**Problem Solving**

**Draw a Picture**

**Goals:**
Develop skill of solving a problem by drawing a picture.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

**Materials:**
Paper
Crayons
Problem Steps Poster

**Steps:**
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Draw a picture to help you solve each one.

2. We all know that Mary had a little lamb. This lamb had a mommy lamb and a daddy lamb. If each lamb eats two bails of hay, how may bails should Mary buy?

3. When Jack and Jill went up the hill they took three friends. Each child brought a sandwich for lunch. How many sandwiches were there?

4. John's dad has a big van with four seats. On two of the seats, only one person may sit. The third and fourth seats will hold three people each. How many people can ride in the van?

5. There are twenty four cookies and six children. If each child wants the same number of cookies, how many does each get?

6. I took a picture of some children at the park with their puppies. My picture has seven heads and twenty two legs. How many children were there?

7. Fred, Joe and Jim have marbles. They out them all in a pile. There are ten marbles. Joe and Jim each have the same number of marbles. Fred has one more than they each do. How many marbles does each boy have?
Problem Solving

Act out the Problem

Goals:
Develop skill of solving a problem by acting it out.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps Poster
Play Money
Pencils
Cups
Saucers

Steps:
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Act out each problem to help you solve it.

2. Mary bought two pencils and an eraser. The pencils cost ten cents and the eraser costs fifteen cents. How much did Mary pay?

3. Mrs. Jones needs cups and saucers. Saucers cost two dollars and saucers cost three dollars. A cup can only be bought with a saucer, but extra saucers can be bought separately. Mrs. Jones spent twenty seven dollars on cups? How many saucers did she buy? How much were they?

4. Mary hopped on her right foot three times. Joey hopped on his left foot six times. Fred hopped on both feet twice. How many hops were made?

5. There are five people. Each person shakes hands with every other person. How many hand shakes were there?
Problem Solving

Use Objects

Goals:
Develop skill of solving a problem by using objects.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps Poster
Beans

Steps:
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Use beans to represent the objects in each problem.

2. Jim bought three boxes of pencils. There are 15 pencils. How many pencils were in each box if there were the same number of pencils in each box?

3. Mary put 16 marbles into a box. Jan took out 11. Laura put 25 back in. How many are in the box?

4. The scout troop is going on a trip. Each bus holds nine boys. How many buses will the twenty-six scouts need?

5. Jimmy can make four pots from a pound of clay. Jim needs to make 15 pots. How much clay must he buy?
Problem Solving

Guess And Check

Goals:
Develop skill of solving a problem by guessing and checking.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps Poster

Steps:
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Solve each problem by guessing, checking your guess, and guessing again until you get it right!

2. Greg and Sally had some marbles. Greg has two more than Sally. If they have 14 marbles, how many does each have?

3. Three numbers in a row add up to 12. The numbers are consecutive, like 1,2,3. What are the numbers?

4. The toy store has toys for 52 cents, 28 cents, 55 cents, and 32 cents. I have four coins. Which toys could be bought with exactly four coins?

5. I have 5 coins that add up to 70 cents. What are my five coins.

6. The following boys have baseball cards.
   Bert  6
   Joe   4
   Tom   7
   Fred  8
   Carl  9

   If three boys put their cards together, and have 17 cards, which boys put their cards together?
Problem Solving

Work Backwards

Goals:
Develop skill of solving a problem by working backwards.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps Poster

Steps:
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Work backward to solve each one.

2. I had some money. I went to the store and bought a drink for 45 cents. I have $1.25 left. How much did I begin with?

3. Jim got his box of candy on Monday. On Tuesday he gave away two pieces of candy and ate one. On Wednesday Dana gave Jim back the candy she had borrowed from him. On Thursday he has four candies. How much candy was in Jim's box?

4. \(? + 7 - 6 \times 2 = 8\)

5. Susan and Joe went to the game. Her ticket was two dollars and his was $1.50. They each had a drink for a dollar each. Susan has three dollars. How much did she begin with?
Problem Solving

Make a List

Goals:
Develop skill of solving a problem by making a list.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps Poster

Steps:
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Make a list to help you solve each one.

2. How many different bike licenses, with three numbers in each one, can be made from 1,2,3, and 4?

3. Ann, Beth, Cathy, Dee, and Eve were in a tennis tournament. They each played each of the other girls. How many games were played?

4. Joe saved a penny on march first. On March second he saved two pennies. On March third he saved three pennies and so on. On March fifteenth how much did he have?
Problem Solving

Look for Patterns

Goals:
Develop skill of solving a problem by finding a pattern.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps Poster

Steps:
1. Look at the poster of the steps to solve a problem. Use these steps to guide you through the following problems. Show each step on your paper. Find a pattern to help you solve each one.
2. Fill in the blank 2,4,6,8,____,____,____
3. 

