by Fives, Pallotta, Jerry
(Activity 5)

Introductory Activities

Mental Math for the 5 Facts

The strategy for finding products when 5 is a factor is to count by 5. Provide oral practice with students to use this strategy.

Write on the board:
There are 7 students standing in line.
Each student has his right hand raised.
How many fingers are raised?

Have 7 students come to the front of the room. Have each student raise his or her right hand with the fingers outstretched as the class counts aloud, “5, 10, 15, 20, 25, 30.” Continue until the last student raises her hand and the class says “35.” Repeat with 8 students, 9 students and 10 students.

Plastic Cubes on a Number Line

Prepare a class number line by taping 2-inch wide strips of paper together from Master 7. Label the marks from 1 to 100, and tape the number line on the board or a classroom wall. Each small group of students should have interlocking cubes.

Place 1 pile of cubes on your desk equal to the fingers on 1 hand. How many cubes are shown? (5)
Place another group of 5 cubes on your desk. How many cubes are shown? (10) Add another group of 5.
How many cubes? (15) How did you get your answer? (added 3 groups of 5, counted by 5)

Have a volunteer bring her cubes to the board and demonstrate that the cubes add to 15.
Tell an addition fact and a multiplication fact for this problem. (5 + 5 + 5 = 15 and 3 × 5 = 15)

Ask a student to place the set of cubes above the number line on the board and tell how many cubes in 1 group of 5.

Write on the board:
1 group of 5 = 5 or 1 × 5 = 5

Ask a second student to join another set of 5 cubes to the first set. Then have him show the cubes on the number line. (The second set of cubes, when joined to the first set, should cover the line between 5 and 10.)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line continues to 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jump by fives from 5 to 50.
1. 5 10 15 20 25 30 35 40 45 50
2. Complete the table showing the landing points for jumps of five along a number line.

<table>
<thead>
<tr>
<th>Number of Jumps</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landing point</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

Use cubes on a number line to multiply.
3. 4 × 5 = 20 5 × 6 = 30 3 × 5 = 15
8 × 5 = 40 7 × 5 = 35 9 × 5 = 45

Find the products.
4. 5, 10, 15, 20, 25

Direct attention to the example at the top of the page.
5. How do you know if a number is a landing point when you count by fives? Hint: look for the pattern in problem 2.
The landing points end in 0 or 5.

Write on the board:
2 groups of 5 = 10 or 2 × 5 = 10
Repeat through 10 × 5 = 50.

Write the landing points on the board. What pattern do you see with numbers that are the landing points of 5? (last digit is a 0 or 5)

About This Page

Direct attention to the example at the top of the page. Demonstrate by placing 2 trains of 5 cubes each on the number line. Work several problems with the class, showing students 2 ways to multiply: (1) building upright towers of 5 cubes each and skip counting or (2) building cubes and placing them on the number line.

Follow Up Activities

Listen and Count

This activity reaches out to auditory learners. Drop marbles or counters into a pie plate or empty coffee can, one at a time, pausing after each group of 5. Students count mentally and write the number of cubes or marbles when the counting stops. Have students share the totals they wrote down.

Check the total by taking the counters out of the container, one at a time, pausing as you count each group of 5.

Emphasize the landing points when you are counting.

SKILL BUILDERS 20-3
Objective: To model multiplication using arrays.

Materials: Interlocking cubes, One-Inch Graph Paper (Master 5), stapler, scissors, Multiplication Facts with 5 (Master 25), blue construction paper, glue, small plastic storage bag

Vocabulary: array

Introductory Activities

Building Arrays
Each small group will need several copies of Master 5 and 50 interlocking cubes.

Write on the board:
Mr. Banks arranged his classroom so there were 6 rows with 5 chairs in each row. How many chairs are there in his classroom?

Use your cubes to model 6 rows of chairs with 5 chairs in each row. Begin by making 1 row of 5 cubes.

How many cubes in all? (5) Write this multiplication fact. \((1 \times 5 = 5)\). Repeat until 6 rows of 5 cubes have been made and put next to each other.

Make sure students understand the difference between rows and columns. This rectangle is an array. An array models a multiplication fact by showing objects in rows (horizontal) and columns (vertical) with an equal number in each row and an equal number in each column. Move your finger to show a row. Move your finger to show a column.

How many groups or rows of 5 do you have? (6)
How many cubes in all? (30) Write the multiplication fact. \((6 \times 5 = 30)\). Now let's look at the columns. How many columns? (5) How many cubes in each column?

