<table>
<thead>
<tr>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>For group</td>
</tr>
<tr>
<td>• 1 copy number card strips on card stock, cut along heavy lines.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student is expected to use place value to read, write (in symbols and words) and describe the value of whole numbers through 999,999. (3.1A)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Place value</td>
</tr>
<tr>
<td>• Ones</td>
</tr>
<tr>
<td>• Tens</td>
</tr>
<tr>
<td>• Hundreds</td>
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<tr>
<td>• Thousands</td>
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<tr>
<td>• Ten thousands</td>
</tr>
<tr>
<td>• Hundred thousands</td>
</tr>
<tr>
<td>• Digit</td>
</tr>
<tr>
<td>• Numeral</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Activity: Today you will use number cards to learn more about place value. Place value helps us read and write numbers and know what they mean.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teacher shuffles the number card strips and places them on the table.</td>
</tr>
<tr>
<td>2. Teacher calls out or writes a number in words: Example: eight hundred seventy-nine thousand, five hundred thirty-two.</td>
</tr>
<tr>
<td>3. Students find the cards with the appropriate place values. The cards are placed in order to help the students see the value.</td>
</tr>
<tr>
<td>Students show these cards (on table or stand in order).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8 0 0, 0 0 0</th>
<th>7 0, 0 0 0</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>9, 0 0 0</th>
<th>5 0 0</th>
<th>3 0</th>
<th>2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Warm-up Fact of the Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>6x9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What is the family of facts?</th>
</tr>
</thead>
<tbody>
<tr>
<td>What picture could we draw to represent those facts?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emphasize the &quot;ten times larger&quot; pattern in place value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Students overlap the cards so the number is in the proper written form and read the number and write it in words.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8 7 9, 5 3 2</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Be sure to call out numbers that use zero as a value – ex: 890,462</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Reverse the activity: The teacher makes a number with the cards and the students write out the words.</td>
</tr>
<tr>
<td>6. Journal prompt: Write any six digit number as a numeral and in words.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1</td>
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<td>4</td>
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<td>5</td>
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<td>6,000</td>
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<tr>
<td>7,000</td>
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<td>8,000</td>
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<tr>
<td>9,000</td>
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<tr>
<td>0,000</td>
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<tr>
<td>10,000,000</td>
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<tr>
<td></td>
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<tr>
<td>-------</td>
</tr>
<tr>
<td><strong>6 0,000</strong></td>
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<tr>
<td><strong>7 0,000</strong></td>
</tr>
<tr>
<td><strong>8 0,000</strong></td>
</tr>
<tr>
<td><strong>9 0,000</strong></td>
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<tr>
<td>6</td>
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<td>7</td>
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<td>8</td>
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<tr>
<td>9</td>
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<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>
**True Value**

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For group</td>
<td>The student is expected to use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999. (3.1A)</td>
</tr>
<tr>
<td>• 6 sets digit cards</td>
<td></td>
</tr>
<tr>
<td>(Run each set on a different color, for example: green, yellow, purple, pink, blue, and red.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td></td>
</tr>
<tr>
<td>• Ones</td>
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<tr>
<td>• Tens</td>
<td></td>
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<tr>
<td>• Hundreds</td>
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<td>• Thousands</td>
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<td>• Ten thousands</td>
<td></td>
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<tr>
<td>• Hundred thousands</td>
<td></td>
</tr>
<tr>
<td>• Place value</td>
<td></td>
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<tr>
<td>• Digit</td>
<td></td>
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<tr>
<td>• Numeral</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Warm-up</td>
<td></td>
</tr>
<tr>
<td><strong>Flower Power</strong></td>
<td></td>
</tr>
<tr>
<td>The number is 84.</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** Today we will use digit cards to make numbers and change them to get different values.

1. Teacher shuffles the colored digit cards and distributes them evenly among the students.

2. Teacher assigns each set of color cards a place value from the ones through the hundred thousands. Write the color code on the board using words and numerals.
   - Green = hundred thousands
   - Yellow = ten thousands
   - Purple = thousands
   - Pink = hundreds
   - Blue = tens
   - Red = ones

3. Teacher asks students to work together to assemble the number 436,689 using the appropriate digits and colors.

4. Students look through their cards to create the requested number and lay it out on the white/chalk board tray. A student volunteers to read and write the number.

5. Teacher guides students through place value work by directing actions and asking questions such as the following:
   - How can we make a number that is 1000 greater? Look at your cards and make it happen. (Student having the purple 7 would replace the purple 6.) A student reads and writes the new number.
   - Now make the number 100 less. (Student having the pink 5 would replace the pink 6.) A student reads and writes the new number.
   - Now let’s make the number 20,000 greater. Read and write the new number.
   - Who has the green 7? What is the value of that 7? If we exchange the green 4 for the green 7, what have we done to our number?
   - What should we do if we want to get rid of all the tens?

6. Teacher announces the next number (85,760) and students form it.

7. Teacher directs actions and asks similar questions as those in step 5.

**Vocabulary**

- Ones
- Tens
- Hundreds
- Thousands
- Ten thousands
- Hundred thousands
- Place value
- Digit
- Numeral

**Warm-up**

**Flower Power**

The number is 84.

Adapted from Dr. Lola May
8. Then students create the greatest 6-digit number possible using the numbers and place values in their hands. Share with the group.

9. Students create the least 6-digit number possible using the numbers and place values in their hands. Share with the group.

10. Students pass one card to the person to the right and adjust to a new lowest number.

11. Journal Prompt: Explain the difference between a 3 in the hundreds place and a 3 in the hundred thousands place.
<table>
<thead>
<tr>
<th>0</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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td>3</td>
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<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>
### Place Value Roulette

#### Materials
- Per student:
  - Calculator
- For group:
  - Base ten blocks (optional)

#### TEKS Student Expectation:
The student is expected to use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999. (3.1A)

#### Activity:
Today we will use calculators as a tool to work with whole numbers and learn more about place value.

Note: This activity can be modeled simultaneously with base ten materials. You may also have students record each of the steps in their journal.

1. Teacher writes a number on the board and students enter it into the calculator. Begin with a small number to model the activity, for example: 593. (Teacher needs to enter it into his/her calculator also.)

2. Teacher calls out a value to be added or subtracted from the number displayed on the students’ calculators. For example: add 300.

3. Students perform the operation.

4. Teacher asks:
   - How has our original number changed? (The digit in the hundreds place has changed to an 8. The number is now 893.)

5. Teacher calls out another value to be added or subtracted from the new number displayed on the calculator. For example: subtract 50.

6. Students perform the operation.

7. Teacher asks: How has our number changed this time? (The digit in the tens place has changed to a 4. The number is now 843.)

8. Teacher continues to call out values to be added or subtracted by place value until all place values have been changed. For example: add 4.

#### Vocabulary
- Ones
- Tens
- Hundreds
- Thousands
- Ten thousands
- Hundred thousands
- Place value
- Digit
- Numeral
- Whole number

#### Warm-up
**Function Machine**
add 2
9. A student volunteers to write the solution on the board directly under the original number, then reads it aloud.

10. Students compare their answers to the solution written on the board. If their answer does not match, they may either challenge the answer written or figure out how they made a mistake.

11. Continue playing using larger numbers such as: 71,593.

# The Place is Valuable

**Materials**

- 1 piece of red construction paper (9" x 12")
- 1 piece of blue construction paper (9" x 12")
- Scissors
- Tape
- 1 set digit cards on card stock

**Vocabulary**

- Digit
- Place value period
- Ones period
- Thousands period

**Warm-up**

**Life Saver Math**

multiply by 5

**TEKS Student Expectation:**
The student is expected to use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999. (3.1A)

**Activity:** Today you will play a game to learn more about place value.

1. Each pair of students folds the two sheets of construction paper in half lengthwise and cuts them in half on the fold. They then tape the half-sheets together in the color sequence red-blue. Students divide each color into thirds.

2. Teacher informs students that each color of paper represents a place value period. The blue represents the ones and the red represents the thousands.

3. Students shuffle their cards and stack them face down below their place value chart.

4. Teacher models the game by setting a goal and playing one round.

5. Teacher gives the students one of the following goals:
   - Largest 6-digit number
   - Smallest 5-digit number
   - Largest odd 5-digit number
   - Smallest even 4-digit number
   - Number closest to 5,000

6. When the teacher says, “flip,” each student removes the top card from the stack and places it in one of the boxes on their place value chart. After a card is placed, it cannot be moved. Play continues until the goal number of digits is reached.

7. Teacher asks:
   Who feels they have reached the goal? (To receive credit the student must be able to read it correctly and identify the digits in the ones period and the thousands period.)
   Did anyone get closer to the goal?
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Students clear their charts and play continues with a new goal.</td>
</tr>
<tr>
<td>9.</td>
<td>Students write their final 6-digit number in words.</td>
</tr>
<tr>
<td>10.</td>
<td>Journal Prompt: What was your strategy for making the largest number? The smallest number?</td>
</tr>
<tr>
<td>11.</td>
<td>Discuss the strategies.</td>
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<td>4</td>
<td>9</td>
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<td>3</td>
<td>8</td>
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<td>2</td>
<td>7</td>
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<tr>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>
### Let's Make a Number, Part 2

**Materials**
- Per student
  - Digit Spinner
  - Paper clip
  - Game board (Copy it on both sides for more games.)
- For group
  - 1 High/Low spinner
  - 1 paper clip

**Vocabulary**
- Place value
- Ones
- Tens
- Hundreds
- Thousands
- Ten thousands
- Hundred thousands
- Digit
- Numeral

**Warm-up**
**More or Less**
117,281
- Make it 1,000 more.
- Make it 10,000 less.

**TEKS Student Expectation:**
The student is expected to use place value to read, write (in symbols and words) and describe the value of whole numbers through 999,999. (3.1A)

**Activity:**
Today we will play a game in which you try to build the largest or smallest number possible to learn more about place value.

1. Teacher gives each student a spinner sheet, a paper clip, and a game board.

2. Select one student to spin the high/low spinner. The high/low spinner determines if they are trying to make the largest number possible or the smallest. (Place the paper clip in the center of the spinner and hold in place with an upright pencil. Flick the other end of the paper clip with a finger to spin.)

3. Teacher tells students to spin the digit spinner. The digit spinner determines the digit the players will write. After each spin, the player writes the number as a digit in one space on his or her game board. Once written, that digit cannot be moved.

4. The winner has the highest (or lowest) number and can read it.

5. Journal Prompt: What was your strategy for placing the digits to make the largest number? Smallest number?

6. Discuss strategies.

Adapted from Clarifying Activities, TEKS Toolkit
Let's Make a Number, Part 2 Game Board

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<tr>
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</tbody>
</table>

Number, Operation and Quantitative Reasoning 9/17/2011 Page 3 of 3
**More or Less, Part 1**

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td>The student is expected to use place value to compare and order whole numbers through 9,999. (3.1B)</td>
</tr>
<tr>
<td></td>
<td>Activity: Today you will use a place value mat to compare the value of numbers.</td>
</tr>
<tr>
<td>1 piece of</td>
<td>1. Each student makes a place value mat by folding a piece of large construction paper to make four columns. Have students label the columns: thousands, hundreds, tens, and ones. Assign a different color to each place value on the mat. For example: ones = red, tens = blue, hundreds = green, thousands = yellow</td>
</tr>
<tr>
<td>construction paper</td>
<td>2. Teacher demonstrates how to build numbers and compare them on a place value mat.</td>
</tr>
<tr>
<td>Crayons</td>
<td>- Teacher shows 3,472 by placing the appropriate color tiles in the <em>upper</em> half of a place value mat.</td>
</tr>
<tr>
<td></td>
<td>- Teacher shows 3,610 by placing the appropriate color tiles in the <em>lower</em> half of the place value mat.</td>
</tr>
<tr>
<td>For group</td>
<td>3. Teacher says:</td>
</tr>
<tr>
<td></td>
<td>- What’s the highest place value on the mat? (thousands)</td>
</tr>
<tr>
<td></td>
<td>- How many tiles does each number have in the thousands column? (3)</td>
</tr>
<tr>
<td></td>
<td>- Since the thousands amounts are the same, let’s look at the next highest place value. (hundreds)</td>
</tr>
<tr>
<td></td>
<td>- How many tiles does each number have in the hundreds column? (The top number has 4 hundreds and the bottom number has 6 hundreds.)</td>
</tr>
<tr>
<td>Color tiles</td>
<td>- The number with 4 hundreds is less than the number with 6 hundreds.</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>4. Teacher shows two ways of writing this: 3,472 &lt; 3,610 and 3,610 &gt; 3,472 and reads the number sentences.</td>
</tr>
<tr>
<td></td>
<td>5. Students repeat the activity with other numbers such as 4,582 and 4, 530. Write two different comparison statements and read the number sentences.</td>
</tr>
<tr>
<td></td>
<td>6. Journal Prompt: With crayons draw models for 6,719 and 6,824 in your journal. Explain how to determine which number is greater and which number is less.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up My Product Is 24</th>
<th>Adapted from Frances Thompson, <em>Hands On Math!</em></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What could be my factors?</td>
</tr>
</tbody>
</table>
More or Less, Part 2

**Materials**
- Bag
- Digit cards
- Place value mat made in More or Less, Part 1

**TEKS Student Expectation:**
The student is expected to use place value to compare and order whole numbers through 9,999. (3.1B)

**Activity:** Today we will play a game to review how to compare and order numbers.

1. Teacher writes two four-digit numbers on the board and asks questions to review how to compare and order numbers.
   - What is the highest place value in each number?
   - What is the number in the thousands place?
   - What is the number in the hundreds column?
   - Etc.

2. Teacher explains the rules for the game:
   - The winner is the player who makes the **biggest** number.
   - Draw a digit card out of the bag.
   - Place that digit on your place value mat. Once the card is placed it can not be moved.
   - Make three more draws to get a four digit number.

3. After each student has pulled out 4 numbers & put them on his/her place value mat, the students look to see who has the biggest number. Have students discuss their strategies for creating the largest number. Play the game again using your strategy.

4. Play the game again with the goal being to create the smallest number.

5. **Journal Prompt:**
   - Now, I’d like for you to put the following numbers in order from greatest to least: 9,102 2,345 6,579 221 8,100 (Write these on the board)
   - How did you decide the order for these numbers?

**Vocabulary**
- Digit
- Place Value
- Greatest
- Least
- Compare

**Warm-up**
**Spotlight Number 36**
- Can you make this by adding two numbers?
- Can you make this by multiplying two numbers?
- Can you make this by subtracting two numbers?

Adapted from Frances Thompson, *Hands-On Math*

**Digit Cards**
<table>
<thead>
<tr>
<th>4</th>
<th>9</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>8</td>
<td></td>
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<tr>
<td>2</td>
<td>7</td>
<td></td>
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<tr>
<td>1</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>0</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
## Line Them Up

### Materials

For group

- 1 set of Line Them Up number cards on cardstock, cut

### TEKS Student Expectation:

The student will use place value to compare and order whole numbers through 9,999. (3.1B)

### Activity:

Today you will take turns lining up numbers in order. Being able to order numbers will help you organize information.

1. The teacher decides who will be the first director. (Pick a name out of a jar, pick a number or any other way he/she wants to decide.)

2. The teacher says, “The director is _________. The rest of you will pick numbers and will not speak.”

   - The students each pick a number card and hold it chest high in front of them.
   - The director moves the students so that the numbers are in order from least to greatest. (You can have them lined up from greatest to least)
   - The director reads the numbers in order.

3. A new director is picked and the activity is repeated.

4. Journal Prompt: If these numbers are the populations of small towns in Texas, describe how you would put the towns in order from the least to the greatest population.