Can you add a row to Pascal's triangle?
4. Rita swam three laps on the first day of swim practice. She swam five on the second day. On the third day she swam seven laps. If she continued this way, how many laps will she swim on the seventh day?
5. A male bee has only a female parent. A female bee has a male and a female parent. Finish this family tree by adding a top row.
Problem Solving to Take Home

Use all the Strategies!

Goals:
Develop skill of solving a problem.
Develop Logical thinking and Reasoning skills.
Promote Mathematics Communication.

Materials:
Paper
Crayons
Problem Steps on a sheet of paper

Steps:

1. Try mixing up the problems and discussing the possible ways to solve each one.
2. Try other problems.
3. Try solving a problem in different ways.
Steps to Solve A Problem

1. Read the Problem

2. Understand the Problem

3. Repeat the Question Asked in the Problem


5. Develop a Plan.

6. Carry out the Plan.

7. Find and State the Solution.

8. Is this Solution Reasonable?
Whole Number Sense

Egg Carton Numbers

Goals:
Develop a concept of number.
Practice Counting.
Estimate numbers.
Promote Mathematics Communication.

Materials:
Egg Carton
Basket of Beans

Steps:
1. Take an egg carton and turn it upside down. Don't open it yet!
2. Look at the egg carton. Guess how many holes there are.
3. Count the holes. Was your guess close?
4. Open the egg carton and name the numerals you see.
5. Does this match the number you counted? Why?
6. Guess and discuss how many beans it will take to fill the carton, one bean in each hole. Why?
7. Place one bean in each hole and count aloud. Was your guess correct? Why?
8. Place the correct number of beans in each hole to match it's label, counting out loud.
9. Completely fill the carton this way with beans.
10. Guess how many beans you have put in the carton all together?
11. Remove the beans into the lid counting them out loud. Was your guess close? Why?
Whole Number Sense

Dots and Dots and Dots!

Goals:
Develop number concept.
Develop conservation of number.
Promote Mathematics communication.
Practice estimation.

Materials:
Cards with two, four, five, six, seven, eight, nine, ten, eleven, and twelve dots on them
Beans
Number Sheet
Crayons

Steps:
1. Look at a card. How many dots do you think are on that card?
2. Count the dots on the card out loud. Were you close? Why?
3. How many beans do you think it will take to place a bean on each dot.
4. Place a bean on each dot counting aloud. Were you close? Why?
5. Find a card that has the same number of dots on it without counting the dots.
6. Count out loud the dots on the card? Were you correct? If no, try again.
7. How many beans would it take to place a bean on each dot of this card?
8. Place a bean on each dot. Were you close? Why?
9. Show this number on your fingers.
10. Write the numeral on your number sheet.
11. Write down some things that come in groups of this number on your number sheet.
12. Try another dot card with a different number of dots!
13. Keep going until you have all the numerals 1-12 on your number sheet!
# Number Sheet

<table>
<thead>
<tr>
<th>Number Name</th>
<th>Numeral</th>
<th>Things that come in groups of this number</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td></td>
<td></td>
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<tr>
<td>Six</td>
<td></td>
<td></td>
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<tr>
<td>Seven</td>
<td></td>
<td></td>
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<tr>
<td>Eight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ten</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eleven</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twelve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Whole Number Sense

M&M Math

Goals:
Develop concept of number.
Promote Mathematics communication.
Promote literature and Mathematics.
Develop a concept of set.
Develop conservation of number.

Materials:
One bag of M&M's per student
The M&M Book

Steps:
1. Remember, this book was published before the change in colors so substitute blue wherever it mentions a tan.

2. Don't eat any M&M's until the book tells you to!!

3. Read the book together, and doing what it says.

4. Lay out the M&M's on the pictures.

5. Be sure to read slowly and discuss each page as you go along. There is a lot to talk about with M&M Mathematics!
Whole Number Sense To Take Home

Everyday Estimation

Goals:
Practice estimation.
Develop number concept.
Promote Mathematics communication.

Materials:
Index cards or scraps of paper
Tape
Pencils
String

Steps:
1. This activity will help make estimation a part of daily life in your family.
2. Tie a piece of string to each pencil and tape each opposite end of string to a card.
3. Write one question on each card. Sample questions include: In one week...
   a. How many times does your family open the fridge?
   b. How many times do you go into the restroom?
   c. How many times do you open the front door?
   d. The back door?
   e. How many times are you all in one room together?
   f. How many times do you change the TV channel?
4. Ask each family member to make a guess and write it on the card with their initials.
5. Tape the card somewhere appropriate to the question. For example a. would be good on the refrigerator.
6. The family can keep a tally of the results.
7. After a week get together and discuss. Who was closest? Why? What was your thinking?
8. To extend the activity come up with more questions, everyone can add them!
9. Your family may even enjoy creating and doing a family math scavenger hunt!
Place Value

Guessing and Grouping

Goals:
Estimating numbers.
Practice modeling, making trades, and naming numberals according to their place value.
Promote Mathematics communication.