Write the multiplication fact \((5 \times 6 = 30)\)

Repeat the procedures through 9 groups of 5. We have just made a model of the multiplication facts of 5. We will draw pictures of each of the arrays in the 5 family on graph paper. Outline an array to show 1 group of 5. The array will look like 1 row of square cubes. Write \(1 \times 5\) on your array.

The first number in a multiplication sentence indicates the number of rows, and the second number tells how many squares in each row. Relate 6 rows of 5 to the addition of 5 six times \((5 + 5 + 5 + 5 + 5 + 5 = 30)\). Repeat drawing pictures through 9 rows of 5. After ensuring that the arrays have been drawn correctly, have each student cut out their nine arrays and staple them at the top to make a stair of 5s as shown on lesson plan page 90.

Write the answer to each fact on the back of the array so that the student can use the stairs to drill and check the multiplication facts. Refer to the diagram on page 9 of the Lesson Plans.

About This Page

Read the example at the top of the page that relates the picture to the Introductory Activity. We cannot see all of the cubes in problem 9. Can you build a model to match? Have students study problems 9 and 10. These are both pictures of arrays. What is the difference between the two? (Problem 9 is a picture of cubes and problem 10 is a drawing of squares on graph paper.)

Follow Up Activities

Flash Cards for Fives
Practice on the basic facts should be done in manageable groups. Each student or pair of students will need a copy of Master 25, a sheet of blue construction paper and a small plastic storage bag. Students glue Master 25 on blue construction paper, cut out each card and write the product on the back of the card. Store cards in the bag for each student to use to practice on a regular basis, e.g., every Friday. Demonstrate how to practice with a partner. Display the fact to the student who will say the product aloud. If the student takes more than 3 or 4 seconds to say the answer, have the student repeat the fact 3 times in a complete sentence to their partner (e.g., “2 times 6 is 12,...”)
Playing Card Doubles

Players: 2–4

You Need: A deck of playing cards with Jokers, Jacks, Queens and Kings removed

Shuffle the deck and place it face down in your group. One player is the leader who turns over the top card while the rest of the players mentally double the number and try to be the first to shout out the answer. The winner keeps the card. Play through the deck, then switch leaders until everyone has the chance to be leader. Write down each person’s score each round and add them up to find the winner.

Card War

Players: 2

You Need: A 36 card deck
(Ace through 9 in all four suits)

One player turns over a card and both players multiply it by 6 (or 7, 8, or 9 depending on the facts you learned today). The first player to say the correct product wins the card. Play continues a designated period of time (e.g., until all cards are gone, after a pass through the deck, or 3 minutes). You can also play with three players where one player turns over a card and judges who said the fact first.

www.movingwithmath.com
Reinforce that even though there are a different number of equal parts shaded for \( \frac{3}{4} \) and \( \frac{5}{6} \), they represent the same part of the whole fraction bar. On the remainder of this page, students generalize similarities and differences among fraction bars.

Materials: Fraction Bars\(^*\) or Fraction Strips (Master 1) and color crayons, overhead Fraction Bars\(^*\) (optional)

Vocabulary: similarities, differences

**Introductory Activities**

*Fraction Similarities and Differences*

Distribute a set of Fraction Bars\(^*\) to each group of 2-5 students (or students may prepare their own out of Fraction Strips, Master 1, by coloring with crayons).

Each fraction bar in this set represents one whole unit such as one whole cracker or one whole brownie. Look through your set of fraction bars with your group. Find ways your bars are all alike (similarities) and ways they are not alike (differences). Record your findings in a table with two columns headed **Similarities and Differences**.

Begin by asking students to name one way they are all alike (all made of the same material) and one way they are different (all different colors). After 5 minutes, ask volunteers from each group to suggest similarities and differences they have found as you list their ideas on the board or overhead.

<table>
<thead>
<tr>
<th>Similarities</th>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>same material</td>
<td>colors</td>
</tr>
<tr>
<td>same size</td>
<td>divided into different parts</td>
</tr>
<tr>
<td>same shape</td>
<td>number of shaded parts differs</td>
</tr>
<tr>
<td>congruent</td>
<td>number of bars of any one color differs</td>
</tr>
<tr>
<td>same width and height</td>
<td></td>
</tr>
<tr>
<td>same area and perimeter</td>
<td></td>
</tr>
<tr>
<td>same thickness</td>
<td></td>
</tr>
<tr>
<td>same weight</td>
<td></td>
</tr>
<tr>
<td>all divided into parts of equal size*</td>
<td></td>
</tr>
</tbody>
</table>

*It is very important that the last similarity (that each whole bar is divided into parts of equal size) be verbalized. This is the essential concept of a fraction.