### Vocabulary

- Numerical order
- Least
- Greatest

### Warm-up

**Two At a Time**

\[ \triangle + \Box = 5 \]
\[ \triangle - \Box = 3 \]

**Answer:**

\[ \triangle = 4 \]
\[ \Box = 1 \]
<table>
<thead>
<tr>
<th>Line Them Up – number cards</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 467</td>
</tr>
<tr>
<td>5, 647</td>
</tr>
<tr>
<td>5, 964</td>
</tr>
<tr>
<td>4, 596</td>
</tr>
<tr>
<td>6, 974</td>
</tr>
<tr>
<td>8, 994</td>
</tr>
</tbody>
</table>
## Digit Control

### Materials
- Per student
  - Dry erase board (opt.)
  - Dry erase marker (opt.)

### TEKS Student Expectation:
The student is expected to use place value to compare and order whole numbers through 9,999. (3.1B)

### Activity:
Today you will use certain rules to make numbers and use your place value knowledge to compare them.

1. Teacher explains the activity.
   - Students draw 2 horizontal lines on a dry erase board or paper.
   - Teacher says: You are to write any 4-digit number on each line. You may use the digits 0-9 and the digits may be repeated.
   - Each student shows his/her number
   - Students compare their numbers to other students’ numbers using comparison statements such as 3,457 is less than 4,289.
   - Students erase their dry erase boards (or get a new piece of paper) and redraw 2 lines.

2. Teacher says a new rule:
   - For the next two numbers, you are to use the digits 0-9 and the digits may be repeated. (Not all digits will be used when forming the two numbers.)
   - On the top line, write the greatest possible 4-digit whole number.
   - On the bottom line, write the least possible 4-digit whole number.
   - Students show their numbers and discuss.
   - Students erase their dry erase boards (or get a new piece of paper) and redraw 2 lines.

3. Teacher says a new rule:
   - For the next two numbers, you are to use the digits 0-9, but this time no two digits may be the same. (Not all digits will be used when forming the two numbers.)
   - On the top line, write the greatest possible 4-digit whole number.
   - On the bottom line, write the least possible 4-digit whole number.
   - Students show their numbers and discuss.
   - Students erase their dry erase boards (or get a new piece of paper) and redraw 2 lines.

### Vocabulary
- Digit
- Greatest
- Least
- Same
- Consecutive
- Greater than
- Less than

### Warm-up
**Fact of the Day**
4X9
- What is the family of fact?
- What is a word that could be answered using that fact?

Adapted from **TEXTEAMS 3-5 Institute**
4. Teacher reviews the meaning of "consecutive numbers" then gives a new rule:

- For the next two numbers, you are to use the digits 0-9 and no two digits may be the same. (Not all digits will be used when forming the two numbers.)
- On the top line, write the greatest possible 4-digit whole number, without consecutive numbers next to each other.
- On the bottom line, write the least possible 4-digit whole number, without consecutive numbers next to each other.
- Students show their numbers and discuss.

5. Journal Prompt: Write a paragraph to a friend explaining how to compare two four-digit numbers.
Coin Bingo

Materials
Per student
- Coin Bingo board
- Collection of coins
- Magnifiers (optional)

For teacher
- Two sets of digit cards 0-5 in a bag (Make these, or use digit cards from another activity.)

Vocabulary
- Cents
- Amount
- Horizontal
- Vertical
- Diagonal

TEKS Student Expectation:
The student is expected to determine the value of a collection of coins and bills. (3.1C)

Activity: Today we will play a game to see how you can get different combinations of coins to equal a given amount of money. This will help you know different ways to pay for things at the store or count your change.

Background:
1. Teacher distributes a collection of coins. It would also be interesting to have small hand magnifiers available for students to examine the coins and bills more closely.

2. Ask students to review the money by naming and describing each coin and bill and telling the value. Example: “This is a quarter. There is a picture of George Washington on one side and the American eagle on the other. It is worth 25 cents.”

3. The teacher might also probe for more information by asking what other coins can be combined to equal the value of a quarter. Example: five nickels equals one quarter.

4. When students have had an adequate amount of time to review, explain the game Coin Bingo.

Coin Bingo:
Note: Part of the strategy of the game is selecting which coins to use, so students need access to a large collection of coins.

1. Students place a coin in each square of the board in any arrangement they wish.

2. Teacher calls out an amount of money, determined by drawing two digit cards from the bag, using the first card as the tens and the second card as the ones.

3. Students remove coins from as many places on the board as needed to equal the amount called. Students must keep each collection of removed coins so the teacher can check to be sure they were correct.

4. The student who clears an entire row, column or diagonal first says “Coins!” and wins the game. Variations might include removing a row and a column, clearing the entire board, etc.

5. Journal Prompt: Select an amount of money less than $.99 and show three different collections of coins that equal that amount.

Warm-up
Flower Power 78
## Coin Bingo

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<th>C</th>
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</tbody>
</table>
Money Match

Materials
For Group
- Money Match cards

Per student
- Collection of real coins and bills
- Magnifiers (opt.)

Vocabulary
- Quarter
- Dime
- Nickel
- Penny
- Dollar
- Value
- Cents

TEKS Student Expectation:
The student is expected to determine the value of coins and bills. 3.1C

Activity: Today we will play a matching game where you will match collections of coins and bills with their amounts.

Note: Choose one of the four sets of cards to match the group's knowledge. Sets of cards may also be combined to make the game more challenging.

1. To play Money Match, students place all of the money cards face up on a table.

2. Teacher keeps the value cards and calls out one value at a time.

3. Students pick up as many money cards as they can that match the value the teacher called. The teacher waits until all of the students are finished picking up money cards before she calls out the next value.

4. The object of the game is to have the most cards.

5. Journal Prompt: Explain to a friend how you could have more than one way to make $.40.

Extensions:
1. Consider the cards that are remaining on the table at the end of the game as "ghost cards." Did the ghost win?

2. Have all the players count the total amount of money they have on all of their cards at the end of the game, including the ghost. Determine who has the greatest amount of money.
Money Match Cards – Set 1

15¢

20¢
Money Match Cards – Set 1

25¢
Money Match Cards – Set 1

30¢
<table>
<thead>
<tr>
<th>Money Match Cards – Set 1</th>
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</thead>
<tbody>
<tr>
<td>![Image of coins]</td>
</tr>
<tr>
<td>35¢</td>
</tr>
</tbody>
</table>
Money Match Cards – Set 1

40¢

[Images of coins representing 40 cents]
Money Match Cards – Set 1

45¢
Money Match Cards – Set 1

50¢
## Money Match Cards – Set 2

<table>
<thead>
<tr>
<th>55¢</th>
<th><img src="image1.png" alt="Penny" /></th>
<th><img src="image2.png" alt="Penny" /></th>
<th><img src="image3.png" alt="Penny" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>60¢</td>
<td><img src="image4.png" alt="Nickel" /></td>
<td><img src="image5.png" alt="Nickel" /></td>
<td><img src="image6.png" alt="Nickel" /></td>
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</tbody>
</table>
### Money Match Cards – Set 2

<table>
<thead>
<tr>
<th>65¢</th>
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</thead>
<tbody>
<tr>
<td>2 quarters</td>
</tr>
<tr>
<td>1 nickel</td>
</tr>
<tr>
<td>10 pennies</td>
</tr>
</tbody>
</table>
Money Match Cards – Set 2

75¢
Money Match Cards – Set 2

80¢
Money Match Cards – Set 2

85¢
Money Match Cards – Set 2

90¢
Money Match Cards – Set 2

95¢
Money Match Cards – Set 2

$1.00
### Money Match Cards – Set 3

<table>
<thead>
<tr>
<th>$1.25</th>
<th>$1.50</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
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<tr>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
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<tr>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
</tbody>
</table>
Money Match Cards – Set 3

$1.75
Money Match Cards – Set 3

$2.00
Money Match Cards – Set 3

$4.25

$4.75
<table>
<thead>
<tr>
<th>Money Match Cards – Set 3</th>
<th>$7.50</th>
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</thead>
<tbody>
<tr>
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<td>$10.00</td>
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</table>
## Money Match Cards – Set 4

<table>
<thead>
<tr>
<th>$3.47</th>
<th>![One Dollar Bill]</th>
<th>![Nickels, Dimes, Quarters]</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5.72</td>
<td>![Five Dollar Bill]</td>
<td>![Pennies, Nickels, Dimes]</td>
</tr>
<tr>
<td>$6.98</td>
<td>![Ten Dollar Bill]</td>
<td>![Dimes, Nickels, Pennies]</td>
</tr>
</tbody>
</table>
Money Match Cards – Set 4

$7.33

$8.23

$9.52
### Money Match Cards – Set 4

<table>
<thead>
<tr>
<th>Amount</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>$10.87</td>
<td>2 dollar bills, 2 quarters, 5 dimes, 3 nickels, 1 penny</td>
</tr>
<tr>
<td>$11.56</td>
<td>2 dollar bills, 1 quarter, 3 dimes, 2 nickels, 1 penny</td>
</tr>
<tr>
<td>$12.27</td>
<td>3 dollar bills, 1 quarter, 3 dimes, 2 nickels, 3 pennies</td>
</tr>
</tbody>
</table>
Money Match Cards – Set 4

$15.35

$17.16

$22.50
### Dollars and Cents

**Materials**
- Collection of coins and bills

**Vocabulary**
- Dollar bill
- Quarter
- Dime
- Nickel
- Penny

**Warm-up**

**Life Saver Math**

Add 6

**TEKS Student Expectation:**
The student is expected to determine the value of a collection of coins and bills. (3.1C)

**Activity:** Today we will practice counting money.

1. Teacher shows 4 one-dollar bills, 2 quarters, 1 dime, and 3 pennies and says:
   - How much money do I have? ($4.63)
   - My friend just gave me 2 quarters and one nickel. How much money do I have now? (Add the coins to the teacher’s stack and count.)

2. Teacher shows 12 dollars, 4 dimes, and 1 nickel and says:
   - How much money do I have? ($12.45)
   - I spent $1.10 on candy. How much money do I have left? (Take the coins away from the teacher’s stack and count.)

3. Students use the collection of coins and bills for the following activities:
   - Show me $3.10.
   - Show me $16.94.
   - Show me $.72.
   - Show me $11.33.
   - Continue with additional amounts as needed.
   - My parents give me $.45 every week. How much money do they give me every month (4 weeks)? (Use coins to add .45+.45+.45+.45.)
   - The price on a toy car is $3.75. What bills and coins might I use to buy the car?

4. Journal Prompt: Describe at least two different situations where you might have to count money.

5. Share your ideas.
### Pieces of Pie

**Materials**

- Pieces of Pie sheets
- Scissors

**TEKS Student Expectation:**
The student is expected to use fraction names and symbols to describe fractional parts of whole objects or sets of objects with denominators of 12 or less (3.2B).

**Activity:** Today we will explore fractions by looking at whole circles cut into different sized fractional parts and then comparing the pieces. Sometimes numbers can have different names, but be the same amount.

1. Teacher says:
   - Our circle is going to represent 1 whole circle.
   - Looking at the first circle, how many pieces is it divided into? (2)
   - Are those pieces equal? (yes)
   - Since they are equal pieces, we can name each piece with a fraction.
   - What fraction could name each piece? Write the fraction in each white rectangle on our first circle.
   - What did you write as the denominator? Why?
   - What did you write as the numerator? Why?

2. Repeat the process outlined in step one to analyze and label each fraction circle (thirds, fourths, sixths, and twelfths).

3. Teacher says:
   - Let’s explore to see if we have any pieces that might be the same size as our $\frac{1}{2}$. Look at each of the fraction circles and decide which circles can be cut exactly into halves along a line.

4. Students cut the appropriate circles into halves and test each half by placing it on the circle that models halves.

5. Teacher asks, if we had a circle to model eighths, how many eighths would equal $\frac{1}{2}$? How do you know?

6. Teacher says:
   - When different-named fractions are of equal sizes, we call these equivalent fractions. We can show fractions are equivalent by using the equal sign. $\frac{1}{2} = \frac{2}{4}$. (Students record this math sentence in their journal.)

**Vocabulary**

- Equivalent fractions
- Numerator
- Denominator
- Comparing
- half/halves
- third(s)
- fourth(s)
- sixth(s)
- eighth(s)
- twelfth(s)

**Warm-up**

**Function Machine**

multiply by 8
• We’ve shown that \( \frac{1}{2} \) and \( \frac{2}{4} \) are equivalent fractions, write more equivalent fractions in your journal. (ex. \( \frac{1}{2} = \frac{3}{6}, \frac{1}{2} = \frac{6}{12}, \frac{2}{4} = \frac{6}{12}, \frac{2}{4} = \frac{3}{6} \), etc.

7. Teacher says Now we will use our fraction circles to compare the sizes of fractions. Cut out one slice of each of your fraction pies.

8. Lead students to lay various fraction pieces on top of each other and make comparisons. Example:

\[
\begin{align*}
\frac{1}{2} & > \frac{1}{3} \\
\frac{1}{3} & < \frac{1}{2} \\
\frac{1}{4} & < \frac{1}{2}
\end{align*}
\]

9. Students share their results and discuss.

10. Journal Prompt: Write to explain why \( \frac{1}{2} \) and \( \frac{1}{4} \) are not equivalent fractions.
Cups of Counters

Materials
Per student
- 12 two-color counters
- Cup
- Cups of Counters recording sheet

TEKS Student Expectation:
The student is expected to compare fractional parts of whole objects or sets of objects in a problem situation using concrete models. (3.2B)

Activity: Today we will work with finding and comparing fractional parts of groups. We will talk about the vocabulary of fractions. Knowing about fractions is very important, because not everything comes in wholes.

1. Teacher says:
   - How many students do we have in our group?
   - When we work with fractions, we call the total number of members in a group the denominator. We always place it in the same place when we write fractions, so that we always know where to look to find the total members of a group. (Teacher draws a fraction bar on the board and writes the word denominator under it. Beside this she makes another fraction bar and puts the total number of students in the group under it.)

   \[
   \frac{\text{denominator}}{\text{number of students in group}}
   \]

   - Often we want to know about just a portion of the group. For example, what part of our group is boys? To show how many are in the portion of the group that we are talking about, we place that number above the fraction bar. We call it the numerator. (Teacher writes the word numerator above the fraction bar.)

   \[
   \frac{\text{numerator}}{\text{denominator}}
   \]

   - Write the fraction to represent the boys as part of the group.
   - What fraction of our group is girls? When we write our fraction, what should be our denominator? What should be our numerator?
   - Which fraction of the group is larger? The fraction of boys or the fraction of girls? (Write comparison sentences, for example: $3/5 > 2/5$, $2/5 < 3/5$.)
   - In our group, is the fraction of boys more or less than half of the group? Girls?

Vocabulary
- Equal
- Whole
- Part
- Numerator
- Denominator
- Compare
- Greater than
- Less than

Warm-up
More or Less
254,541
- Make it 1,000 more.
- Make it 10,000 less.

Adapted from Marilyn Burns
2. Teacher says:
   - Now we will look at another model for fractions using 2-color counters in a cup. (Teacher takes a cup with 5 counters in it. She shakes it and pours out the 2-colored counters.)
   - What part of the whole group of counters is showing red? Write it as a fraction.
   - What part of the whole group of counters is showing yellow? Write it as a fraction.
   - Write two comparison statements for this spill.

3. Students select a number of counters from 5 to 12 and put them in their cups. Students shake the cup, pour out the counters and complete the information on the Cups of Counters recording sheet.