Materials:
Place Value chart for ones, tens, hundreds, and thousands.
A large bucket of ones units.
Base ten block set.
Record Sheet
Crayons

Steps:
1. Take a large handful of units from the bucket and put it on the table in front of you. Guess how many units you have grabbed, and record it on the record sheet.

2. Count the number and write it down on your record sheet as well. Were you close? Exactly right!?

3. Place the units on the place value chart and make proper trades for the base ten blocks.

4. Write the numeral from the chart on your record sheet under the actual number. Are they the same or different? Why?

5. Write down which numeral is in the ones place? The tens place? The hundreds place? The thousands place?

6. What do each of these numerals mean? Why? Write this down too! Try as many handfuls of units as you would like!
Guessed Units:
Actual counted units:
Numeral from Place Value Chart:

Numeral from the... This means ......
one place
tens place
hundreds place
thousands place

Guessed Units:
Actual counted units:
Numeral from Place Value Chart:

Numeral from the... This means ......
one place
tens place
hundreds place
thousands place

Guessed Units:
Actual counted units:
Numeral from Place Value Chart:

Numeral from the... This means ......
one place
tens place
hundreds place
thousands place
Place Value

Placing Digits

Goals:
Develop an understanding of position and place value relationships.
Develop logical thinking skills and strategies.
Promote Mathematics communication.

Materials:
Paper
Crayons
Deck of Cards

Steps:
1. Remove from the deck of cards, all the Kings, Queens, Jacks, and Jokers, so that all that is left is Aces and number cards. The ace will represent one, and the ten will represent zero, so that we have all numerals 0 - 9 to play with.
2. Each player draws three boxes on their page as shown.

3. One card is drawn. Each player places the numeral represented by this card in any box they choose. Once a numeral is in a box, it cannot be moved.
4. Repeat for a second and a third card.
5. Compare three digit numerals. Whose is largest? Smallest? Why?
6. Which digits are in the hundreds places? tens places? ones places?
7. Play a game in different ways: The winner has the largest three digit numeral, The winner has the smallest three digit numeral, Try different numbers of digits in the numeral by drawing two, four or even five cards, Try placing digits in arithmetic problems as shown below, and compare the answers to the problems to find a winner. (largest or smallest answer wins.)
Place Value

Memory

Goals:
Develop connections between numerals, place value, and word meanings.
Promote Mathematics communication.

Materials:
Deck of number cards

Steps:
1. Shuffle and then lay out the cards face down on the table.

2. This game is played like memory, only each turn consists of turning over 3 cards, and each match is a set of 3 cards.

3. To find a match, you must find the numeral, the words, and the place value that go together. For example: 543, four hundred fifty three, and 4 hundreds, 5 tens, and 3 ones.

4. Each player on his turn turns over three cards. If they match, he gets another turn, and he keeps the 3 cards.

5. The player with the most cards wins!
600
six hundred
34
thirty four
6 hundreds
3 tens and 4 ones
30
678
six hundred seventy eight
3 tens
6 hundreds, 7 tens, and 8 ones
4
809
eight hundred and nine
4 ones
8 hundreds and 9 ones
450
123
one hundred twenty three
four hundred fifty
<table>
<thead>
<tr>
<th>Number Description</th>
<th>Number Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 hundreds and 5 tens</td>
<td>1 hundred, 2 tens, and 3 ones</td>
</tr>
<tr>
<td>55</td>
<td>654</td>
</tr>
<tr>
<td>fifty five</td>
<td>six hundred fifty four</td>
</tr>
<tr>
<td>5 tens and 5 ones</td>
<td>6 hundreds, 5 tens, and 4 ones</td>
</tr>
<tr>
<td>670</td>
<td>43</td>
</tr>
<tr>
<td>six hundred seventy</td>
<td>forty three</td>
</tr>
<tr>
<td>6 hundreds and 7 tens</td>
<td>4 tens and 3 ones</td>
</tr>
<tr>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>forty</td>
<td>nine</td>
</tr>
<tr>
<td>4 tens</td>
<td>nine ones</td>
</tr>
</tbody>
</table>
**Place Value To Take Home**

**Guess and Group Take Two**

**Goals:**
Practice estimating numbers.
Practice modeling, making trades, and naming numerals according to place value.
Promote Mathematics communication.