**Follow-Up Activities**

*What's My Secret?*

With a partner or small group, students take turns selecting a subset of fraction bars which are alike in one way. Others in the group try to guess the secret. Demonstrate an example by showing all the bars of one color and have students guess the secret of the sorting. Other ways in which the students may sort are shown.

<table>
<thead>
<tr>
<th>Similarity</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{1}{4} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{1}{2} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{3}{4} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{1}{3} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{2}{3} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{1}{5} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{2}{5} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{3}{5} ) shaded</td>
</tr>
<tr>
<td>all parts are shaded</td>
<td>all have ( \frac{4}{5} ) shaded</td>
</tr>
</tbody>
</table>

**Connections to Literature:**

*Fractions are Part of Things*, Dennis, J. Richard. Fractional parts of simple shapes and irregular figures are shown.

**Skill Builders** 11-1, 11-2, 11-6
Fractions
Read To Me Activity

Book: *How Many Ways Can You Cut a Pie?* by Jane Belk Moncure

Summary: Squirrel promises to divide her pie into sections for her animal friends if she wins the pie contest.

Activity: As you read the story, have the students use their fraction bars to show how the pie is divided. Also have students draw a number line to show each fraction. This illustrates that there are many ways to show the same fraction.
Objective: To add fractions with unlike denominators.

Materials: Multiple strips (made from the Table of Multiples, Master 4), Fraction Bars®

**Introductory Activities**

**Adding with Fraction Bars**

The following activities prepare students to discover and use the patterns or rules for finding the lowest common denominator and changing the fractions into equivalent fractions.

Write on the board:

You are making a pizza topping with $\frac{2}{3}$ cup of white cheese and $\frac{1}{4}$ cup of yellow cheese. How much cheese in all?

Allow each small group time to discuss possible ways to solve the problem using a set of Fraction Bars®. Have students explain their thinking. Guide students to discover the Golden Rule of Fractions: you cannot add or subtract fractions unless they are the same color. **To add $\frac{2}{3}$ (yellow) plus $\frac{1}{4}$ (blue), the bars must be changed to a common color.**

What common color can we change $\frac{2}{3}$ and $\frac{1}{4}$ to? (orange) **Find the equivalent fractions in orange.** ($\frac{2}{3} = \frac{8}{12}$ and $\frac{1}{4} = \frac{3}{12}$)

Write on the board:

$$\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

**Addition with Multiple Strips**

Demonstrate the same problem with the Table of Multiples (Master 4).

<table>
<thead>
<tr>
<th>X</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>16</td>
<td>18</td>
<td>20</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>27</td>
<td>30</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>24</td>
<td>30</td>
<td>36</td>
<td>42</td>
<td>48</td>
<td>54</td>
<td>60</td>
<td>66</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>14</td>
<td>21</td>
<td>28</td>
<td>35</td>
<td>42</td>
<td>49</td>
<td>56</td>
<td>63</td>
<td>70</td>
<td>77</td>
<td>84</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>16</td>
<td>24</td>
<td>32</td>
<td>40</td>
<td>48</td>
<td>56</td>
<td>64</td>
<td>72</td>
<td>80</td>
<td>88</td>
<td>96</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>18</td>
<td>27</td>
<td>36</td>
<td>45</td>
<td>54</td>
<td>63</td>
<td>72</td>
<td>81</td>
<td>90</td>
<td>99</td>
<td>108</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>110</td>
<td>120</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>22</td>
<td>33</td>
<td>44</td>
<td>55</td>
<td>66</td>
<td>77</td>
<td>88</td>
<td>99</td>
<td>110</td>
<td>121</td>
<td>132</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>24</td>
<td>36</td>
<td>48</td>
<td>60</td>
<td>72</td>
<td>84</td>
<td>96</td>
<td>108</td>
<td>120</td>
<td>132</td>
<td>144</td>
</tr>
</tbody>
</table>

Cut the multiplication table into multiple strips. Use your multiple strips to find the lowest common denominator and equivalent fractions for each pair of fractions.