4. Journal Prompt: Find another trait about our group (glasses/no glasses, sneakers/no sneakers, etc.) and write fraction comparison statements.
Cups of Counters

Number of Counters in my Cup: ______

<table>
<thead>
<tr>
<th>Fraction that is Red</th>
<th>Fraction that is Yellow</th>
<th>Comparison Sentences</th>
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Fraction of Fall

Materials
Per student
- Fraction of Fall sheets
- Scissors
- Markers, crayons, or colored pencils
- Glue stick

Vocabulary
- Fraction
- Numerator
- Denominator
- Set

Warm-up
Flower Power
38

TEKS Student Expectation:
The student will use fraction names and symbols to describe fractional parts of whole objects or sets of objects with denominators of 12 or less. (3.2C)

Activity: Today we will explore fractional parts of a group of fall leaves. It is important to find a fractional part of a group when sharing a group of items among your friends.

1. Teacher distributes the activity sheets and directs students to:
   - Color 3 leaves red.
   - Color 5 leaves orange.
   - Color 2 leaves yellow.
   - Color 1 leaf brown.
   - Cut them out, mix them up (important—students need to see and know that not all same fractional parts of a set are right next to each other), and glue them to the tree.

2. Teacher asks:
   - Write a fraction in your journal to show what part of our whole group of leaves is red. Why did you choose the denominator that you did? What does your numerator represent?

3. Repeat the process with each color of leaf.

4. Teacher asks:
   - Does it matter if the same color leaves are next to each other?
   - Write the fraction of the leaves in the set that are brown and orange.
   - Which is larger — the fraction of orange leaves or the fraction of yellow and red leaves?

5. Journal Prompt: Using the leafy tree, write a question for our group that has not been asked yet. Be sure that you know the answer to the question that you write.
Fraction of Fall

3 red, 5 orange, 2 yellow, 1 brown (Should be 1 left.)
## Finding Fractions

**Materials**
- 1 set Cuisenaire® rods

**TEKS Student Expectation:**
The student is expected to use fraction names and symbols to describe fractional parts of whole objects with denominators of 12 or less. (3.2C)

**Activity:** Today we will use Cuisenaire® rods to explore fractions.

1. Teacher distributes Cuisenaire® rods to students and allows them to explore a little by asking:
   - Can you use the rods to build any models of fractions?
   - Discuss observations.

2. Teacher directs each student to place an orange Cuisenaire® rod in front of them and says:
   - The orange rod is a whole. You are going to build fractional parts of the orange rod as many different ways as possible.
   - The rules are:
     - All parts must be equal. (That means that the rods will be the same color in any row.)
     - The parts must exactly equal the whole. (They can't stick out too far and must fill the length completely.)

3. After students have made some fractions, the teacher asks:
   - If orange is the whole, what fractions can you find? Students should record in their journal. Example:

     
     When orange = 1, yellow = \(\frac{1}{2}\).
     
     red = \(\frac{1}{5}\)
     
     white = \(\frac{1}{10}\)

4. Repeat the process with other colored rods to represent the whole and record the relationships. Examples
   - When blue = 1, rows can be built that represent thirds and ninths.
   - When brown = 1, rows can be built that represent halves, fourths, and eighths

5. Journal Prompt: Choose another rod to equal one and record fractions you can find.

**Vocabulary**
- Equal parts
- Fraction
- Whole

**Warm-up**
**Lifesaver Math**
multiply by 7
### Counting Up and Counting Back

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Group</td>
<td>The student is expected to model addition and subtraction using pictures, words, and numbers. (3.3A)</td>
</tr>
<tr>
<td>• Base ten blocks</td>
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</tbody>
</table>

| Per student        |                                                                                          |
| • Hundred Chart    |                                                                                          |

#### Activity: Today you will practice a way to count by tens to make it easier to add and subtract.

1. The teacher leads students to practice counting by tens from different beginning numbers. Example: Start at 64 and count on by tens stopping before you get to 100 (74, 84, 94). How many tens did you add on (3)? You can model this on the hundred chart. Practice counting by tens with other numbers.

2. The teacher models using the counting up by tens strategy to add. Visual models like base ten blocks may also be helpful to use.

   \[
   32 + 53 =
   \]
   
   “I started counting at 32 and counted up 5 tens.”
   “32, 42, 52, 62, 72, 82”
   “Then I have to count up the 3 ones from 53.”
   “82, 83, 84, 85”
   “My answer is the last number I say, 85.”

3. Practice this strategy with the following problems:

   \[
   48 + 37 = 26 + 59 = 33 + 84 =
   \]

4. Ask students if this strategy would work for subtraction. What would we have to change? Explore this idea.

   \[
   75 – 44 =
   \]
   
   “I started counting at 75 and counted back 4 tens.”
   “75, 65, 55, 45, 35”
   “Then I have to count back 4 ones from the 44.”
   “35, 34, 33, 32, 31”

5. Practice this strategy with the following problems:

   \[
   83 – 57 = 76 – 33 = 92 – 47 =
   \]

#### Vocabulary
- Counting Up
- Counting Down

### Warm-up

**More or Less**

- 87,340
- Make it 10,000 more.
- Make it 100 less.

**Note:** Continue to practice this strategy in future lessons.
6. Show students how the counting up strategy could also be used to solve subtraction problems.

   \[ 67 - 39 = \]
   “I start counting at 39 and count up by tens to 67.”
   “39, 49, 59”
   “I stop at 59 because another ten would have put me past 67.”
   “Then I count on by ones to get to 67.”
   “59, 60, 61, 62, 63, 64, 65, 66, 67”
   “Then I go back and count the tens and ones and I get 28.

7. Practice this strategy with other problems.

8. Journal Prompt: Show how you could use counting up by tens to solve the problem 28 + 41.
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<td>98</td>
<td>99</td>
<td>100</td>
</tr>
</tbody>
</table>
First the Tens and Then the Ones

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(None)</td>
<td>The student is expected to model addition and subtraction using pictures, words, and numbers. (3.3A)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strategy</td>
</tr>
<tr>
<td>• Adopt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>More or Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>952,637</td>
<td></td>
</tr>
<tr>
<td>• Make it 10,000 more.</td>
<td></td>
</tr>
<tr>
<td>• Make it 100,000 less.</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** Today you will practice a strategy that might make it easier to add and subtract.

1. The teacher models adding a two-digit number by combining the tens first and then the ones, and then combining the tens and ones.

2. Model this strategy with the following example:

   \[
   \begin{align*}
   48 + 87 &= \\
   40 + 80 &= 120 \quad \text{Add the tens} \\
   8 + 7 &= 15 \quad \text{Add the ones} \\
   120 + 15 &= 135 \quad \text{Add the tens and ones}
   \end{align*}
   \]

3. This can also be modeled by making a tree diagram and drawing lines to pull out the tens and ones. Model vertically as well as horizontally.

   \[
   \begin{align*}
   48 + 87 &= \\
   40 + 80 &= 120 \quad \text{Add the tens} \\
   8 + 7 &= 15 \quad \text{Add the ones} \\
   120 + 15 &= 135
   \end{align*}
   \]

4. Ask students if they think this is an easier or harder way to add 48 and 87. Discuss why.

5. Have students adopt the Tens and Ones Strategy by practicing it on the following problems:

   \[
   \begin{align*}
   37 + 49 &= \\
   88 + 21 &= \\
   95 + 36 &= \\
   57 + 44 &= \\
   63 + 74 &=
   \end{align*}
   \]

6. Ask students how this strategy could also work when you are subtracting two digit numbers.

7. Ask students how this strategy could also work when you are adding and subtracting three digit numbers.

8. **Journal Prompt:** Make up any addition problem using two numbers that each have two digits and explain to a friend how to use the Tens and Ones strategy to add these numbers.

   Note: Continue to practice this strategy in future lessons.
### Friendly Numbers

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation: The student is expected to model addition and subtraction using pictures, words, and numbers. (3.3A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(None)</td>
<td></td>
</tr>
</tbody>
</table>

#### Activity:

Today you will practice using “friendly” numbers to make it easier to add and subtract.

1. Introduce the idea of using friendly numbers in addition and subtraction with the following problem.

   \[
   73 + 98 =
   \]

2. The teacher explains that these numbers can be made easier to work with by using "friendly" numbers. I can think of 73 as being close to 75 and 98 as being close to 100. Then I can add 75 + 100 = 175. Then I have to take away the 2 that I added to 73 to get to the friendly number 75, and I also have to take away the 2 that I added to 98 to get to 100. 175 – 2 = 173 and 173 – 2 = 171.

3. Ask students if they think that made the problem easier to do.

4. Students will adopt this strategy by using it on the following problems:

   \[
   89 + 48 \quad 76 + 39 \quad 68 + 36 \quad 31 + 92 \quad 42 + 87
   \]

5. Ask students how they think this strategy could work for subtraction.

6. Ask students how they think this strategy could work for three digit numbers.

7. Journal Prompt: Explain what you have learned about "friendly" numbers.

Note: Continue to practice this strategy in future lessons.

#### Vocabulary

- Strategy

#### Warm-up

**My Product Is 36**

- What could be my factors?
## Hidden Spins

### Materials

**For teacher**
- Spinner
- Paper clip for spinner

**Per pair**
- Spinner
- Paper clip for spinner

### TEKS Student Expectation:
The student is expected to model addition and subtraction using pictures, words, and numbers. (3.3A)

### Activity:
Today you will play a game to practice adding and subtracting.

1. Teacher spins the spinner and asks a student to call out a number between 10 and 20. Next, teacher performs the indicated operation, and announces the answer. (For example, if the spinner landed on "add 6" and the student's number was 11, the teacher would say 17.)
   - Students give other starting numbers. Teacher applies the same rule and announces the answer.

2. Teacher says:
   - Now you're ready to play “Hidden Spins”.
   - I will spin the spinner. But, this time I'm going to hide the spinner. Your job is to figure out what my spinner landed on. (Spin the spinner.)
   - Give me numbers between 10 and 20.

3. After each number is given, perform the hidden operation, announce the answer, and record the data on a chart like this:

<table>
<thead>
<tr>
<th>Starting Number</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>18</td>
<td>12</td>
</tr>
</tbody>
</table>

You can see that the spinner landed on subtract 6.

4. Students play “Hidden Spins” with partners. Have students make T-charts and fill them in as they play each game.

5. Journal Prompt: Explain your strategy for figuring out what the hidden operation is.

### Vocabulary
- Operation
- Add
- Subtract

### Warm-up
**Spotlight Number 36**
- Can you make this number by adding 2 numbers?
- By multiplying 2 numbers?
- By subtracting 2 numbers?

Adapted from NCTM, *Navigating Through Algebra*
Place a paper clip in the center of the spinner and hold it in place with an upright pencil. Flick the other end of the paper clip to spin.
### Number Sentence Match

#### Materials
- 1 set Number Sentence Match Cards, cut apart

#### TEKS Student Expectation:
The student is expected to model addition and subtraction using pictures, words, and numbers. (3.3A)

#### Activity:
Today you will match problems with number sentences that can be used to solve them.

1. Give each pair of students a set of matching cards. Have them match the number sentence to the problem.
2. Have students discuss the strategies they use for making the matches.
3. If time permits, students could solve the number sentences.

#### Answers:
1. E
2. F
3. D
4. G
5. A
6. B
7. C

4. Journal Prompt: Pick one of the problems and explain why you picked the number sentence to match it.

#### Vocabulary
- Addition
- Subtraction
- Number sentence

#### Warm-up
**Two At a Time**

\[ \triangle + \square = 9 \]
\[ \triangle - \square = 1 \]

**Answer:**
\[ \triangle = 5 \]
\[ \square = 4 \]
Number Sentence Match Cards

1. There are 550 students in our school. One Monday, four hundred twenty-five students bought lunch at school. How many students brought their lunch from home that day?

A \[28 + 17 = \square\]

2. Tim is a lifeguard at the pool. He counted 17 swimmers going down the slide in 20 minutes. The next time he watched the slide for 20 minutes, there were 28 swimmers. How many more swimmers went down the slide the second time?

B \[497 - 342 = \square\]

3. Alison talked on her cell phone for 342 minutes during the month of November. She shares a phone plan with her sister, Carly. Carly talked on her phone for 497 minutes. What was the amount of minutes the sisters talked during November?

C \[425 + 550 = \square\]

4. The school store started the year with 550 folders. After the first week of school the store had 425 folders. How many folders were sold that first week?

D \[342 + 497 = \square\]

5. Mrs. Smith and Mr. Jones taught 4th grade. Their classes had PE together. Mrs. Smith had 28 students in her class and Mr. Jones had 17 students in his class. How many students were in the PE class?

E \[550 - 425 = \square\]

6. In our school 497 students play on a sports team. Three hundred forty-two students play two or more different sports. How many students only play one sport?

F \[28 - 17 = \square\]

7. The PTA was planning for red ribbon week. They had 425 ribbons left from last year and ordered five hundred fifty more. How many ribbons will they have when the new order arrives?

G \[550 - \square = 425\]

Number, Operation and Quantitative Reasoning 9/17/2011 Page 2 of 2
### Materials
- 1 pack of pencils
- 1 pair of scissors
- 2 packs of crayons
- 2 packs of markers
- 2 books
- 4 glue bottles

### TEKS Student Expectation:
The student is expected to model addition and subtraction using pictures, words, and numbers. (3.3A)

### Activity:
Today we’re going to shop for school supplies. Let’s take an imaginary trip to your favorite store.

1. Teacher shows one pack of pencils and a pair of scissors and teacher says:
   - The pencils and the scissors together cost $9. (Record $9.)
   - The scissors cost $6. (Record $6.)
   - How much do the pencils cost? ($3)
   - How did you work the problem?
   - Did anyone work it differently?

2. Teacher shows two packs of crayons and a glue bottle and says:
   - All of these cost $14.
   - The glue cost $4.
   - How much does one pack of crayons cost? ($5)
   - How did you work the problem?
   - Did anyone work it differently?

3. Teacher shows 1 pack of markers and 1 book and says:
   - One pack of markers and one book cost $11.
   - Do you know how much the markers cost? (No)
   - What are the possible prices of the markers and the books? ($6 and $5, $7 and $4, $8 and $3, $9 and $2, $10 and $1)
   - What additional information would you need to figure it out?

4. Teacher shows two packs of markers and says:
   - Two packs of markers cost $12.
   - Do you know how much one pack of markers costs? (yes, $6)
   - How did you figure that out? (half of 12 is 6)
   - Now can you figure out how much the book costs? ($5)
   - Explain how you figured that out.

5. Teacher says:
   - Well, business has been kind of slow lately. So, the store is having a sale. Here are the new prices:
     - 2 glue bottles cost $6.
     - 1 glue bottle and one pair of scissors cost $8.
     - 1 glue bottle and 2 books cost $11.
<table>
<thead>
<tr>
<th>6.</th>
<th>Allow time for the students to figure out the sale cost for:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 glue bottle, 1 pair of scissors, and 1 book</td>
</tr>
<tr>
<td>7.</td>
<td>Journal Prompt: Make up a school supply problem of your own.</td>
</tr>
</tbody>
</table>
### The 3-Digit Roll

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For group</td>
<td>The student is expected to select addition or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Activity: Today we are going to play a game called &quot;The 3-Digit Roll&quot; where we will try to get sums as close as possible to 999.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Digit</td>
<td>1. Teacher makes up any three-digit number, for example, 431 and writes it on a piece of paper.</td>
</tr>
<tr>
<td>• Sum</td>
<td>2. Then have one of the students rolls three dice.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>3. Teacher records the digits that came up on the dice and asks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower Power</td>
<td>• What 3-digit numbers can we make from the digits rolled?</td>
</tr>
<tr>
<td>62</td>
<td>• Record all possible 3-digit numbers, using the digits rolled. (For example, if 2, 5, and 7 were rolled, you could write 257, 275, 527, 572, 725, and 752.)</td>
</tr>
<tr>
<td></td>
<td>• Now we are going to add one of these 3-digit numbers to our starting number (431). I want the sum to be as close as possible to 999, but not greater than 999.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>4. Try different combinations that students suggest until everyone is satisfied they have the combination that gives the sum closest to 999.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower Power</td>
<td>5. Repeat the activity with a new starting number. After the students have done the activity at least twice, begin to discuss strategies.</td>
</tr>
<tr>
<td>62</td>
<td>6. This activity could also be done with subtraction. The goal number could be as close as possible to 100.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>7. Journal Prompt: Write the strategies you used to choose to pick the 3-digit number that would give you the sum closest to 999.</th>
</tr>
</thead>
</table>
### Shop ‘Til You Drop

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td>The student is expected to select addition and/or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How much more</td>
<td></td>
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<tr>
<td>Total Cost</td>
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<tr>
<td>Dozen</td>
<td></td>
</tr>
<tr>
<td>Half a Dozen</td>
<td></td>
</tr>
<tr>
<td>Exactly</td>
<td></td>
</tr>
</tbody>
</table>

#### Activity:

Today we will go on a shopping trip. We will use mathematics as we buy things we want.