**Materials:**
A large bowl of a small object (buttons, beans, bobby pins, paper clips...)
Paper
Crayons
Record sheet

**Steps:**
1. Reach into the bowl and take a handful of objects out and lay them on the table.
2. Guess how many are there and record it on your sheet.
3. Count how many are actually there. How close were you? Were you exactly right? Record this on your record sheet.
4. Spread out the objects on your blank paper. Circle all the groups of ten you can with a red crayon.
5. Now circle groups of ten red groups with a blue crayon.
6. Record your numeral on your record sheet: The first digit is the number of blue groups, the second digit is the number of red groups, and the third digit is the number of objects not in a group.
7. Is this numeral the same as the actual number you recorded? Why?
8. Record the numeral in the ones place, tens place, and hundreds place.
9. Record what these numerals really mean. Why?
10. Keep trying groups of objects and discussing place value!
Guessed Units:
Actual counted units:
Numeral from Groups:

Numeral from the...
ones place
tens place
hundreds place
Thousands place

This means ......

Guessed Units:
Actual counted units:
Numeral from Groups:

Numeral from the...
ones place
tens place
hundreds place
Thousands place

This means ......

Guessed Units:
Actual counted units:
Numeral from Groups:

Numeral from the...
ones place
tens place
hundreds place
Thousands place

This means ......

2+2
Fractions

Geo Islands

Goals:
Develop concept of fraction.
Promote Mathematics communication.

Materials:
Geo Board
Geo Islands
Rubber bands
Fraction sheet

Steps:
1. Make a rectangular region on the geoboard with a rubber band. This is your one whole unit.

2. Evenly fill the region with geo islands, making sure to use only one color of geo islands.

3. How many islands did it take to fill the space? What color were they?

4. Take all but one island away. You now have a fraction. The fraction is named as follows.

   \[
   \frac{\text{Number of islands in the space}}{\text{Number of islands that fill the space}}
   \]

   In this case, the top number is one and the bottom is the number from step 3.

5. Name your fraction out loud and write it on your fraction sheet. First draw your whole unit, then write the fraction, and then list the color of island you used to make it.

6. Try to make as many fractions as you can using this same unit. Then try another unit.
**Fraction Sheet**

Draw a picture of your whole unit here:

List fractions made with this unit here:

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Color of Island</th>
</tr>
</thead>
</table>

Draw a picture of your whole unit here:

List fractions made with this unit here:

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Color of Island</th>
</tr>
</thead>
</table>

Draw a picture of your whole unit here:

List fractions made with this unit here:

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Color of Island</th>
</tr>
</thead>
</table>
Fractions

Fraction Cards

Goals:
Develop concept of fractions.
Promote Mathematics communication.
Develop logical thinking and reasoning skills.
Develop concept of equivalent fractions.

Materials:
Graph paper with pre-drawn units.
Crayons
Fractions Cards

Steps:
1. Draw a fraction card from the deck.
2. Color in this fraction on a unit on the graph paper using red.
   a. Remember that the bottom number of the fraction shows how many
      pieces it takes to fill the unit. Divide your unit into the correct number of
      pieces.
   b. Remember that the top number of the fraction tells how many of the
      pieces you have. Color this many of your pieces in.
3. Now is the challenge. Can you divide another unit into a different number of
   pieces, and color in a fraction using green, but the fraction should use the
   same number of squares as the red fraction. Not all cards can have an
   equivalent fraction.
4. Name your fraction. The number of shaded pieces you have is on top, and the
   total number of pieces that fill the unit is on the bottom.
5. These two fractions are equivalent: They have different sized pieces, and
   different names, but they take up the same amount of space.
6. How many equivalent fractions can you color?
7. When you run out, then draw another card.
\[
\begin{array}{cccc}
\frac{1}{4} & \frac{2}{4} & \frac{2}{6} & \frac{1}{12} \\
\frac{3}{4} & \frac{4}{4} & \frac{3}{6} & \frac{2}{12} \\
\frac{1}{3} & \frac{2}{3} & \frac{4}{6} & \frac{3}{12} \\
\frac{3}{3} & \frac{1}{2} & \frac{5}{6} & \frac{4}{12}
\end{array}
\]
\[
\begin{array}{cccc}
\frac{2}{2} & \frac{1}{6} & \frac{6}{6} & \frac{5}{12} \\
\frac{6}{12} & \frac{7}{12} & \frac{8}{12} & \frac{9}{12} \\
\frac{10}{12} & \frac{11}{12} & \frac{12}{12} & \frac{12}{12}
\end{array}
\]
Fractions

Fraction Mobile

Goals:
Develop a concept of fractions.
Develop a concept of equivalent fractions.
Promote Mathematics communication.

Materials:
Index cards
Hangers
String
Hole punch
Crayons
Scissors

Steps:
1. Take a stack of index cards.