To add $\frac{3}{8} + \frac{1}{4}$, place the 2 multiple strip over the 3 multiple strip and the 1 multiple strip over the 4 multiple strip.

---

**Adding Unlike Fractions**

Lisa did $\frac{3}{5}$ of her weekly piano practice on Monday. She did $\frac{2}{3}$ of her practice on Tuesday. How much of her weekly practice time has she completed?

Write on the board:

$$\frac{3}{5} + \frac{2}{3}$$

The least common multiple of 5 and 3 is 15.

Multiply each fraction by a form of 1 that will change each denominator to 15.

$$\frac{3 \times 3}{5 \times 3} = \frac{9}{15}$$

$$\frac{2 \times 5}{3 \times 5} = \frac{10}{15}$$

Add:

$$\frac{9}{15} + \frac{10}{15} = \frac{19}{15}$$

Lisa has completed $\frac{19}{15}$ of her weekly practice time.

---

**Follow-Up Activities**

**Skill Builders 17-1**

**About This Page**

Together, read the example at the top of the page. Have students use fraction bars for the first row and multiple strips for the second row. In problem 11, students may generate multiples of 12 and 8 to find the lowest common denominator of 24.
Objective: To subtract fractions with unlike denominators.

Materials: Fraction Bars®, multiple strips (made from the Table of Multiples, Master 4), 10-sided dice

**Introductory Activities**

**Subtraction with Fraction Bars**

Write on the board:

You buy $\frac{3}{4}$ yard of fabric. You use $\frac{1}{3}$ yard to make a pillow. How much do you have left?

You live $\frac{9}{10}$ kilometer from school. You walk $\frac{1}{2}$ kilometer. How far are you from school?

Demonstrate the solution to each problem with Fraction Bars® and multiple strips. Each small group will need a set of fraction bars and a Table of Multiples, Master 4), 10-sided dice from the Table of Multiples, Master 4), 10-sided dice

You cannot add or subtract fractions unless they are the same color. Find $\frac{3}{4}$ and $\frac{1}{2}$. Are they the same color? (No) What color can they be changed to? (orange)

For problem 1 change the blue $\frac{3}{4}$ bar into orange $\frac{9}{12}$ and the yellow $\frac{1}{2}$ bar to orange $\frac{6}{12}$.

To show the same problem with multiple strips, place the 3 multiple strip over the 4 strip and the 1 strip over the 3 strip.

<table>
<thead>
<tr>
<th>3</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>21</th>
<th>24</th>
<th>27</th>
<th>30</th>
<th>33</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>40</td>
<td>44</td>
<td>48</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>27</td>
<td>30</td>
<td>33</td>
<td>36</td>
</tr>
</tbody>
</table>

Write on the board:

$$\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$$

For problem 2, change $\frac{1}{2}$ green to $\frac{3}{6}$ white and then subtract: $\frac{9}{10} - \frac{2}{5} = \frac{4}{10}$. The fraction $\frac{4}{10}$ may be simplified to $\frac{2}{5}$.

**About This Page**

Direct attention to the top of the page. Demonstrate the solution with multiple strips. Students may use fraction bars or multiple strips to complete the rest of the page.

**Follow-Up Activities**

**Dicey Differences**

Game for 2 players. Players take turns throwing two 10-sided dice twice and forming a fraction each time using the smaller number for the numerator and the larger number for the denominator. The player with the greater difference between his or her fractions earns one point. For example, a player throwing a 1 and a 6 on the first throw and a 2 and a 3 on the second throw would subtract: $\frac{5}{2} - \frac{1}{6}$ for a difference of $\frac{1}{2}$.

**Authoring Word Problems**

Continue developing a class file of word problems by having students author at least one addition problem and one subtraction problem that might be solved by a computation problem from pages 19–21. Suggest common settings for the problems, e.g., cooking, map directions, capacity. Encourage students to write problems about their real world.