1. Teacher shows the School Store price list and asks questions such as:
   - How much do 2 rulers cost?
   - How much do 4 pencils cost?
   - How much more do the 2 rulers cost than the 4 pencils?
   - What's the total cost for a sharpener and a magnet?
   - What questions could you ask from the price list?

2. Teacher shows Grocery Store price list and asks questions such as:
   - How much do 24 eggs cost?
   - How much do 2 pies and 3 gallons of milk cost?
   - If I had $10 and I bought a gallon of milk, a dozen eggs and a pie, would I have enough money to buy an ice cream cone?
   - What questions could you ask from the price list?

3. Teacher shows Variety Store price list and says:
   - Now, we are going to go on an imaginary shopping spree. I will give each of you $100 to spend. Let’s see if we can come up with more than half a dozen different ways to spend exactly $100.


5. Have students share the problems they wrote.

---

**Warm-up Function Machine**

add 4
Shop ‘Til You Drop Price List

School Store

Rulers ........................................... 4 for $4.00
Pencils ........................................ 23¢
Sharpeners ..................................... 69¢
Magnets ....................................... 37¢

Grocery Store

One dozen eggs ......................... $2
Pie ................................................ $4
Gallon of milk ............................... $3
Ice cream cone ......................... $2

Variety Store

Baseball glove ......................... $35
Teapot ........................................ $23
Magnifying glass ....................... $12
Ruler ......................................... $1
Watch ......................................... $37
Drum .......................................... $65
Clock ......................................... $9
Keychain ................................... $2
Flashlight ................................. $8
### Materials
- Die
- Seven Rolls sheet

### TEKS Student Expectation:
The student is expected to select addition or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)

### Activity:
Today we will play a strategy game where we will use what we know about place value and subtraction.

1. Teacher models the game by playing a game against the students:
   - Each player starts with 100. (See Seven Rolls score sheet.)
   - Players take turns rolling a die.
   - Each time you roll, you decide whether to use the number rolled as a ten or as a one. For example, a 5 can be a 50 or a five.
   - Each time you subtract the number you choose from the previous difference.
   - The player closer to 0 **after** the 7th roll is the winner. However, if a player reaches 0 **before** the 7th roll, the game is over and the other player wins.

2. After everyone understands the rules, students play the game with partners.

3. After playing this game several times, students discuss the strategies used.

4. Journal Prompt: Write your strategy for winning the game.

### Vocabulary
- Subtract
- Difference

### Warm-up
**Life Saver Math**
subtract 8
### Seven Rolls

<table>
<thead>
<tr>
<th></th>
<th>Player 1</th>
<th>Player 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1(^{st}) Roll</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2(^{nd}) Roll</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3(^{rd}) Roll</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4(^{th}) Roll</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5(^{th}) Roll</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6(^{th}) Roll</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7th Roll</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It’s the Greatest

Materials
For teacher
• Die

TEKS Student Expectation:
The student is expected to select addition or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)

Activity: Today we will play a strategy game that asks you to make sums and differences.

1. Teacher instructs students to create a problem grid like the one below:

    _____  _____  _____

    +  _____  _____  _____

    _____________________

2. Teacher explains the rules:
   • I will roll a die six times.
   • After each roll you will each place the number rolled in any empty place on your problem grid.
   • Once a digit has been placed it can not be moved.
   • Once all six digits have been placed, find the sum.
   • The goal is to get the greatest possible sum.

3. Play the game several times.

4. Discuss different strategies students used to win the game.

Variations:
• Least possible sum
• Greatest possible difference
• Least possible difference

5. Journal Prompt: Write the tips you would give to a friend for winning the game for the greatest possible sum.

Vocabulary
• Sum
• Difference
• Greatest
• Least

Warm-up
More or Less
224,385
• What is 200,000 more?
• What is 1,000 less?
## Road Trip

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For teacher</td>
<td>The student is expected to select addition or subtraction and use the operation to solve</td>
</tr>
<tr>
<td></td>
<td>problems involving whole numbers through 999. (3.3B)</td>
</tr>
</tbody>
</table>

### Vocabulary
- Distance
- Greater/less than

### Warm-up
**My Product Is**
12

### Adapted from
NCTM, *Navigating Through Algebra*

### Activity:
Today we are going to use addition and subtraction to help us figure distances on trips.

1. Teacher asks:
   - Do you or your parents ever use a map when you go on a trip?
   - What does a map tell you?
   - Where or what places can you use a map besides a long trip? (the zoo, the mall, Six Flags)

2. Teacher shows trip #1 and says:
   - We will be using road maps to help us figure out distances.
   - What cities do you see on this map? (Saginaw, Fort Worth, Joshua)
   - The distance from Saginaw to Fort Worth is 8 miles. (Record the distance on the map.)
   - I don’t know the distance from Fort Worth to Joshua. But, I do know that the total distance from Saginaw to Joshua is 30 miles. (Record the distance on the map.)
   - Is the distance from Fort Worth to Joshua greater than or less than the distance from Saginaw to Fort Worth? (greater)
   - How do you know? (The line segment is longer.)
   - So, how can we figure out the distance from Fort Worth to Joshua? (30 – 8 = 22)

3. Teacher shows trip #2. (On this map, Cleburne has been added between Fort Worth and Joshua.) Teacher says:
   - What cities do you see on this map? (Saginaw, Fort Worth, Cleburne, Joshua)
   - We know that the distance from Saginaw to Fort Worth is 8 miles. (Record on the map.) I also know that the distance from Cleburne to Joshua is 5 miles. (Record on the map.)
   - What else can we record on the map? (The distance from Saginaw to Joshua is 30 miles.)
   - How can we figure out the distance from Fort Worth to Cleburne? (8 + 5 = 13, 30 – 13 = 17)

4. Teacher shows trip #3. The students show the teacher how to figure out the distance from Brentwood to Edgar and the distance from Center City to Saugus.

5. Journal Prompt: Write a question you could solve using the trip maps.
Road Trip

Trip #1
- Saginaw
- Fort Worth
- Joshua

Trip #2
- Saginaw
- Fort Worth
- Cleburne
- Joshua

Trip #3
- Brentwood
- Edgar
- Center City
- Saugus
- Delver

- 15 miles
- 6 miles
- 18 miles
- 8 miles
<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per pair</td>
<td>Select addition or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Activity: Today we will sort problems by deciding whether we would use addition or subtraction to solve the problem.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Teacher reads a simple problem: Adam had 5 pieces of gum. He gave 2 pieces to Mary. How many pieces of gum does Adam have now?</td>
</tr>
<tr>
<td></td>
<td>2. Teacher models a thinking aloud strategy by asking the following questions:</td>
</tr>
<tr>
<td></td>
<td>• How many pieces of gum did Adam have to start with? (Record the answer.)</td>
</tr>
<tr>
<td></td>
<td>• Did a change or action take place? If so, what happened? (Adam gave 2 pieces of gum away.)</td>
</tr>
<tr>
<td></td>
<td>• What operation do I use to change a set by taking something away? (Subtraction)</td>
</tr>
<tr>
<td></td>
<td>• What number sentence can I write to represent that action? (5 - 2 = 3)</td>
</tr>
<tr>
<td></td>
<td>3. Teacher asks if this think aloud strategy will also work for two- and three-digit numbers. (Model the following problems using the same think aloud strategy with two and three digit numbers.)</td>
</tr>
<tr>
<td></td>
<td>• Mark found 23 rocks for his collection. He took 15 rocks to school to show his class. How many rocks does he have at home?</td>
</tr>
<tr>
<td></td>
<td>• Sara baked 248 cookies for the school carnival. She sold some of the cookies and now she has 79 cookies. How many cookies did she sell?</td>
</tr>
<tr>
<td></td>
<td>4. Give problem set cards to each pair of students. Explain to students that they need to read each problem and discuss what operation should be used to solve the problem. Ask students to sort each problem by whether they would solve it using addition or subtraction. They do not need to solve the problems at this time; the focus is on choosing the operation.</td>
</tr>
<tr>
<td></td>
<td>5. Have students compare how they sorted problems. Discuss any differences of opinion.</td>
</tr>
<tr>
<td></td>
<td>6. If time permits, have students solve the problems.</td>
</tr>
<tr>
<td></td>
<td>7. Journal Prompt: What think aloud questions did you use for addition and subtraction?</td>
</tr>
</tbody>
</table>

Warm-up

Function Machine
add 8
### What’s the Operation? Part 1 – Problem Cards

<table>
<thead>
<tr>
<th>Problem</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>David is building a racecar for the Boy Scout Derby Day competition.</td>
<td>The doors in the hallway at Tate Elementary are very heavy.</td>
</tr>
<tr>
<td>He has 138 tools in his tool chest. His parents give him 94 new tools</td>
<td>Students have trouble opening them. The custodian has 229</td>
</tr>
<tr>
<td>to help him build a really fast derby car. How many tools does David</td>
<td>wooden wedges to place under the hallway doors. How many more</td>
</tr>
<tr>
<td>have now?</td>
<td>does he need to have 353 wedges so that all the doors can remain</td>
</tr>
<tr>
<td></td>
<td>propped open?</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramon was organizing the tools in his dad’s garage. He found some</td>
<td>Third grade was building simple machines. Cassandra brought 27 tools</td>
</tr>
<tr>
<td>screws in a cabinet. His dad found 448 more in a drawer. He gave the</td>
<td>so that she could work on her project at school. She let Mallory</td>
</tr>
<tr>
<td>screws to David to put with the others. Now he has 676 screws. How</td>
<td>borrow 19 of her tools. How many tools does Cassandra have now?</td>
</tr>
<tr>
<td>many screws did he find in the cabinet to begin with?</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Michael was building a simple machine. He kept it a secret because</td>
<td>Mrs. Ratcliff had some simple machines on display in her classroom</td>
</tr>
<tr>
<td>he wanted everyone to be surprised. He had 133 wheels. He gave some</td>
<td>for parent night. She gave 112 of the simple machines to the librarian</td>
</tr>
<tr>
<td>to Anthony. Now he has 117 wheels left. How many wheels did he give to</td>
<td>to put on display for the whole school. Now she has 83 left in her</td>
</tr>
<tr>
<td>Anthony?</td>
<td>classroom. How many simple machines did Mrs. Ratcliff have in her</td>
</tr>
<tr>
<td></td>
<td>classroom to begin with?</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>The class had some goldfish in their aquarium. Mrs. Smith bought</td>
<td>David has 129 bugs in his collection. He took 65 bugs to school to</td>
</tr>
<tr>
<td>12 more fish for the aquarium. Now there are 43 fish. How many fish</td>
<td>show his friends. How many bugs did he leave at home?</td>
</tr>
<tr>
<td>did they have to start with?</td>
<td></td>
</tr>
<tr>
<td>There are 197 third grade students at Howard Elementary. During the year 28 students moved. How many students are still at Howard Elementary?</td>
<td>The pet store has 75 frogs in a tank. During the week some of the frogs were sold. Now there are 58 frogs left in the tank. How many frogs were sold?</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Katie has 126 trophies from gymnastics competitions. She has a goal of earning 150 trophies. How many more trophies does she need to reach her goal?</td>
<td>Mr. Johnson ordered some ribbons to award at the school assembly. He gave out 549 ribbons and now he has 268 left. How many ribbons did he order to start with?</td>
</tr>
<tr>
<td>The cafeteria baked 287 cookies for lunch. Students bought 58 of the cookies. How many cookies did the cafeteria have left?</td>
<td>Maggie found 151 rocks for her collection on her trip to Colorado. Her mother said she could only take 48 home on the airplane. How many rocks will she have to leave behind?</td>
</tr>
</tbody>
</table>
### What’s the Operation? Part 2

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair</td>
<td>Select addition or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Activity: Today you will sort problems that do not include an action and decide whether to add or subtract to solve the problem.</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Operation</td>
<td></td>
</tr>
<tr>
<td>- Compare</td>
<td></td>
</tr>
<tr>
<td>- Equation</td>
<td></td>
</tr>
<tr>
<td>- Addition</td>
<td></td>
</tr>
<tr>
<td>- Subtraction</td>
<td></td>
</tr>
</tbody>
</table>

#### Warm-up

**My Product Is**

40. What could be my factors?

#### TEKS Student Expectation:

Select addition or subtraction and use the operation to solve problems involving whole numbers through 999. (3.3B)

#### Activity: Today you will sort problems that do not include an action and decide whether to add or subtract to solve the problem.

1. Teacher reads a simple problem.
   - Matt had 8 markers. David had 5 markers. How many more markers did Matt have than David?

2. Teacher models a thinking aloud strategy by asking the following questions:
   - What am I comparing in this problem? (The number of markers.)
   - What do I know about the number of markers? (Matt has 8 and David has 5.)
   - What question am I trying to answer? (How many more markers Matt has than David.)
   - What operation can I use to make this comparison? (Subtraction or addition - If I subtract I can solve the equation 8 - 5 = \(\_\), and If I add I can solve the equation 5 + \(\_\) = 8.)

3. Read another simple problem.
   - There are 9 students inside during recess. 4 of the students are finishing homework and the rest are making up a test. How many students are making up a test?

4. Model a thinking aloud strategy by asking the following questions:
   - What are the two different things students are doing inside during recess? (4 students are finishing homework, some students are making up a test.)
   - Does this problem have a total? (9 students)
   - What is the unknown part? (Number of students making up a test)
   - What is the known part? (4 students finishing homework)
   - What operation can I use to solve this problem? (addition or subtraction)
     \[
     9 = 4 + \_ \\
     9 - 4 = \_ 
     \]
5. Teacher asks if this think aloud strategy will also work for two- and three-digit numbers. (Model the following problems using the same think aloud strategy with two and three digit numbers.)

- There are 157 third grade students at Lee Elementary. 68 are boys and the rest are girls. How many are girls?
- Third grade collected 258 pounds of aluminum cans for the recycling center. They collected 47 more pounds than second grade. How many pounds did second grade collect?

6. Give problem set cards to each pair of students. Explain to students that they need to read each problem and discuss what operation they would use to solve the problem. Ask students to sort each problem by whether they would add or subtract to solve it.