2. Write the numeral one on one index card and color it in.

3. Cut a card into two equal parts. Label each part one half and color it in a different color.

4. Cut cards and label them for thirds, fourths, fifths, sixths, as many as you like.

5. Each set of fractions is equivalent: I whole, 2/2, 3/3, 4/4, 5/5,... Discuss this idea.

6. Punch a hole in the top of each card. Lay them out to keep the like pieces together.

7. When you have it laid out, then tie the strings to make your mobile.

8. Here is a sample.
Fractions

Order Please!

Goals:
Develop concept of fraction.
Develop sequence skills.
Promote Mathematics communication.

Materials:
Graph paper with pre-drawn units
Crayons
Fraction cards
Order cards
Ordering mat

Steps:
1. Draw cards from the pile one at a time.

2. Place each card on the order mat under the correct label, "about 0," "about 1/2," or "about 1."

3. After all the cards are in one of the columns, work to put the cards into order using the order cards ( < ). Remember, this is the "less than" sign, for example, 1 < 3.

4. It may be helpful to color each fraction on graph paper. Remember, to draw the fraction, the bottom number tells how many equal pieces to divide the unit into, and the top number tells how many pieces to shade in.
<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>2</th>
<th>6</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>
ABOUT 0

ABOUT \frac{1}{2}

ABOUT 1
Fractions to Take Home

Name Game

Goals:
Develop concept of fractions.
Promote Mathematics communication.

Materials:
Name Sheet
Crayon

Steps:
1. Make a list of names of those in your family and your friends on your name sheet.
2. Count the number of letters in each name, the number of vowels, and the number of consonants.
3. Figure the fraction of vowels and consonants. Remember the top number is "how many" and the bottom is "out of how many total."
4. Figure the fraction of consonants.
5. Be sure that the fractions sum is one. Remember that one = 12/2, 3/3, 4/4, ....
6. How many names can you find?!!
Name Sheet

<table>
<thead>
<tr>
<th>Name No.</th>
<th>No. of letters</th>
<th>No. of vowels</th>
<th>No. of consonants</th>
<th>Fraction of vowels</th>
<th>Fraction of consonants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joe</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2/3</td>
<td>1/3</td>
</tr>
</tbody>
</table>
Decimals

Base Ten Blocks - Decimal Style!

Goals:
Develop concept of decimal place value.
Promote Mathematics communication.

Materials:
Base ten blocks set
Place Value decimal chart
Paper
Crayons

Steps:
1. Look at the large Cube. How many flat squares (Flats) can you put together to make a Cube?
2. It takes ten Flats to make a Cube, so one Flat is equal to one tenth of a Cube.
3. How many long pieces (Longs) does it take to make a Cube?
4. It takes 100 Longs! One Long is one one-hundredth of a Cube.
5. Can you guess how many small cubes, (Units), it will take to make a Cube?
6. Yes, 1000 Units! One unit is one one-thousandth of a Cube.
7. Look now at our chart. You see the pictures, the words, and the numerals for each of these. Notice how we write these numerals.
8. Write the numeral for one hundred. Now think how to write the numeral for one hundredth. Notice the difference. Talk it over.
9. Now, each partner take turns modeling decimal numbers on the chart. Remember, place value tells us that no more than ten of any one type of piece may be used at a time. If there are more than ten, we must make a trade for the next largest piece instead. As your partner models the numeral, you can say and write the numeral. Check each other and talk it over!
10. Finally, try the reverse. One partner says and writes a decimal, and the other try to model it. Keep discussing your thinking as you go!
Decimals

Dueling Decimals

Goals:
Practice naming, writing, and modeling decimals.
Promote Mathematics communication.
Develop logical reasoning and thinking skills.

Materials:
Deck of cards
Base Ten blocks set
Two Place Value Decimal Chart
Crayons
Paper

Steps:
1. Make four stacks of cards:
   a. All the hearts Ace through ten.
   b. All the spades Ace through ten.
   c. All the diamonds Ace through ten.
   d. Put the other cards aside and shuffle each stack.
2. The Ace will represent a one, and the ten will represent a zero. Each player
   needs a chart to begin.
3. Draw a heart. Each player may model the numeral drawn as either ones(Flats),
   tenths(Longs), or hundredths(Units) on their chart, but once the choice is
   made, you cannot change your mind.
4. Draw a spade and model this numeral using a different place value than your
   heart.
5. Finally model your final place value with the numeral drawn from the diamond
   pile.
6. Once your three digit decimal is modeled, you must correctly write it on your
   paper and say it out loud.
7. The winner is the one with the largest numeral - Talk it out.
8. Re - shuffle each pile and clear your board, and you may play as often as you
   like!
Computation

Multi - Link Cubes

Goals:
Develop concept of families in computation.
Promote Mathematics communication.
Develop logical thinking and reasoning skills.