**Skill Builders 17-2**
Students write one of the following fractions in each of the blank squares:

\(\frac{1}{2}, \frac{2}{2}, \frac{1}{3}, \frac{2}{3}, \frac{3}{3}, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{4}{4}, \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, \frac{5}{5}, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \frac{4}{6}, \frac{5}{6}, \frac{6}{6}, \frac{1}{10}, \frac{2}{10}, \frac{3}{10}, \frac{4}{10}, \frac{5}{10}, \frac{7}{10}, \frac{9}{10}, \frac{1}{12}, \frac{5}{12}, \frac{7}{12}, \frac{11}{12}, \frac{12}{12}\)

Place a set of Fraction Bars® in a small box and shake. Select one fraction at a time and read it aloud. Students having that fraction or another name for it in lowest terms cover the square. For example if \(\frac{3}{4}\) is drawn \(\frac{9}{12}\) could be covered. The first player to get five covered in a row, column, or diagonal, is the winner. After playing a few turns, ask students which factors are best to write in the squares. (those which have the greatest number of equivalent fractions)
Using Hands-On Activities, Games, and Literacy Connections to Reach Diverse Student Needs

I. The Problem

National Results Indicate That Students Lack Conceptual Understanding

<table>
<thead>
<tr>
<th>Problem (7-year-olds)</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 - 8</td>
<td>42%</td>
</tr>
<tr>
<td>47 - 18</td>
<td>40%</td>
</tr>
</tbody>
</table>

Stanford Achievement Test (SAT 9)

II. The Solution

A. Linking objectives, tests, and instruction
   B. The three stages of learning
   C. Scaffolding logical structures
   D. Teaching conceptual underpinnings

III. Hand-On Activities

IV. Conclusion
The Problem

National Results Indicate That Students Lack Conceptual Understanding

<table>
<thead>
<tr>
<th>Problem (13 year-olds)</th>
<th>% Answering Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{2} + \frac{1}{3} )</td>
<td>33%</td>
</tr>
<tr>
<td>( \frac{3}{4} + \frac{1}{2} )</td>
<td>33%</td>
</tr>
<tr>
<td>Estimate the best answer for ( \frac{12}{13} + \frac{7}{8} )</td>
<td>25%</td>
</tr>
</tbody>
</table>

National Assessment of Educational Progress

The Solution

Linking Objectives, Tests, and Instruction

The Three Stages of Learning

Concrete Transition Abstract

The Three Learning Styles

Kinesthetic Visual Auditory

Scaffolding Logical Structures

An explicit and logical structure that guides and helps students understand new topics.
The Solution

Teaching Conceptual Underpinnings

- Pattern used in counting
- Pattern in our number system
- What addition means
- Meaning of multiplication
- Meaning of a fraction
- Pattern for equivalent fractions

Number Sense

Objective:
To order the numbers 1 to 10.

Materials:
a cored of 122 NHL pl
in
hi
reer.

Read Fish Eyes, Ehlert, Lois
Morozumi, Atsuko
We can show this number
Note: Before class, make copies of Master 20 (Vocabulary with base ten blocks.

Objective:
To explore and name base ten blocks. To match the blocks with their place value names.

Materials:
10 tens blocks, 10 hundreds blocks, and a place value mat.

In an earlier chapter, we built towers to 5 following and making the new tower 1 story more. How many stories are in your tower? (3)

The main reason students make errors with whole numbers 1 to 10 is that they do not understand multi-digit numeration. They do not know that 43 means 4 tens and 3 ones or 40 + 3.

How many different sizes do you have? (3)

How many of the ones blocks are the same as or alike, and how they are different?

We name this block the
"hundreds" or "flat" block.
After children can touch and count from 1 to 10, have them begin to count forward from a number.

One Bear with Bees in His Hair, Ryan, Pam Munoz
One Hundred Is a Family, Ehlert, Lois
Ten Flashing Fireflies, Morozumi, Atsuko
M
th Te
section a ny me
s
is
b
by
ny me
s
s
b

©M
th Te
cher
Pre
s
b
y
ny me
s
s
b

Chapter 4 Kindergarten

Number Sense

Objective:
To explore and name base ten blocks and their place value names.

Materials:
10 tens blocks, 10 hundreds blocks, and a place value mat.

Explain the benefits and proper use of manipulatives.
Set ground rules for using them and discuss take-out and clean-up routines.
We name this block the
"hundreds" or "flat" block.
We name this block the
"hundreds" or "flat" block.

We name this block the
"hundreds" or "flat" block.

How are the blocks different?
What blocks are shown?
What is one way the blocks are the same?
What blocks are alike, and how they are different?

What number in the correct place on the chart.
How many different sizes do you have? (3)
Put 1 of the pictures of cubes the same color as the cubes in your tower.
How many of the ones blocks are the same as or alike, and how they are different?