7. Have students compare how they sorted problems. Discuss any differences of opinion.

8. If time permits have students solve the problems.

9. Journal Prompt: Select a problem that you and another student chose different operations for and explain each method.
### What's the Operation? Part 2 – Problem Cards

<table>
<thead>
<tr>
<th>Problem</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The buses traveling to the Zoo Field Trip held 115 students. 78 students were on the first bus and the rest of the students were on the second bus. How many students were on the second bus?</strong></td>
<td><strong>Miller Elementary had 374 students participate in the Science Fair. Aldridge Elementary had 412 students participate in the Science Fair. How many students participated in the Science Fair at both schools?</strong></td>
</tr>
<tr>
<td><strong>The baby elephant weighed 458 pounds. The baby rhino weighed 167 pounds more than the elephant. How much did the baby rhino weigh?</strong></td>
<td><strong>Matt loaded 212 boxes on the moving van. 147 of the boxes contained breakable items and the rest were unbreakable. How many boxes contained unbreakable items?</strong></td>
</tr>
<tr>
<td><strong>The acrobat at the circus was 125 feet in the air. He was 79 feet higher than the trapeze artist. How high was the trapeze artist?</strong></td>
<td><strong>There were 450 seats at the IMAX Theater. 286 seats were occupied and the rest were empty. How many seats were empty?</strong></td>
</tr>
<tr>
<td><strong>Cameron had a score of 843 on the video game. Gary had a score of 717. How many more points did Cameron score than Gary?</strong></td>
<td><strong>There were 573 cars for sale at the Toyota dealership at the first of July. At the end of July there were 309 cars for sale. How many cars were sold during July?</strong></td>
</tr>
<tr>
<td>The school choir toured all over the district performing. They sang 205 songs at elementary schools and 138 songs at middle schools. How many songs did they sing at schools?</td>
<td>Kathy did 315 minutes of homework. She did 78 more minutes of homework than Tammy. How many minutes of homework did Tammy do?</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>The Outdoor Learning Center takes care of 202 animals. The city pound takes care of 462 animals. How many more animals does the pound take care of than the Outdoor Learning Center?</td>
<td>The school nurse treated 318 students during September. She treated 85 more students in October than she did in September. How many students did she treat in October?</td>
</tr>
<tr>
<td>The pencil machine holds 530 pencils. 250 of the pencils are decorated and the rest are plain. How many pencils are plain?</td>
<td>The bank downtown employs 545 people. 399 of the employees are men and the rest are women. How many employees are women?</td>
</tr>
</tbody>
</table>
## Factor War

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation: The student is expected to learn and apply multiplication facts through tens using concrete models. (3.4A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per pair</td>
<td></td>
</tr>
<tr>
<td>• Deck of playing cards</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** Today we will play a game similar to the game of War. However, we will compare products rather than just the numbers on the cards.

**Note:** You can manipulate the facts being practiced by the cards you choose to leave in the deck.

- Ace = 1
- Number cards = card values
- Face cards = 10

You might want to remove face cards so you don't have lots of practice on tens.

1. Students play with a partner. Student 1 deals all of the cards face down (half to student 2 and half to himself).

2. Each student turns over the first two cards in his or her stack, these are the factors, and multiplies the two values. They take turns announcing their products by saying, for example, "The product of 7 and 8 is 56." You should also reinforce the vocabulary that 7 and 8 are factors.

3. The student with the higher product wins all four cards.

4. If the products are the same, the students repeat step 2 and the winner keeps all eight cards. Step 2 is repeated every time there is a tie, and the student who finally gets the higher product keeps all the cards that have been turned over.

5. **Journal Prompt:** Write to explain why 3 X 5 beats 3 X 4.

### Vocabulary
- **Product**
- **Factor**

### Warm-up
**Spotlight Number 48**
- Can you make it by adding 2 numbers?
- Can you make it by multiplying 2 numbers?
- Can you make it by subtracting 2 numbers?
### Circles and X’s

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For group</td>
<td>The student is expected to solve and record multiplication problems (one-digit multiplier). (3.4B)</td>
</tr>
<tr>
<td>Per pair</td>
<td>Activity: Today we will play a game called Circles and X’s. We will make a book to record the game.</td>
</tr>
<tr>
<td>Per student</td>
<td>1. Teacher shows students how to fold a plain piece of paper into fourths, cut them apart, stack them on top of each other and staple them together to form an eight-page booklet. (Use fronts and backs.)</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>2. On the front of the booklet, students write “Circles and X’s” and their names. The remaining 7 sheets of the booklet will be used for playing the game with a partner.</td>
</tr>
<tr>
<td></td>
<td>3. The teacher and one student model how to play the game on the board:</td>
</tr>
<tr>
<td></td>
<td>• Teacher rolls a die, reports the number that comes up, and draws that number of circles on the board, pointing out that the circles need to be large enough to draw X’s inside of them later.</td>
</tr>
<tr>
<td></td>
<td>• Teacher rolls the die again, reports that number, and draws that number of X’s in each of the circles.</td>
</tr>
<tr>
<td></td>
<td>• Student repeats the above procedure rolling the die and drawing corresponding circles and rolling the die a second time to draw that number of X’s inside each circle.</td>
</tr>
<tr>
<td></td>
<td>• Teacher asks the class to figure out how many X’s each person drew and writes the total number of X’s underneath each person’s drawing on the board.</td>
</tr>
<tr>
<td></td>
<td>4. Teacher says:</td>
</tr>
<tr>
<td></td>
<td>• Play 7 rounds of this game with a partner. Illustrate each round on a separate page of your booklet using all 7 remaining pages.</td>
</tr>
<tr>
<td></td>
<td>• You can see who wins each round by comparing how many X’s each player draws, but the winner of the entire game is the person who has more X’s after 7 rounds.</td>
</tr>
<tr>
<td></td>
<td>• At the end of 7 rounds figure out your total number of X’s and record it on the cover of your booklet.</td>
</tr>
<tr>
<td></td>
<td>5. When everyone completes the game, the teacher shows the students how to record repeated addition and multiplication sentences on each page of their booklets.</td>
</tr>
<tr>
<td></td>
<td>6. Teacher draws on the board a sample page of four circles with two X’s in each.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up Two at a Time</th>
<th>Adapted from Marilyn Burns, <em>Math by All Means</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>△ + △ = 6</td>
<td>Answer: △ = 3, □ = 8</td>
</tr>
<tr>
<td>□ - △ = 5</td>
<td></td>
</tr>
</tbody>
</table>
7. Underneath the drawing, teacher writes and reads aloud the different ways this problem can be recorded:
   - $2 + 2 + 2 + 2 = 8$
   - 4 groups of 2 equals 8
   - $4 \times 2 = 8$

8. Journal Prompt: Write three mathematical sentences to represent the picture drawn on each page of your booklet.
<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For teacher</td>
<td>The student is expected to solve and record multiplication problems (one-digit multiplier). (3.4B)</td>
</tr>
<tr>
<td>• Chart paper divided into 8 parts with the headings 2’s, 3’s, 4’s, …9’s</td>
<td>Activity: Today we are going to think about things that come in groups.</td>
</tr>
<tr>
<td>For group</td>
<td></td>
</tr>
<tr>
<td>• Cubes or counters</td>
<td>1. Teacher says:</td>
</tr>
<tr>
<td>Per student</td>
<td>• Many items come in groups. Some products we buy at the store are packaged with the same number of items. School supplies (crayons, markers) and some foods (eggs, soft drinks) often come in groups. Many things in nature (petals on a flower, legs on a dog) happen in certain numbers.</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>• What things can you think of that come in groups?</td>
</tr>
<tr>
<td>• Multiplication</td>
<td>2. Students brainstorm lists of things that come in 2’s, 3’s, 4’s, 5’s, 6’s, 7’s, 8’s, and 9’s. Teacher records a few of the students’ ideas under each number on the chart paper.</td>
</tr>
<tr>
<td>Warm-up</td>
<td>3. To make students aware of multiplication problem solving situations, the teacher asks a few questions based on the student-generated lists. For example:</td>
</tr>
<tr>
<td>Fact of the Day</td>
<td>• We know that there are 4 legs on a dog. How many legs do 6 dogs have?</td>
</tr>
<tr>
<td>3 X 7</td>
<td>• There are 7 days in a week. How many days are in 4 weeks?</td>
</tr>
<tr>
<td></td>
<td>• Have students offer several more suggestions.</td>
</tr>
<tr>
<td></td>
<td>4. Students write a multiplication question on one side of a sheet of paper and solve it on the back of the sheet.</td>
</tr>
<tr>
<td></td>
<td>5. When finished, students trade their questions with a partner and solve by writing the solution below their partner’s problem.</td>
</tr>
<tr>
<td></td>
<td>6. Partners explain their work to each other.</td>
</tr>
<tr>
<td></td>
<td>7. Teacher brings students back together and asks several volunteers to share their questions.</td>
</tr>
<tr>
<td></td>
<td>8. Teacher asks:</td>
</tr>
<tr>
<td></td>
<td>• How did you solve your problem?</td>
</tr>
<tr>
<td></td>
<td>• What did all of the problems have in common?</td>
</tr>
<tr>
<td></td>
<td>9. Journal Prompt: Write and solve one more multiplication problem from the examples on the chart.</td>
</tr>
<tr>
<td></td>
<td>Note: Save the chart for Picturing Multiplication, Part 2.</td>
</tr>
</tbody>
</table>
| Materials | TEKS Student Expectation:  
The student is expected to solve and record multiplication problems (one-digit multiplier). (3.4B) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For teacher</td>
<td>Activity: Today we are going to use our &quot;Picturing Multiplication&quot; chart and write some multiplication number sentences.</td>
</tr>
<tr>
<td>Per student</td>
<td>1. Have each student pick a number (2 – 9) from the &quot;Picturing Multiplication&quot; chart.</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>2. Students fold their paper in half. Referring to the posted list of things that come in groups, each student chooses one item from his/her posted number list and illustrates a few groups of that item on half of the page.</td>
</tr>
<tr>
<td>Warm-up</td>
<td>3. To clarify directions, teacher gives the following example and models it. Teacher says:</td>
</tr>
<tr>
<td>Flower Power</td>
<td>4. Students draw their pictures clearly enough for the items in each group to be counted.</td>
</tr>
<tr>
<td>96</td>
<td>5. Students write brief sentences describing the groups and the total number of items represented in their picture. For example:</td>
</tr>
<tr>
<td></td>
<td>Here are 6 people. Each person has 2 eyes. There are 12 eyes in all.</td>
</tr>
</tbody>
</table>
|      | 6. Teacher says:  
|      | • We can describe the problems in your pictures using addition. For example, 6 people have 2+2+2+2+2+2=12 eyes. (Teacher writes addition problem.)  
|      | • We can also write 6 groups of 2 as a multiplication sentence: 6 x 2 = 12.  
|      | Here are 6 people. Each person has 2 eyes. There are 12 eyes in all. |
|      | 7. Write the two kinds of number sentences for your problem. |

Materials
- "Picturing Multiplication" chart from Part 1
- Colored pencils, markers, or crayons
- Plain paper

Vocabulary
- Number sentence
- Repeated addition
- Multiplication

Warm-up
Flower Power 96
8. Students share their work.

9. Repeat the process on the other half of your paper.

10. Discuss and then assign part three as a Journal Prompt:
    - How are multiplication and addition related?
    - Does changing the order of the numbers in multiplication change the answer?
    - What does 3 x 2 really mean?
### Let’s Shop

#### Materials
- Toy Store Price List

#### TEKS Student Expectation:
The student is expected to solve and record multiplication problems (one-digit multiplier). (3.4B)

#### Activity:
Today we will make an imaginary visit to a toy store and learn about multiplying as we spend our money.

1. Post the Toy Store Price List so all students can see it.

2. Teacher tells the students that Katie is a girl who received a $30 gift certificate to a toy store for her birthday. She can spend up to $30 on any selection of the listed items.

3. In pairs, students work to find at least two different ways Katie might spend the money. For each selection, they record in the following two ways:
   - First, write a story about the choices they made.
   - Second, prepare a receipt to show how much Katie spent and how much money, if any, she has left.

4. Teacher models on the board an example of a receipt for students to use.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>Price</td>
<td></td>
<td></td>
</tr>
<tr>
<td>items</td>
<td>$3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>items</td>
<td>$4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>items</td>
<td>$5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$</td>
<td></td>
</tr>
</tbody>
</table>

(Teacher may need to explain @ symbol.)

5. To reinforce the idea that problems can have more than one solution, teacher has each partner pair share some of the different ways they found to spend exactly $30. Teacher records these solutions on the board using multiplication sentences.

6. Journal Prompt: Record one way to spend $30 at the toy store in your journal.

#### Vocabulary
- Receipt
- @

#### Warm-up
**Function Machine**
multiply by 2
# Toy Store Price List

<table>
<thead>
<tr>
<th>$3 Items</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacks</td>
<td></td>
</tr>
<tr>
<td>Bubble Making Kit</td>
<td></td>
</tr>
<tr>
<td>Smelly Stickers</td>
<td></td>
</tr>
<tr>
<td>Jump Rope</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$4 Items</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflatable Globe</td>
<td></td>
</tr>
<tr>
<td>Card Games Pack</td>
<td></td>
</tr>
<tr>
<td>Pack of Baseball Cards</td>
<td></td>
</tr>
<tr>
<td>Glow in the Dark Bouncing Ball</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$5 Items</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Basketball</td>
<td></td>
</tr>
<tr>
<td>Jigsaw Puzzle</td>
<td></td>
</tr>
<tr>
<td>Jewelry Making Kit</td>
<td></td>
</tr>
<tr>
<td>Stuffed Bear</td>
<td></td>
</tr>
</tbody>
</table>
## Multiply with Manipulatives

<table>
<thead>
<tr>
<th>Materials Per student</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 18 piece of construction paper</td>
<td>The student is expected to solve and record multiplication problems (one digit multiplier). (3.4B)</td>
</tr>
<tr>
<td>Base 10 blocks</td>
<td></td>
</tr>
</tbody>
</table>

### Vocabulary
- Units
- Longs
- Flats
- Product
- Multiplication

### Warm-up
**Lifesaver Math**
multiply by 3

### Activity: Today we are going to multiply with base ten blocks.

1. Make place value mats by folding construction paper into thirds and labeling ones, tens, and hundreds.

2. Teacher says:
   - My cookie sheet holds 14 cookies. I have 3 cookie sheets ready to put in the oven. (Write the problem 14 x 3 on the board.)

3. Teacher models and each student builds the number 14 three times with their base ten blocks on the place value mat. (Each student should have 3 groups of 14 represented on the mat.)

4. Teacher asks:
   - How many groups of 14 do you have? (3)
   - How many units do we have? (12)
   - How many longs do we have? (30)
   - How many longs do we now have? (4)
   - How many units? (2)
   - How should we regroup our units? (Exchange 10 units for 1 long, leaving 2 units remaining in the units position.)
   - How many longs do we now have? (4)
   - How many units? (2)
   - How many longs do we now have? (4)
   - How many units? (2)
   - How many longs do we now have? (4)
   (Record 40 + 2 = 42 underneath the problem.)

5. Teacher leads the students through the same process with additional problems such as:
   - There are 24 rolls in a package. How many rolls are in 3 packages?
   - There are 32 crayons in a box. How many crayons are in 2 boxes?
   - There are 18 drinks in a pack. How many drinks are in 4 packs?

6. Journal Prompt: Make up another problem that you would solve with multiplication.
### Towers, Rows, and Groups

**Materials**
- Per student
  - 12 snap cubes
  - 18 color tiles

**Vocabulary**
- Division
- Divide

**Warm-up**
More or Less
65, 878
- What is 20,000 more?
- What is 400 less?

**TEKS Student Expectation:**
The student is expected to use models to solve division problems and use number sentences to record the solutions. (3.4C)

**Activity:** Today we will work with snap cubes and color tiles to solve division problems.

**Snap Cubes:**
1. Teacher says:
   - I have twelve cupcakes and I want put them in packages of six for a bake sale. How many packages can I make? Make a train of 12 cubes to represent the 12 cupcakes.

2. Teacher asks:
   - How many towers of 6 can be made from this train?
   - How many cubes did we start with? (Teacher writes 12.)
   - How many cubes did we place in each tower? (Teacher writes $\div 6$.)
   - How many towers were we able to make? (Teacher writes $= 2$.)