Material:
Multi - Link cubes
Crayons
Paper

Steps:
1. One partner can make a Multi - Link snake, all in one color.
2. The other partner tries to make as many different snakes as possible that are made up of two different colors, and that is the same length as the first snake.
3. For each set of snakes that are the same length write a number family list and draw the corresponding snakes. For example:
   \[
   1 + 4 = 5 \\
   2 + 3 = 5 \\
   3 + 2 = 5 \\
   4 + 1 = 5
   \]

4. Make as many families as possible!
5. Try to find the subtraction families too!

Length of snake - The number of one color = The number of the other color.
6. For a challenge, try multiplication and division. One snake is many colors, the same number of each color.

The multiplication is :
   The number of colors \( \times \) The Number of each color = Length of snake

The division is :
   Length of snake \( \div \) The number of each color = The number of colors
   Length of snake \( \div \) The number colors = The number of each color
Computation

Number Puzzle

Goals:
Develop Addition, Subtraction, Multiplication, and Division skills.
Promote Mathematics Communication.
Develop logical reasoning and thinking skills.

Materials:
Number Cards
Computation sheet

Steps:
1. Choose which numbers you will use. Some will use just 1 - 10, others 1 - 20.

2. Choose a computation sheet. Addition, subtraction, multiplication, division, addition and subtraction, or a mix of all.

3. Draw cards one at a time to 15 and place them on your computation sheet to make true statements.

4. See how many true statements you can make with your 15 numbers.

5. How did you decide where to place the cards?
Addition

____ + ______ = ______

____ + ______ = ______

____ + ______ = ______

____ + ______ = ______

____ + ______ = ______

2x2
Subtraction

_____ - _______ = _______

_____ - _______ = _______

_____ - _______ = _______

_____ - _______ = _______

2 x 2

1
Multiplication

____ x ____ = ____

____ x ____ = ____

____ x ____ = ____

____ x ____ = ____

____ x ____ = ____
Addition and Subtraction

____ + _____ = ______

_____ - _____ = ______

_____ + _____ = ______

_____ - _____ = ______

_____ + _____ = ______
All Operations

___ + ___ = ___

___ - ___ = ___

___ \times ___ = ___

___ \div ___ = ___

___ + ___ = ___

2+2
Computation

Dice

Goal:
Promote Mathematics communication.
Develop computation skills.
Develop logical thinking and reasoning skills.

Materials:
Number Strip 1 - 12
Beans
Two die

Steps:
1. Each player needs a number strip and beans.

2. On his turn, a player rolls the die. With the beans he may cover up the sum of the die square, or the squares of the two numbers rolled.

3. The first player to cover all of his or her squares wins.

4. If on his turn, a player cannot cover the sum because it is already covered, he must cover the two numbers, if he cannot cover the two numbers because one or both are already covered, then he must cover the sum, if he cannot cover either the two numbers or the sum because they are all covered, then he loses the turn.

5. Change the rules to play the products, quotients, or differences of the numbers rolled. Either one operation per game, or play where there is all possibilities!

6. What kind of strategies did you use?
Calculators

Nimble Calculator Races

**Goals:**
Develop logical reasoning and thinking skills.
Look for patterns and strategies.
Become comfortable with a calculator.
Promote Mathematics communication.

**Materials:**
Each pair of players needs one calculator

**Steps:**
1. Clear the calculator. Each player takes turns adding one or two each time. The first person to reach seven wins, and going over seven loses. Try several times, with each player going first. Discuss a strategy for winning.

2. Enter an eleven into the calculator. Each player takes a turn subtracting one or two each time. The winner is the person to reach zero, and a negative number loses. Try several times, with each player going first. Discuss a strategy for winning. How is the strategy different than the first game?

3. Try these other games.
   a. Start from zero. Each turn add one, two, three, or four. The winner is the first to reach twenty one. Going over loses.
   
   b. Begin with 101 and each turn subtracts one, two, three, four, five, six, seven, eight, or nine. Reaching zero wins, and a negative number loses.
   
   c. Begin at zero. Each turn may add one, two, three, four, five, six, seven, eight, or nine. The winner is the first to reach 100, and again, going over loses.
   
   d. Enter 2001 into the calculator. A player may subtract any number 1 to 99. The winner is the first to reach zero. A negative number loses.

4. Be sure to discuss strategies and compare!
Calculators

Calculator Pathways to Mathematics Computations

Goals:
Become familiar with the calculator.
Develop logical thinking skills and strategies.
Promote Mathematics communication.

Materials:
Calculators for each player
Calculator paths
Two types of markers

Steps:
1. Choose a game board by reading the labels for the kinds of operations required for each one.

2. A player chooses two numbers from the circle on the bottom of the game board, and estimates the result of the operation on that number. There is a board for addition, addition and subtraction, multiplication, and multiplication and division. The player wants the result to be a number on the game board, and in his or her path to the other side.

3. The result is then found by calculator, and if it is on the board, it is covered with a marker.

4. The goal is to cover a path with your markers to reach from one opposite side to the other. Opposite sides are marked with matching symbols.