Number Sense

Objective:
Read To Me Activity

Book: Ten Flashing Fireflies by Philemon Sturges

Summary: A young boy is proud of having caught a jar full of fireflies which seems to him like owning a piece of moonlight.

Activity: Use this story to introduce the "Towers of One More" activity. Give each student ten interlocking cubes and tell them that these will be their "fireflies." As you read the story have them show the number of fireflies that they have caught. Before you turn each page to find the number, have them add one cube to their tower and tell how many fireflies they have as one is added each time. Students will delight in being able to check their answers by reading the next page in the story.

How are the blocks different?
What blocks are shown?
What is one way the blocks are the same?
What blocks are alike, and how they are different?

How many different sizes do you have? (3)
Put 1 of the pictures of cubes the same color as the cubes in your tower.
How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?

How many of the ones blocks are the same as or alike, and how they are different?
Objective:
To build models and draw pictures of numerals. To write numbers in expanded notation.

A numeral can be written several different ways. To start with, students could build numbers in blocks, use Base Ten blocks and the place value mats, and then draw pictures of the numbers. For each numeral, the students could build a model in base ten blocks and then draw a picture of the model. These models could then be spread out so that they are easier to count. 

Base ten blocks, Place Value Mats (Masters 1 and 2), 6-sided dice with pictorial representation

Place Value Mats (Masters 1 and 2)

Card 3

<table>
<thead>
<tr>
<th></th>
<th>Ones</th>
<th>Tens</th>
<th>Hundreds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Card 4

<table>
<thead>
<tr>
<th></th>
<th>One Million</th>
<th>Ten Million</th>
<th>Hundred Million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Addition and Subtraction

Read To Me Activity

Book: Every Buddy Counts by Stuart J. Murphy

Summary: A little girl goes through the day counting her "buddies," which include her pets, family members and neighbors.

Activity: Together as a class write the "buddies" that you can count around school. For example, 1 principal, 2 P.E. teachers, 3 janitors, etc. Have each student draw one set of the "buddies." When finished with the pages, put them in a class book titled, "Every Buddy at School Counts!"

Students can also write addition sentences using the class list. For example, "We have 1 principal and 3 P.E. teachers. How many buddies in all?" Have one student come to the board and write the addition sentence that goes with each problem.

Expansion Notation

Hammer to 100 Game

- Students write each of the digits 1–9 in random order on the squares on each card.
- Every Buddy Counts by Stuart J. Murphy
- Students can also write addition sentences using the class list.
Addition and Subtraction

**Hundred Board Game**

- Start by building Tens: 1-10 (subtract the ones, then subtract the tens) Have students complete the page with a partner.
- Use the Place Value Mat and base ten blocks to solve the problem.

**Story 2: You have 79 hot dogs. You sell 28 hot dogs.**

- How many hot dogs did they sell?
- How many hot dogs did they have after they sold 28 hot dogs?
- How many hot dogs did they have after they earned 5¢ more. Discuss the meaning of the word “earn” and different ways to find the answer. Ask students which way seems easier and why.

Two possible solutions:

1. Subtract the tens: 79 - 28 = 51
2. Subtract the ones: 9 - 8 = 1
Then subtract the tens: 71 - 20 = 51

Addition and Subtraction

**Subtraction Bingo**

- Subtracting 2-Digit Numbers
- Subtracting 3-Digit Numbers
- Subtracting 4-Digit Numbers

**Materials:**
- Hundred Board Game
- Base ten blocks
- Interlocking cubes
- Blank Hundred Board (Master 12)
- Number Tiles (Master 6)
- Small plastic bag
- Pennies and dimes
- 10-sided dice

**Vocabulary:**
- Subtraction
- Base ten blocks
- Interlocking cubes
- Blank Hundred Board
- Number Tiles
- Small plastic bag
- Pennies and dimes
- 10-sided dice

**Addition and Subtraction**

**Multiplication**

**Materials:**
- Classroom Number Line to 100
- Interlocking cubes
- Blank Hundred Board (Master 12)
- Number Tiles (Master 6)
- Small plastic bag
- Pennies and dimes
- 10-sided dice

**Vocabulary:**
- Subtraction
- Base ten blocks
- Interlocking cubes
- Blank Hundred Board
- Number Tiles
- Small plastic bag
- Pennies and dimes
- 10-sided dice
Multiplication

Read To Me Activity

Book: Arctic Five's Arrive by Ellyn J. Pinches

Summary: A counting book in which animals in groups of five share a hilltop to view the northern lights.