3. Teacher states: This is one of the ways to record a division statement. (Students return the snap cubes to the train formation.)
   - How many packages of 3 cupcakes can be made with our snap cubes? Write the division statement for this problem. Return your snap cubes to the train formation.
   - Now I want to have 3 packages of cupcakes to sell. How many cupcakes can I put in each package? Use your cubes to solve the problem and write the division statement.

**Color Tiles**
1. Teacher says:
   - I have 18 cupcakes and I want to put them in packages of 9 for a bake sale. How many packages can I make? Make a set of 18 tiles to represent the 18 cupcakes. (Students each take 18 color tiles.)

2. Teacher asks:
   - How many sets of 9 can you make using all these tiles? Record your division statement.
   - How many sets can you make if each package has 6 cupcakes? Record your division statement.
   - Now divide the 18 cupcakes into 6 packages all the same size. How many cupcakes are in each package? Record your division statement.

3. Journal Prompt: Finish this statement "Division is…"
# What’s Left?

## Materials

Per pair
- Die
- 12 counters
- Six squares of paper (about 5” x 5”)

## TEKS Student Expectation:
The student is expected to use models to solve division problems and use number sentences to record the solutions. (3.4C)

## Activity:
Today we will play a game with partners called "What's Left?" to understand the meaning of remainders in division.

1. Student 1 rolls a die and takes that many squares of paper from the center of the playing area.
2. Student 1 divides the 12 counters among the squares equally and determines the left over (remaining) counters. For example if a 5 is rolled, the student lays out 5 squares and equally divides the counters among the squares—2 counters per square with 2 counters left over.
3. On the recording sheet, both students record the division sentence next to Student 1’s initial. (Example: BD 12 ÷ 5 = 2 R2)
4. Student 1 keeps the counters that were left over (the remainder) and returns the counters from the squares to the center playing area before the next player takes a turn.
5. Student 2 repeats steps 1 – 4 using the counters that have been returned to the center.
6. Students continue playing until all counters are gone from the center playing area, taking turns and recording the moves as in the following example:
   - BD 12 ÷ 5 = 2 R2
   - ZA 10 ÷ 3 = 3 R1
   - BD 9 ÷ 5 = 1 R4
   - ZA 5 ÷ 5 = 1 R0
   - BD 5 ÷ 6 = 0 R5
7. The student with the most counters wins.

## Vocabulary
- Remainder
- Divisor
- Quotient

## Warm-up
**My Product Is** 28
- What could be my factors?

Adapted from Marilyn Burns, *Leftovers*
8. The teacher directs students to look at their recording sheets and then asks:
   - Which of your problems had a remainder of zero? (Teacher records the responses on the board.)
   - Why is this so? (They are basic division facts.)
   - When you were playing, was there a number that was hard to “get out of”? Why do you think that happened?
   - Why would 12 be the hardest number to “get out of?”

9. Journal Prompt: Complete the following sentences together. When we played "What's Left?"…
   - the first number in the division sentence represented … (the beginning amount).
   - the second number in the division sentences represented …(the number of groups-the divisor).
   - the answer in the division sentences represented ...(how many in each group-quotient).
   - the remainder in the division sentences represented… (how many are left over).
**Round & Round We Go! (to the nearest ten)**

**Materials**
- Number line

**TEKS Student Expectation:**
The student is expected to round two-digit numbers to the nearest ten. (3.5A)

**Activity:** Today we will learn about rounding numbers to the nearest ten using a number line. It is important to know how to round because rounding can make numbers easier to think about and work with.

1. The teacher shows a number line with 0, 10, 20, 30, 40, 50.

2. Teacher says:
   - I labeled this number line with “round numbers” from 0 to 50.
   - Now, I want to put 28 on the number line. Where should I write it? (Write 28 on the number line.)
   - What 2 round numbers is 28 between? What is it closer to?
   - There is a process in math called “rounding”. When you round, you find the “round number” which a number is closer to. 28 is between 20 and 30, but it’s closer to 30. So, we round it to 30. In other words, 28 is almost/about 30.

3. Repeat these steps with other numbers such as 41, 17, 2, and 36.

4. Teacher says:
   - Where should I write 35 on my number line?
   - What 2 round numbers is 35 between? What’s it closer to? (It’s not closer to either one; it’s exactly in the middle.)
   - When a number is exactly between 2 round numbers, we round the number up. So, 35 will be rounded up to 40.

5. Repeat these steps with other numbers such as 15, 45, and 25.

6. Journal Prompt: What does it mean when we say to round a number to the nearest ten?
### Round & Round We Go AGAIN! (to the nearest hundred)

#### Materials
- Number line

#### TEKS Student Expectation:
The student is expected to round three-digit numbers to the nearest hundred. (3.5A)

#### Activity:
Today we are going to round on a number line with larger numbers. It is important to know how to round because rounding can make numbers easier to think about and work with.

1. Teacher says:
   - We’ve learned that “round numbers” are the numbers with a zero in the ones place (0, 10, 20, 30, 40, 50, etc.). When rounding any two-digit number to the nearest ten, we always look at the “rounding numbers”.
   - Today, we are going to learn how to round three-digit numbers to the hundreds place.

2. Teacher shows a number line with 0, 100, 200, 300, 400, and 500.

3. Teacher says:
   - I labeled this number line with the three-digit round numbers from 0 to 500. All of the three-digit round numbers are hundreds. They have zeroes in the tens and the ones places.
   - Now, I want to write the number 325 on the number line. Where should I write it? (Write 325 on the number line.)
   - What two round numbers is 325 between? What is it closer to?
   - 325 is between 300 and 400, but it’s closer to 300. So, we round it to 300. In other words, 325 is almost/about 300.

4. Repeat the process with other numbers such as 180, 532, 465, 157 and 268.

5. Teacher says:
   - Where should I write 250 on my number line?
   - What two round numbers is 250 between? What is it closer to? (It’s not closer to either one; it’s exactly in the middle.)
   - When a number is exactly between two round numbers, we round the number up. So, 250 gets rounded up to 300.

6. Teacher and students repeat these steps with 50, 150, 350, and 450.

7. Journal Prompt: How is rounding three digit numbers like rounding two digit numbers?

#### Vocabulary
- Round
- Almost/About
- Closer
- Between
- Exactly
- In the Middle

#### Warm-up
**Two at a Time**

- △ + □ = 6
- △ + △ = 4

**Answer:**
- △ = 2
- □ = 4
Hilly Number Lines

Materials
Per student
- Hilly Number Lines sheets
- Scissors

TEKA Student Expectation:
The student is expected to round two-digit numbers to the nearest ten and three-digit numbers to the nearest hundred. (3.5A)

Activity: Today we are going to round numbers on a hilly number line. It is important to know how to round because rounding can make numbers easier to think about and work with.

1. Have students cut out the Number Circles for 10 and 100.
2. Students place the number circle for 34 on the number lines where it belongs. (This action requires estimation and the students' placement may vary somewhat.)
3. Teacher asks the students to decide which way the circle would roll. Have the students move the circle to the bottoms of the hill.
4. Repeat with the other circles.
5. Discuss how deciding which way the circle will roll is a way of thinking about rounding.
6. Do more rounding problems:
   - Round 32 to the nearest 10. Explain your thinking.
   - Round 87 to the nearest 10. Explain your thinking.
   - Round 45 to the nearest 10. Explain your thinking.
7. Give the students copies of the Hilly Number Lines 100.
8. Repeat the process above with the Hilly Number Lines 100 and the number circles (100).
9. Do more rounding problems:
   - Round 325 to the nearest 100. Explain your thinking.
   - Round 650 to the nearest 100. Explain your thinking.
   - Round 345 to the nearest 100. Explain your thinking.
10. Journal Prompt: What happens when a number is located at the top of a hill?

Vocabulary
- Rounding

Warm-up
Fact of the Day
6 X 7
- What is a word problem that could be answered using this fact?
Number Circles 10

34  67  93  25  52  41  78  85

Number Circles 100

123  872  750  348  924  283  419  565
**What is Rounding?**

**Materials**
Per student:
- Construction paper, 2 blue half-sheets and 1 red half-sheet
- Base-ten Blocks

**TEKS Student Expectation:**
The student is expected to round two-digit numbers to the nearest ten and three-digit numbers to the nearest hundred. (3.5A)

**Activity:** Today we are going to build models with base ten blocks to help us understand rounding. It is important to know how to round because rounding can make numbers easier to think about and work with.

**Note:** Label the half-sheets of construction paper as follows:
- Blue – Lower Multiple
- Red – Between
- Blue – Higher Multiple

**Nearest Ten**
1. Teacher asks students to use the base-ten blocks to build the number 36 on the “between” sheet.
2. Then the students use the base-ten blocks to build 30 on the “lower multiple” sheet and 40 on the “higher multiple” sheet.
3. Teacher asks the students to look at the model of 36 and compare it to 30 and 40.
   - Is 36 closer to 30 or 40?
   - How do you know?
   - Discuss how you can tell which multiple of 10 the number is closer to.
     (If more than half of the ten stick is there (5 or more) then you round up to the next higher multiple of 10. If not, the number rounds down to the lower multiple of ten.)
4. Repeat the process with other numbers such as 53, 81, 38.
5. Repeat the process with other numbers in the hundreds such as 247, 153, 281, and 438. Discuss how you can tell which multiple of 100 the number is closer to. (If half or more of the hundred flat is there (50 or more) then you round up to the next multiple of 100. If not, the number rounds down to the lower multiple of 100.)
6. **Journal Prompt:** How can thinking about base ten blocks help me to round?

**Vocabulary**
- Rounding
- Estimate

**Warm-up**
**Flower Power**
55
<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td>The student is expected to estimate sums and differences beyond basic facts. (3.5B)</td>
</tr>
<tr>
<td>- Base-ten Blocks</td>
<td>Activity: Today we will use base ten blocks to practice rounding numbers to estimate</td>
</tr>
<tr>
<td>- Rounding with Base Ten Blocks worksheet</td>
<td>solutions to problems. It is important to know how to round because rounding can make</td>
</tr>
<tr>
<td></td>
<td>numbers easier to think about and work with.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Round</td>
<td>1. The students demonstrate how easy it is to count by 10s. Tell the students that these</td>
</tr>
<tr>
<td>- Estimate</td>
<td>are multiples of 10.</td>
</tr>
<tr>
<td>- Approximate</td>
<td>2. The students demonstrate how easy it is to count by 100s. Tell the students that these</td>
</tr>
<tr>
<td>- Multiple</td>
<td>are multiples of 100.</td>
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<td></td>
<td>3. The teacher asks:</td>
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<td></td>
<td>- What is 30 + 10?</td>
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<tr>
<td></td>
<td>- What is 30 + 40?</td>
</tr>
<tr>
<td></td>
<td>- What is 50 + 20?</td>
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<tr>
<td></td>
<td>- What is 300 + 300?</td>
</tr>
<tr>
<td></td>
<td>- What is 300 + 400?</td>
</tr>
<tr>
<td></td>
<td>- What is 500 + 200?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>Rounding with Two Digits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function Machine add 10</td>
<td>1. Teacher gives the following problem and the students use the base-ten blocks to act out the</td>
</tr>
<tr>
<td></td>
<td>problem.</td>
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<td></td>
<td>- Mrs. Gumphry has 35 kids in her class. On Wednesday the kindergarten class came to visit.</td>
</tr>
<tr>
<td></td>
<td>The kindergarten class has 24 kids. How many kids were in Mrs. Gumphry’s class on Wednesday?</td>
</tr>
<tr>
<td></td>
<td>2. After students find the solution to the problem, teacher discusses with the students that</td>
</tr>
<tr>
<td></td>
<td>in this problem we wanted an exact answer, but sometimes we do not care about the exact</td>
</tr>
<tr>
<td></td>
<td>answer. We just want to get close. We want an approximate answer.</td>
</tr>
<tr>
<td></td>
<td>3. Teacher gives another real-life situation and the students use the base-ten blocks to act</td>
</tr>
<tr>
<td></td>
<td>out the problem, but this time they are not concerned with the exact answer, just an</td>
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<tr>
<td></td>
<td>estimate. Students will round and build the numbers using only tens.</td>
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<tr>
<td></td>
<td>- Frank got a job this summer. He made $39 in June, $42 in July and $19 in August. ABOUT</td>
</tr>
<tr>
<td></td>
<td>how much money did Frank make this summer?</td>
</tr>
</tbody>
</table>
4. Discuss how they decided to build each number. Make sure the students understand that if there were not 5 or more ones (half or more), they would not build the number with another ten.

Rounding with three digit numbers
1. For these problems the students round and use only hundreds blocks. (Review how to round to the nearest hundred.)

   - Larry spent 123 dollars on school supplies, 259 dollars on clothing and 178 dollars on sports equipment. ABOUT how much money did he spend?

2. Complete the worksheet, Rounding with Base Ten Blocks, for additional practice.

3. Journal Prompt: Rounded numbers are easier to add or subtract with because…. 
Rounding with Base-ten Blocks

1. Betsy’s big dog weighs 89 pounds. Her small dog weighs 12 pounds. ABOUT how much more does her big dog weigh?

2. Evan read a book that had 38 pages. Then he read a book that had 42 pages. ABOUT how many pages did Evan read?

3. Use the chart to answer the questions:

<table>
<thead>
<tr>
<th>Students' Heights</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adam 59 inches</td>
</tr>
<tr>
<td>Brian 48 inches</td>
</tr>
<tr>
<td>Carlos 39 inches</td>
</tr>
<tr>
<td>Debra 62 inches</td>
</tr>
</tbody>
</table>

   About how much taller is Debra than Carlos?

   About how much does Brian need to grow to get as tall as Debra?

4. Mrs. Peters had 286 students in her school last year. This year she will have 139 additional students. ABOUT how many students will Mrs. Peters have in her school this year.

5. Mr. Bloom planted 425 plants in his garden. 109 of the plants did not grow. ABOUT how many plants grew?
### Materials
- That's SUM Estimation Cards, cut

### Vocabulary
- About
- About the same
- Rounded Numbers
- Estimate
- Data
- Approximately
- Greater than
- Less than

### Warm-up
**Lifesaver Math**
add 7

### TEKS Student Expectation:
The student is expected to estimate sums beyond basic facts. (3.5B)

### Activity: Today we are going to practice using estimation to make problems easier to solve.

1. Teacher says:
   - Some problem situations may ask you to find “about” how much or how many, instead of “exactly” how much or how many. When such a problem situation does not require an exact answer, the data given in the problem can be **rounded** to numbers that are **about the same**, but easier to add/subtract mentally or on paper.

2. Teacher shows Problem 1 from the "That's SUM Estimation" sheet and says:
   - The word “about” in the question is telling us that, for this problem, an estimate is needed.
   - What data do we have in Problem 1? (59 cents & 27 cents)
   - What rounded amount is 59 cents closer to? (60 cents)
   - What rounded amount is 27 cents closer to? (30 cents)
   - So, 60 cents & 30 cents are **about the same** as 59 cents & 27 cents. But, 60 cents & 30 cents are easier to work with because they have a zero in the one's place.
   - Should we add or subtract the 60 cents and 30 cents? Why?

3. Teacher writes the following data below Problem 1:

   \[
   59 + 27 \\
   60 + 30 = 
   \]

4. Teacher says:
   - 59 + 27 represents the actual data in the problem.
   - 60 + 30 is the math problem we will solve to estimate about how much the drink and gum cost.
   - What is 60 + 30? How did you get the answer?
   - Is 90 cents greater or less than the actual answer? (greater) How do you know? (60 & 30 are both greater than 59 & 27.)

5. Teacher shows Problem 2 and says:
   - The word approximately is a different way to say about.
   - So, we'll be using numbers “close to” the data numbers.
6. Teacher repeats the steps from Problem 1 with Problem 2. (Round the numbers, add the estimate, explain how we know that the estimate will be less than the actual answer.)