5. A result not on the board, means a lost turn, and if a result is already covered it may not be covered again.

6. Further directions are on each game board.
Two players take turns.

Pick any two numbers from the large circle.

Add the two numbers you picked.

If the answer is on the game board and not already covered, cover it with one of your markers.

To win: Make any path with your markers that connects your two sides.

The first player goes from one star side to the other star side, and the second player goes from one dot side to the other dot side.
CALCULATOR PATH Subtraction and addition

Two players take turns.
* Choose any two numbers from the large circle.
* Add or subtract the two numbers.
* If the answer is on the game board and not already covered, cover it with one of your markers.
* The first player goes from one star side to the other star side, and the second player goes from one dot side to the other dot side.
* To win: Make any path with your markers that connects your two sides.
Two players take turns.
* Choose any two numbers from the large circle.
* Multiply the two numbers together with your calculator.
* If the product of your numbers is on the board and not covered, cover it with one of your markers.
* To win, make any path from star side to star side or dot side to dot side.
Two players take turns.

Choose any two numbers from the large circle.

Divide the smaller number into the larger number.

If the quotient is on the game board and not already covered, cover it with one of your markers.

To win, make any path from star side to star side or dot side to dot side.
Calculators

Human Calculators!

Goals:
Practice basic number operations.
Promote Mathematics communication.
Practice mental math skills
Become familiar with calculator operation.

Materials:
Calculator
Paper
Crayons
Tape
Large Paper Calculator "Buttons."

Steps:
1. Take a set of Calculator Buttons and work together to create a model of a calculator on the floor.

2. One person is the human calculator, the other is the worker.

3. The worker gives the human calculator a scrap of paper with a problem on it, with no answer. For example, 7+5.

4. The human calculator begins at clear and hops his or her way through the problem, figuring the answer in his or her head, and hops on the answer too. Don't skip any buttons!

5. The worker checks the human calculator with the electric calculator.

6. Take turns in each role!
Clear =  

. +/- x 

÷
Calculators to Take Home

Aunt Bebe's Costly Calculations

Goals:
Develop logical reasoning and thinking skills and strategies.
Become familiar with the calculator.
Promote Mathematics communication.

Materials:
Record sheet
Calculator
Pencil

Steps:
1. Aunt Bebe lives in the wilds of Nedbury, North Dakota. She is an eccentric old gentlewoman who has a burning interest in many things and especially loves calculating Machines! She sponsored a contest with a special set of calculators rules.
   a. Recording each button you press on your record sheet, use only the keys 2, 6, +, - , x, ÷, and =. Make your calculator show the number 12 with only ten keys pressed. You win a dollar for each key you press as long as it is less than ten keys total and you get a 12 in the end. Try more than one way!
   b. Do the same to try to display 30, 19, 13, 110, and 6.2. Remember to record all strokes, the end display, and the pay you earned.
   c. If you can display the numbers .16, 6.4, and .03, using ten keys or less and only the given seven keys from part a, I will pay four dollars per key.
   d. If you can do part c, but must use memory keys as well as the other seven given, then I will pay you 25 cents per key you use.

2. Try to win as much money as possible, keeping an accurate record sheet. How rich can you get?

3. Check each others answers and their winnings, and discuss how you did it!
RECORD SHEET

Keys used to get to the number  

Payment

12

30

19

13

110

6.2

.16

6.4

.03
Spatial Awareness

Pattern Blocks

Goals:
Identify shapes.
Develop concept of congruence.
Develop concept of tessellation.
Promote Mathematics communication.

Materials:
Pattern Blocks
Paper

Steps:
1. Lay out pattern blocks in front of you.
2. Choose a block at random and name the shape and color.
3. Repeat until each color has been named.
4. Choose three blocks, all of any one color.
5. Notice that all three are the same shape and same size. They are congruent.
6. All the reds are congruent, all the yellows, all the blues, all the greens ....
7. Make a design with your blocks.
8. Can you make a repeating pattern?
9. Try to make a repeating pattern with one type of block that will cover a piece of paper with no spaces.
10. Which shapes can do this? Which cannot? This is called tessellation.
11. Can you combine two or more kinds of blocks to make a shape that will tessellate?
**Spatial Awareness**

**Geometric Solids**

**Goals:**
Develop a concept of spheres, cubes, rectangular prisms, cones, pyramids, cylinders, and other prisms.
Promote Mathematics communication.

**Materials:**
Geometric solids
Clay

**Steps:**
1. Look at the geometric solids.
2. Name each one. How are they alike, how are they different?
3. Try to draw each one on your geometric solids sheet.
4. What do you know in the world that comes in these shapes. Record this on your geometric solids sheet.
5. Can you model them with the clay?
6. Now try to model combinations of them!
<table>
<thead>
<tr>
<th>Name</th>
<th>Picture</th>
<th>Examples</th>
</tr>
</thead>
</table>

Geometric Solids Sheet
Spatial Awareness

Tangrams

Goals:
Identify shapes.
Develop concept of spatial awareness.
Promote Mathematics communication.
Promote literature and Mathematics.