Activity: As you read the story, ask, “How many groups of 5 animals are there now?” Keep track of how many animals are on the hilltop using repeated addition and multiplication. Since the story only goes to 30, have the students continue with repeated addition and multiplication up to 9 groups of 5.

Have the students vote to pick a place many different animals might go—a tree, a pond, a field or island. Assign a number to each student and tell them that is the number of groups of 2 animals that are going to the destination. Each student will fill in and illustrate the sentence, “Name’s (number) groups of 2 (name of animal) are going to the (place), that is 2 x ___ (number needed) or 2 x ___ (name of animal) altogether. Ex. John’s 3 groups of 2 blue jays are going to the big oak tree. That is 2 x 3 or 2 x 3 = 6 blue jays altogether.” These pages may be placed on a bulletin board or in a class book titled, “Places Two Arrive.”

Materials:
- Interlocking cubes
- Number Line to 100 (Master 7)
- Counters or marbles
- Pie tin or empty coffee can

Plastic Cubes on a Number Line

2 groups of 5 = 10 or 2 strips of paper together from Master 7. Label the marks from 1 to 100, and tape the number line on the board or a classroom wall. Each small group of students should have interlocking cubes. Have the students vote to pick a place many different animals might go—a tree, a pond, a field or island. Assign a number to each student and tell them that is the number of groups of 2 animals that are going to the destination. Each student will fill in and illustrate the sentence, “Name’s (number) groups of 2 (name of animal) are going to the (place), that is 2 x ___ (number needed) or 2 x ___ (name of animal) altogether. Ex. John’s 3 groups of 2 blue jays are going to the big oak tree. That is 2 x 3 or 2 x 3 = 6 blue jays altogether.” These pages may be placed on a bulletin board or in a class book titled, “Places Two Arrive.”

Materials:
- Interlocking cubes
- Number Line to 100 (Master 7)
- Counters or marbles
- Pie tin or empty coffee can

Plastic Cubes on a Number Line

2 groups of 5 = 10 or 2 strips of paper together from Master 7. Label the marks from 1 to 100, and tape the number line on the board or a classroom wall. Each small group of students should have interlocking cubes.

Plastic Cubes on a Number Line

2 groups of 5 = 10 or 2 strips of paper together from Master 7. Label the marks from 1 to 100, and tape the number line on the board or a classroom wall. Each small group of students should have interlocking cubes.

Plastic Cubes on a Number Line

2 groups of 5 = 10 or 2 strips of paper together from Master 7. Label the marks from 1 to 100, and tape the number line on the board or a classroom wall. Each small group of students should have interlocking cubes.

Plastic Cubes on a Number Line

2 groups of 5 = 10 or 2 strips of paper together from Master 7. Label the marks from 1 to 100, and tape the number line on the board or a classroom wall. Each small group of students should have interlocking cubes.
Fractions

Objectives: To add fractions with unlike denominators.
Materials: Multiple strips (made from the Table of Multiples, Master 4), Fraction Bars®

Adding with Fraction Bars

This activity prepares students to discover and use the patterns or rules for finding the lowest common denominator and changing the fractions into equivalent fractions.

1. Make sure the students have a Fraction Bar® and multiple strips. Each small group has a set of strips. The task is for students to add fractions using the same color. Find the equivalent fractions for each pair of fractions.

2. Direct attention to the top of the page. Have students complete the worksheets. Each problem is solved by a computation problem from pages 19–21. Suggest common settings for the problems, e.g., cooking, map directions, capacity. Encourage students to write problems about their real world.

Fractions Read To Me Activity


Summary: Squirrel promises to divide her pie into sections for her animal friends if she wins the pie contest.

Activity: As you read the story, have the students use their fraction bars to show how the pie is divided. Also have students draw a number line to show each fraction. This illustrates that there are many ways to show the same fraction.
Fractions

Teaching Conceptual Underpinnings

- **Counting Pattern** - each number is one more
- **Place Value** - 10 of one block is the same as one of the next larger block
- **Addition** - putting numbers together
- **Multiplication** - putting together groups of the same size
- **Fraction** - a whole divided into parts of equal size
- **Equivalent Fractions** - multiply or divide numerator and denominator by the same number

**Conclusion**

“We remember 10% of what we hear, 30% of what we see, and 90% of what we do.”

- Jean Piaget