7. Students work Problem 3 independently.

1. Ronnie bought a candy bar for 59¢ and a pack of gum for 27¢. About how much did the candy bar and the gum cost?

2. Carlos and Mark collect stamps. Carlos bought a stamp for $.34 and one for $.42. Mark bought two stamps for $.53 each. Approximately how much did they spend on all the stamps?

3. Julia had 38 stickers. Her brother gave her a package of 15 new stickers for her birthday. Approximately how many stickers does Julia have now?
### Estimation Makes a DIFFERENCE

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For group</td>
<td></td>
</tr>
<tr>
<td>• Estimation Makes a Difference sheet</td>
<td></td>
</tr>
<tr>
<td>Note: Teach this lesson after &quot;That's SUM Estimation.&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** In the That's SUM Estimation lesson, we learned that some words like “about” and “approximately” mean that an estimate, rather than an exact answer, is needed. Today, we’re going to practice more with problem like this.

1. Teacher shows Problem 1 and says:
   • “Best Estimate” is another way to say “about.”
   • What data do we have in Problem 1? (57 and 83)
   • What rounded number is 57 closer to? (60)
   • What rounded number is 83 closer to? (80)
   • Should we add or subtract 60 and 80? Why?

2. Teacher writes the following data below Problem 1:
   \[
   83 - 57 \\
   80 - 60 =
   \]

3. Teacher says:
   • 83-57 represents the actual data in the problem.
   • 80 - 60 is the math problem we will solve to estimate about how much candy is left.
   • What is 80 - 60? How did you get the answer?
   • 20 is the estimated answer. Is 20 greater than or less than the actual answer?
   • This is difficult to determine because 80 is less than 83, but 60 is more than 57. So, for this problem, let’s look at a number line.

4. Teacher shows the number line and explains:
   • Since the actual answer represents a greater distance on the number line than the estimate, the estimated answer is less than the actual answer.

5. Teacher repeats the steps from Problem 1 with Problem 2. (Round the numbers, subtract the estimate; use a number line to figure out if the estimate is greater than or less than the actual answer.)

6. Students work Problem 3 independently.

1. Maria gave 57 pieces of candy to her friends. She started with 83 pieces of candy. What is the best estimate for the number of pieces of candy Maria has now?

Options:
- 50
- 60
- 70
- 80
- 90

Actual answer

Estimated answer
Estimation Makes a “DIFFERENCE”

2. Chad and Jason collect stamps. Chad has 73 stamps. Jason has 47 stamps. About how many more stamps does Chad have than Jason?

3. Mrs. Potter owns a flower shop. She used 54 mums and 65 daisies to make decorations. What is the best estimate for how many more daisies Mrs. Potter used than mums?
I Have, Who Has

Materials
For group
- I Have, Who Has cards, cut

Per student
- Recording sheet

Vocabulary
- Estimate

TEKS Student Expectation:
The student is expected to estimate sums and differences beyond basic facts. (3.5B)

Activity: Today we are going to play a game called I Have, Who Has.

1. Teacher says:
   - This game is a circular game. We will know if we played it correctly if the first person who asks a question is the last person to give the answer.
   - Although we are usually very flexible with how we round numbers to estimate, this game will not work unless we all follow the same rule. So we will always round to the leading digit. That means that if the number is in the hundreds, we will round to the nearest hundred. (389 will round to 400 not 390.) If the number has only two digits, we will round to the nearest 10.

2. Teacher passes out recording worksheets and a card to each student (If there are extra cards some students can double up on cards).

3. Teacher starts game by saying: "Who has about 592 – 87?"

4. Students estimate the sum (or difference) on recording worksheet.

5. Students check the answer with the cards. If they have the estimated answer the student says: "I have…who has ….."

6. Continue this until the answer 100 (back to the teacher).

Teacher card:

```
I have
100.
Who has about
592 – 87?
```
<table>
<thead>
<tr>
<th>I have 1500.</th>
<th>Who has about 1889 + 435?</th>
<th>I have 750.</th>
<th>Who has about 82 – 61?</th>
<th>I have 60.</th>
<th>Who has about 581 – 482?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have 200</td>
<td>Who has about 642 + 895?</td>
<td>I have 600</td>
<td>Who has about 778 – 45?</td>
<td>I have 900</td>
<td>Who has about 132 – 36?</td>
</tr>
<tr>
<td>I have 800.</td>
<td>Who has about 567 – 423?</td>
<td>I have 500</td>
<td>Who has about 432 + 234?</td>
<td>I have 240.</td>
<td>Who has about 272 + 635?</td>
</tr>
<tr>
<td>I have 280.</td>
<td>Who has about 876 – 99?</td>
<td>I have 190</td>
<td>Who has about 221 + 251?</td>
<td>I have 140</td>
<td>Who has about 37 + 225?</td>
</tr>
<tr>
<td>I have 510.</td>
<td>Who has about 78 + 188?</td>
<td>I have 1000</td>
<td>Who has about 64 + 64 + 68?</td>
<td>I have 630.</td>
<td>Who has about 184 – 62?</td>
</tr>
<tr>
<td>I have 100.</td>
<td>Who has about 592 – 87?</td>
<td>I have 1300.</td>
<td>Who has about 323 + 667?</td>
<td>I have 20.</td>
<td>Who has about 871 – 74?</td>
</tr>
</tbody>
</table>
I Have, Who Has Student Recording Sheet (Write each problem inside a rectangle.)

<p>| | | | |</p>
<table>
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</tbody>
</table>
I Have, Who Has Answer Key

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who has about 592 – 87?</td>
<td>I have 510.</td>
</tr>
<tr>
<td>Who has about 78 + 188?</td>
<td>I have 280.</td>
</tr>
<tr>
<td>Who has about 876 – 99?</td>
<td>I have 800.</td>
</tr>
<tr>
<td>Who has about 567 – 423?</td>
<td>I have 200.</td>
</tr>
<tr>
<td>Who has about 642 + 895?</td>
<td>I have 1500.</td>
</tr>
<tr>
<td>Who has about 889 + 435?</td>
<td>I have 1300.</td>
</tr>
<tr>
<td>Who has about 323 + 667?</td>
<td>I have 1000.</td>
</tr>
<tr>
<td>Who has about 64 + 64 + 68?</td>
<td>I have 190.</td>
</tr>
<tr>
<td>Who has about 221 + 251?</td>
<td>I have 500.</td>
</tr>
<tr>
<td>Who has about 432 + 234?</td>
<td>I have 600.</td>
</tr>
<tr>
<td>Who has about 778 – 45?</td>
<td>I have 750.</td>
</tr>
<tr>
<td>Who has about 82 – 61?</td>
<td>I have 20.</td>
</tr>
<tr>
<td>Who has about 871 – 74?</td>
<td>I have 830.</td>
</tr>
<tr>
<td>Who has about 184 – 62?</td>
<td>I have 140.</td>
</tr>
<tr>
<td>Who has about 37 + 225?</td>
<td>I have 240.</td>
</tr>
<tr>
<td>Who has about 272 + 635?</td>
<td>I have 900.</td>
</tr>
<tr>
<td>Who has about 132 – 36?</td>
<td>I have 60.</td>
</tr>
<tr>
<td>Who has about 581 – 482?</td>
<td>I have 100.</td>
</tr>
</tbody>
</table>
### Picture Frames

**Materials**
- For group
  - 150 red color tiles (or 3 copies of tiles on red)
  - 150 green color tiles (or 3 copies of tiles on green)

**Vocabulary**
- Geometric pattern
- Number pattern
- Table

**TEKS Student Expectation:**
The student is expected to identify and extend whole number and geometric patterns to make predictions and solve problems. (3.6A)

**Activity:** Today we will explore patterns as we create several picture frames. Patterns can be found all around us and enable us to make predictions and solve problems.

1. Teacher says:
   - Suzy Q is making picture frames. Each picture frame has a square picture in the center. Suzy uses red tiles to represent each square picture. Around the picture, she makes a frame with green tiles. The frame is always one tile wide.

2. Teacher makes:
   - Picture One with 1 red tile (1 x 1) in the middle and 8 green tiles for the frame.
   - Picture Two has 4 red tiles (2 x 2) in the middle and 12 green tiles for the frame.
   - Picture Three has 9 red tiles (3 x 3) in the middle and 16 green tiles for the frame.

3. Teacher and students fill in the information on the following table:

<table>
<thead>
<tr>
<th>Picture #</th>
<th>Red Tiles</th>
<th>Green Tiles</th>
<th>Red and Green Tiles</th>
</tr>
</thead>
</table>

4. Teacher asks:
   - What geometric patterns do you see as the pictures get larger and larger?
   - What number patterns do you find on the table?

5. Students use tiles and follow the pattern to create Picture Four (16 red tiles – 4 x 4 – and 20 green tiles).

6. Teacher asks:
   - If there are 36 red tiles, how many green tiles are there? Explain how you got your answer. (If there are 36 red tiles, then the center has to be 6 x 6. Since there are 2 more green tiles for each side of the frame, then there should be 28 green tiles.)

7. Journal Prompt: How many green tiles would you need to frame a square having 5 rows of 5 red tiles each? Explain how you got your answer.

---

**Warm-up**

**Fact of the Day**
is 7 x 8.
What is the family of facts?
What picture could we draw to represent this fact?

**Adapted from NCTM, Navigating Through Algebra**
Picture Frames (optional master for 1 by 1 tiles)

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```

## Multiplication Patterns

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Group</td>
<td>The student is expected to identify patterns in multiplication facts using concrete objects, pictorial models or technology. (3.6B)</td>
</tr>
<tr>
<td>• Tape</td>
<td></td>
</tr>
<tr>
<td>Per student</td>
<td></td>
</tr>
<tr>
<td>• 50+ counters</td>
<td></td>
</tr>
<tr>
<td>• Pattern board (Make 2 copies and tape them together to make 10 columns.)</td>
<td></td>
</tr>
<tr>
<td>• Blank cards (You can make them from the second row of the pattern board so they are the right size or use Post-it notes.)</td>
<td></td>
</tr>
</tbody>
</table>

### Activity:
Today we will explore patterns in multiplication facts. Finding patterns can help us recall our facts in a timely manner.

1. On a pattern board students use counters to build a set of 3 and write the number 3 on a blank card. Then they put another set of 3 in the next box and write the total number of counters on a new card (6)

2. The students continue adding equal sets and writing the new total.

3. When the pattern board is full, the students answer questions such as:
   - How many counters in 4 groups of 3? How do you know?
   - How many counters in 7 groups of 3? How do you know?

### Vocabulary
- Equal groups
- Pattern

<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>
</tr>
</thead>
</table>
Warm-up
Flower Power
Your number is 48.

If I have 15 counters, how many groups of 3 do I have? How do you know?

4. Students practice counting by 3’s while seeing the groups of counters and the number cards as cues.
   - The teacher turns over some of the number cards and has the students count by 3’s.
   - The teacher removes all the number cards and the student counts by 3’s with the aid of only the picture.
   - The student takes all the number cards (mixed up) and puts them in order correctly on the pattern board.
   - The student hides his/her eyes while the teacher switches two of the number cards. Then the student corrects the pattern of the cards.

5. Repeat with equal groups of 2, 4, 5, etc.

6. Journal Prompt: If there were 25 students in the classroom, how many groups of 5 students were there? How do you know?
Multiplication Patterns Board

<table>
<thead>
<tr>
<th>Place counters here</th>
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</table>

<table>
<thead>
<tr>
<th>Place number cards here</th>
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Make 2 copies and tape together to make a pattern board that has 10 columns.
**Patterning the Multiples**

**Materials**
- Per student
  - Patterning the Multiples 0 – 99 chart
  - Crayon

**Vocabulary**
- T-chart
- Multiples
- Patterns

**TEKS Student Expectation:**
The student is expected to identify patterns in multiplication facts using concrete objects, pictorial models, or technology. (3.6B)

**Activity:** Today we will explore patterns made by products of multiplication facts. Understanding these patterns helps us see relationships among numbers.

Note: You may wish to use the examples students generated in "Picturing Multiplication" in 3.4B if you have already completed that activity.

1. Teacher assigns the creation of a different T-chart to each student. Ex:
   - Wheels on a tricycle (3)
   - Wheels on a car (4)
   - Fingers on a hand (5)
   - Soft drinks in a six-pack (6)
   - Days in a week (7)
   - Legs on an octopus (8)
   - Planets in our solar system (9)
   - Years in a decade (10)
   - Players on a football team (11)
   - Months in a year (12)

2. Student constructs a T-chart with the amount of groups in the left column and the number of members in the extended group listing at least 12 multiples.

3. Student colors in the multiples from the last column of the T-chart on a 0-99 chart. Student then continues the pattern on the T-chart.

4. **Journal Prompt:** Write to describe the pattern of your multiplication fact.

5. Share your findings.

<table>
<thead>
<tr>
<th>Number of Tricycles</th>
<th>Total Number of Wheels</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
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<tr>
<td>1</td>
<td>3</td>
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<td>12</td>
<td>36</td>
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**Warm-up**

**Function Machine**

Multiply by 7.
Patterning the Multiples

My number is _______.

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<th>1</th>
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Number Patterns

TEKS Student Expectation:
The student is expected to identify patterns in multiplication facts using concrete objects, pictorial models, or technology. (3.6B)

Activity: Today we will use number lines to explore patterns when skip counting. Patterns help us recall and understand multiplication facts.

1. Teacher asks a student to count by fives and place a marker by each number counted on the number line.

2. Teacher demonstrates making jumps by 5’s on the number line from 5 to 20 and counting the jumps as you move.

3. Teacher asks:
   - How many jumps are there from 5 to 10?
   - Is there the same number of jumps from 10 to 15? 15 to 20? Etc.

4. Teacher records the skip counting pattern for five on the board and asks how the pattern can help remember facts for fives.

5. Repeat the process, counting by fours, by sevens, etc. Students make a record of each set of skip counting numbers.

6. Journal Prompt: Draw a number line and show a skip counting pattern of your own. How can skip counting help you remember your multiplication facts?

Vocabulary
- Pattern
- Skip counting
- Multiplication facts

Warm-up
Lifesaver Math
Multiply by 9.
### Silent Times

#### Materials
Per student:
- 2-3 copies Silent Times grid paper

#### Vocabulary
- Related multiplication facts

#### Warm-up
**My Product Is**
- 42
- What could be my factors?

#### TEKS Student Expectation:
To identify patterns in multiplication facts using concrete objects, pictorial models, or technology. (3.6B)

#### Activity:
Today we will explore patterns between two related multiplication facts. Seeing patterns enables us to find solutions to other problems and situations.

1. Teacher says:
   - When a star is drawn on the board, it indicates that everyone must be silent - even **me**.
   - When I write a problem on the board - because we can’t talk - use the “thumbs up” sign to indicate when you know the answer.

2. Teacher draws a star on the board.

3. Teacher then writes a multiplication fact (3 x 2) on the board for students to solve and waits silently for the thumbs to come up.

4. Teacher hands the writing implement to a student to write the answer on the board.

5. The rest of the students respond with thumbs up if they agree, thumbs down if they disagree, or thumbs sideways if they are indecisive or confused about the answer.

6. Teacher writes another problem that is related to the first fact on the board (3 x 4).

7. Steps 4 and 5 are repeated for the related fact.

8. Teacher erases the star and has the students draw the arrays for the 2 facts on centimeter grid paper.

9. Teacher asks:
   - How are the two problems related?
   - What is the same about these problems? What is different?
   - How can you use what you know from the first problem to help solve the second?