Materials:
Tangrams
Grandfather Ping
Tangram shape cards

Steps:
1. Lay out the tangrams in front of you. Name each shape.

2. Can you put them together to form a square?

3. Read and discuss Grandfather Ping, making each tangram shape in the story and name each shape in it.

4. Can you make other figures from the tangrams?

5. Can you fill in the tangram cards with the shapes?
Spatial Awareness to Take Home

Shape Scavenger Hunt

Goals:
Identify shapes and shapes within shapes in everyday life.
Promote Mathematics communication.

Materials:
Paper
Crayon

Steps:
1. Name a two or three dimensional shape.

2. Each player searches the home to find as many examples as they can.

3. Discuss each example and give one point for each.

4. Name another shape.

5. Continue for as many shapes as you can think of.

6. The player with the most points wins!
Measurement

Length

Goals:
Develop concept of length.
Promote Mathematics communication.
Practice measuring skills.

Materials:
pencil
meter cardboard strips
decimeter straws
centimeter cubes
metric trundle wheel
tape measure
ball
calipers
objects to measure with calipers

Steps:
1. Choose a cardboard strip, it is one meter long.

2. Answer these questions:
   a. Are you more than one meter tall? __________
   b. Are you more than two meters tall? __________
   c. How many meters tall are you? __________

3. Choose a straw. Answer these questions:
   a. How many straws equal your meter strip? _______
   b. The straw is one decimeter long. How many decimeters equal one meter? _______

4. Choose a cube.
   a. How many cubes equal your decimeter straw? _______
   b. How many cubes equal your meter strip? _______
   c. A cube is a centimeter long. How many centimeters are in a decimeter? _______
      How many centimeters are in a meter? _______

5. How many meters wide is this room? Guess, then find out using the meterr wheel. Guess _______ Check_________
6. Would you measure these in meters, decimeters, or centimeters?
   a. A new piece of chalk. ________
   b. Kindergarten child. ________
   c. Pinky finger. ________
   d. Pencil. ________

7. Look at the tape measure. Find one meter. It is divided into ___ centimeters.

8. Each centimeter is divided. How many parts is it divided into? _____

9. Each part is called a millimeter. How many millimeters are in a centimeter? __

10. How many millimeters are in a meter? ____

11. Guess how long each of these might be, then check using the tape measure:
   a. Distance around a ball. guess ______ check ______
   b. Distance around your head. guess ______ check ______
   c. Your height. guess ______ check ______
   d. The length of your foot. guess ______ check ______
   Be sure to guess before you measure and measure to the nearest millimeter.

12. Find the calipers. This is another tool used to measure. How many centimeters do you think are between your ears? Write your guess here _______ cm.

13. Measure the width of your fist with the calipers. ________ Do you want to change your guess? Write a new guess here ________ cm.

14. Measure the distance between your ears with the calipers. __________

15. Guess then measure the objects on the table with the calipers. Record your guess and check on the back of this sheet.

16. Are your guesses getting closer? ________

17. What else could be measured with calipers? __________
Measurement

Maps

Goals:
Develop concept of length.
Practice reading a map.
Promote Mathematics communication.
Practice measuring skills.

Materials:
map
paper
pencil

Steps:
1. Look at the map. The letters and numbers help locate spaces. Morriston is at N-10. Can you find it?

2. Red roads list distances in kilometers in red and black roads list distances in kilometers in black. A kilometer is 1000 meters. What town is 21 kilometers from Morriston? How many meters is equal to 21 kilometers?

3. What park is at G-18?

4. What lake is at J-12?

5. Windsor is at S-2. It is across a river from what U.S. city?

6. What lake is in McGregor Point Park at J-6?

7. Is it closer to go from Belleville K-18 to Kaladar H-19 through Madoc or through Roblin?

8. What direction did you go?

9. If I can drive 75 kilometers every hour how long will it take me to go on highway 417 from Ottawa E-23 to Carillon Park D-26?
Measurement

Mass

Goals:
Develop concept of mass.
Promote Mathematics communication.
Practice measuring skills.

Materials:
balance scale
masses
thimble
diaper pin
button
button
penny
dime
spool
scale
cubic centimeter units
measuring cup
water

Steps:
1. Look at the mass wrights. See how each is marked with its mass in grams.

2. Hold the 1 gram mass and see how it feels.

3. What object on the table feels like it weighs 1 gram? ___________

4. Use the balance scale to compare the 1 gram mass with this object. Do they balance? ________

5. If no, try other objects.