10. Teacher repeats the procedure for more difficult pairs of problems. Ex:
   - 4 x 3 and 4 x 6
   - 7 x 2 and 7 x 4 and then 7 x 8

11. Journal Prompt: Write about a pattern you learned today.

Adapted from: Marilyn Burns, *Lessons for Extending Multiplication, Gr. 4-5*
### Materials
- Area Patterns grid
- Vertical strip
- Horizontal strip

### Vocabulary
- Vertical
- Horizontal
- Arrays
- Area

### TEKS Student Expectation:
The student is expected to identify patterns in multiplication facts using concrete objects, pictorial models, or technology. (3.6B)

### Activity:
Today we will be making arrays on grid paper and looking for patterns. Patterns enable us to recall and understand the process of multiplication.

1. Teacher says:
   - We will make the arrays on a grid using one strip of paper as the vertical edge and another strip as the horizontal edge.
   - We will count the squares and record the area in the lower right hand corner of each rectangle.
   - We will do three together, and then you will do at least 10 more by yourself, making sure to look for patterns.

2. Teacher models the first array:
   - Starting at the far left edge, count over 5 squares and lay your vertical edge along the outside edge of the fifth square all the way down the paper.
   - Now, starting from the top edge, count down 4 squares and lay your horizontal edge along the bottom edge of the fourth square all the way across the paper.
   - Count the number of squares in the rectangle we've formed. (20)
   - Record that number in the square located in the lower right hand corner formed by the vertical and horizontal strips of paper.

3. Teacher and students repeat step 2 for a 3 x 2 array (vertical edge of 3 and a horizontal edge of 2).

### Warm-up
**Spotlight Number**
The number is 17, can you make it by:
- Adding 3 numbers?
- Multiplying 2 numbers?
- Subtracting 2 numbers?

Adapted from: AIMS, December 1996.
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<td>4.</td>
<td>Repeats step 2 for a 6 x 4 array (vertical edge of 6 and a horizontal edge of 4.)</td>
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<tr>
<td>5.</td>
<td>Students continue making their own arrays by selecting their own numbers, using their own vertical and horizontal edges, counting the area, and recording the answer.</td>
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<tr>
<td>6.</td>
<td>Teacher asks: Who will describe one of the patterns that you’ve discovered?</td>
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<tr>
<td>7.</td>
<td>Journal Prompt: Write about one of the patterns you discovered. (Even if the association to the multiplication table is not made, there are patterns galore in rows, columns, diagonals, etc.)</td>
</tr>
</tbody>
</table>
Area Patterns

[Blank grid]
Area Patterns – Vertical Strips
Materials
Per student
• Approx. 50 color tiles

TEKS Student Expectation:
The student is expected to identify patterns in related multiplication and division sentences (fact families) such as $2 \times 3 = 6$, $3 \times 2 = 6$, $6 \div 2 = 3$, and $6 \div 3 = 2$. (3.6C)

Activity: Today we will explore multiplication facts by building arrays. Arrays allow us to visually see how multiplication and division facts are related.

1. Teacher directs students to arrange 12 color tiles in an array consisting of six rows with two tiles in each row.

2. Teacher asks:
   • What multiplication facts represent this array? (Teacher records $6 \times 2 = 12$ and $2 \times 6 = 12$)

3. Teacher directs students to separate the 12 tiles into 2 rows with 6 tiles in each row.

4. Teacher asks:
   • What division fact relates to this array? (Teacher records $12 \div 2 = 6$)

5. Students separate the 12 tiles into 6 rows with 2 tiles in each row.

6. Teacher asks:
   • What division fact relates to this array? (Teacher records $12 \div 6 = 2$)
   • What pattern do you notice in the four number sentences?
   • How are your number sentences alike?
   • How are your number sentences different?

7. Teacher states that fact families are related multiplication and division sentences.

8. Repeat the process, building additional arrays such as: $5 \times 7$, $8 \times 3$, etc. Students work in pairs to create their own arrays and describe them with multiplication and division sentences. Share with the group.


Vocabulary
• Array
• Fact family

Warm-up Two at a Time

$11 - \square = \triangle$
$1 + \triangle = \square$

Answer: $\triangle = 5$
$\square = 6$
**What's Your Story?**

<table>
<thead>
<tr>
<th>Materials For group</th>
<th>TEKS Student Expectation: The student is expected to identify patterns in related multiplication and division sentences (fact families) (3.6C).</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What's Your Story number cards, cut apart</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** Today we will create stories using fact families. Fact families can tell how multiplication and division are related.

**Note:** Each card has 3 related numbers. (For example, a card might show 9, 45, and 5.)

1. Teacher shuffles the cards and places them face down in a stack in the center of the students.

2. Teacher models creating fact family stories.
   - Take the card off the top of the stack and show it to the students.
   - Tell related multiplication and division story problems, using all three numbers on the card.
   - Example: If 24, 4, and 6 are on the card:
     - Division: 24 cans of Dr. Pepper are placed in 4 equal stacks on the grocery store shelf. How many cans are in each stack?
     - Multiplication: There are four 6-packs of Dr. Pepper on the shelf. How many Dr. Peppers are there?

3. Student pairs draw a card from the stack and make related multiplication and division story problems, using all three numbers on the card. Each pair reports their stories to the rest of the group.

4. The other players in the group decide if the stories are a correct example for division and multiplication.

5. Teacher says:
   - Yesterday, I put some counters into groups. I had the same number of counters in each group. I cannot remember the groups, but I can remember that there were 12 counters in all. What might the groups have been? (2 groups of 6, 6 groups of 2, 3 groups of 4, or 4 groups of 3)

6. **Journal Prompt:** Use 3, 24, and 8 to create multiplication and division story problems of your own.

**Vocabulary**
- Quotient
- Product

**Warm-up**

**Fact of the Day**
9 x 7

Write the fact family. What picture could we draw to represent that fact?

Adapted from Frances Thompson, *Hands-On Math!*
| 9, 45, 5 | 12, 3, 4 |
| 36, 4, 9 | 6, 30, 5 |
| 8, 7, 56 | 6, 7, 42 |
| 32, 4, 8 | 3, 6, 2 |
| 8, 72, 9 | 64, 8, 8 |
### Materials

(No materials listed)

### TEKS Student Expectation:

The student is expected to generate a table of paired numbers based on a real-life situation such as insects and legs. (3.7A)

### Activity:

Today we will use a T-chart to help us organize information. Organizing numbers in this way enables us to see patterns and solve problems.

1. **Teacher states:**
   - I need some organizational help today to determine how many plates, napkins, and cups to buy for a party.
   - I know that:
     - plates come in packages of 10
     - cups come in packages of 8
     - napkins come in packages of 12
   - I need to know how much of each one to buy for 30 people. Would you help me figure out what I should buy for the party?

2. **Teacher thinks aloud as he or she models and students record:**
   - T-charts are helpful when organizing this type of information. (Teacher draws one on the board.) Why do you think these are called T-charts? (shape of a T)
   - On this T-chart I'll record the number of packages and the number of plates. (Label the tops of the T-chart.)
   - If I buy one package of plates, how many plates will I have? 2 packages? 3 packages? How many packages of plates do I need to buy for 30 people? (Do not erase T-chart.)

3. **Repeat the process for the napkins and cups, making a T-chart for each.**

4. **Teacher reveals that he or she may have additional guests at the party.**

5. **Students extend the T-charts to find how many packages of paper goods would be needed for 45 guests.**

6. **Journal Prompt:** Choose one of the T-charts we made and describe the pattern between the numbers in the left hand column and the numbers in the right hand column. Using that pattern, explain how to find how many packages will be needed for 60 guests.

### Vocabulary

- Pattern
- T-chart

### Warm-up

**Flower Power**

The number is 72, what are some ways to make that number?
## Materials
- Counters (if needed)

## Vocabulary
- Number pairs
- T-chart
- Table

## Warm-up
**Function Machine**
The operation is + 5.

### TEKS Student Expectation:
The student is expected to generate a table of paired numbers based on a real-life situation such as insects and legs. (3.7A)

### Activity:
Today we will explore some tables of paired numbers that relate to real-life situations. Tables help us organize data and discover patterns among numbers.

1. Teacher presents a familiar situation from which students can create related number pairs (using counters to represent the objects in the situation as needed).

2. Teacher says: Thomas is a bicycle salesman. He needs to order tires for the bikes in his shop.
   - Let’s start with 1 bike. How many tires does Thomas need?
   - How many tires does Thomas need for 2 bikes?
   - If we write the number of bikes in a row such as 1, 2, 3, 4, 5, we can write the number of tires under it. (Demonstrate on chalkboard.)
     - Number of bikes: 1, 2, 3, 4, 5 ...
     - Number of tires: 2, 4, 6, 8, 10 ...
   - Or we can organize the lists into a table (T chart) to show the related pairs of numbers:

<table>
<thead>
<tr>
<th>Number of bikes</th>
<th>Number of tires</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

3. Teacher asks:
   - If Thomas wants to buy tires for 6 bikes, how can we use the table to find out how many tires he needs?
   - Can we use the table to find out how many tires he will need for 20 bikes? How could we find out without filling in the table up to 20? (Teacher allows partners time to discuss and explain their ideas.)

4. Teacher presents a new situation:
   - A ticket to the zoo costs $4.00. How much would it cost for two people to go to the zoo? Three people? Four people? Ten people?

5. Students work in pairs to generate a table to represent this situation and to share with the class.
6. If time permits, teacher continues having pairs of students develop tables and sets of related number pairs to represent other situations such as number of sides on triangles, number of legs on spiders, and number of days in a week.

7. Teacher asks:
   - How does a table help you find a pattern?
   - How are the numbers in the right-hand column of the table related to the numbers in the left-hand column?

8. Journal Prompt: Explain how to use a table like the ones we worked with today to solve problems.

9. Share and discuss.
**Tables**

**Materials**
- Tables sheet

**Per student**
- Tables sheet

**Vocabulary**
- Table
- Pattern
- Relationship

**TEKS Student Expectation:**
The student is expected to generate a table of paired numbers based on a real-life situation such as insects and legs. (3.7A)

**Activity:** Today we will be working with problems that have tables. Tables organize our information and help us discover patterns that help us solve problems.

1. **Teacher says:**
   - How many people are in our group?
   - How many hands are in our group?
   - How many fingers are in our group?
   - Let's use the tables on our worksheet to organize our numbers and look for patterns. (Do Table A together.)

2. **Teacher asks:**
   - How do you find the number of hands for 3 people? (Multiply 3 times 2.) For 4 people? (Multiply 4 times 2.)
   - How could you find the number of hands for 10 people? 20? 100?

3. Do Table B together. Ask students what they did to find the number of fingers each time. What is the pattern?

4. Have the students fill out the remaining tables on their own.

5. **Journal Prompt:** (Instead of writing in the space provided on problem G, you may want to have students create a problem and corresponding table in their journal.)

6. The group shares the problems they wrote and completes the tables together.
### Tables

**A)** Fill out the table below to show the number of hands in a room if there are 0, 1, 2, 3, 4 people in a group.

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Number of hands</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**B)** Fill out the table below to show the number of fingers in the room if there are 0, 2, 5, 8, 10 people in a group.

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Number of fingers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

**C)** The baker makes a cake called 1-2-3-4 cake. The cake was named because it uses:
- 1 cup butter
- 2 cups sugar
- 3 cups flour
- 4 eggs

Fill out the table to show the number of eggs needed for 1, 2, 4, 8, and 10 cakes.

<table>
<thead>
<tr>
<th>Number of cakes</th>
<th>Number of eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

**D)** The teacher is giving out prizes to the students who work the hardest in math! Each winner gets 3 pencils.

Fill out the table to show the number of pencils the teacher needs for 2, 5, 7, 9, and 12 student winners.

<table>
<thead>
<tr>
<th>Number of winners</th>
<th>Number of pencils</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>3</td>
</tr>
</tbody>
</table>
E) The soccer team was having a pizza party. There were 8 slices in each pizza. Fill out the table to show the number of pizzas for 8, 16, 24, 32, and 40 slices.

<table>
<thead>
<tr>
<th>Number of pizzas</th>
<th>Number of slices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

F) In the movie theater, each row has 9 seats. Fill out the table to show the number of seats for 1, 3, 7, 9, and 10 rows.

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number of seats</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

G) Your turn! Write a problem that shows a relationship between two things. Fill out the table with numbers in your problem.
### Summer Days

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation: The student is expected to identify patterns in a table of related number pairs based on a real-life situation and extend the table. (3.7B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td><strong>Summer Days</strong> sheets (may be cut into cards)</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td></td>
</tr>
<tr>
<td>• Table</td>
<td></td>
</tr>
<tr>
<td>• Number pair</td>
<td></td>
</tr>
<tr>
<td>• Pattern</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** Today we will explore tables centered around summer activities. Using tables helps us organize information and discover patterns and relationships.

1. Teacher distributes copies of the question cards.

2. Teacher asks questions such as:
   - How do the numbers in the right-hand column relate to the numbers in the left-hand column?
   - Reading across each row, what do the number pairs represent?
   - Can we use the related numbers pairs to find a pattern?
   - What pattern do you see? How did you find it?
   - Can you use words to describe the pattern?
   - Can you use your description to make predictions about other number pairs that belong in the table?

3. **Journal Prompt:** Describe how to make a table to show that every person who enters Water World gets seven free water ride passes. (Your table should show up to 8 people.)

**Warm-up**

**More or Less**
The number is 987,654. Make 10,000 more. Make 1,000 less.

Adapted from **TEKS Clarifying Activities**
1. At the water park there is a ride where you need a tube. They have tubes that are shaped like this: 🔝

Two people share one tube and go on the ride together!

We can show the number of people and the number of tubes needed in a table.

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Number of tubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Finish the table to show the number of tubes needed for 8, 10, 12, and 20 people.

2. Bryan’s mom is making fruit punch to bring to the park. The instructions on the can say to mix 1 can of fruit punch mixture with 3 cans of water.

Complete the table to show the cans of water needed for different amounts of fruit punch.

<table>
<thead>
<tr>
<th>Cans of fruit punch</th>
<th>Cans of water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>
3. One of the roller coasters at the park is called the Rattlesnake. It has 4 people sitting in each row. They can add more rows on busy days. Complete the table below to find the different number of people that can fit on the roller coaster.

<table>
<thead>
<tr>
<th>Number of rows</th>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

4. Alison found a starfish on the beach. It had 5 arms. Alison’s cousins started searching the beach for more starfish. When they put them together in the pool they dug in the sand there were many arms! Complete the table below to show the number of arms for the different numbers of starfish.

<table>
<thead>
<tr>
<th>Number of starfish</th>
<th>Number of arms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>
5. At the picnic there were many different kinds of races for the children and adults. One of the races was a wheelbarrow race. Each adult holds a child’s legs. The children walk on their hands as the adults walk with their feet. So every team has 2 people and 4 hands and feet (2 hands and 2 feet) touching the ground.

Complete the table to show the number of people and the number of hands and feet touching the ground as they race:

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Number of hands and feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>10</td>
<td>24</td>
</tr>
</tbody>
</table>

6. It was a very hot day. The temperature reached 100 degrees! Everyone was going to the park to see the fireworks. As the sun started to set, the temperature started to drop. It dropped 5 degrees every hour. How much cooler will it be when the fireworks are over?

Use the table to show the temperature each hour after it started to drop.

<table>
<thead>
<tr>
<th>Number of hours</th>
<th>Temperature in degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>5</td>
<td>75</td>
</tr>
<tr>
<td>6</td>
<td>65</td>
</tr>
</tbody>
</table>
# String it Along

## Materials
For the group
- 2-meter long piece of string or yarn

## TEKS Student Expectation:
The student is expected to name, describe, and compare shapes and solids using formal geometric vocabulary. (3.8)

## Activity:
Today we will work together to make different shapes with a piece of string. Knowing geometric shapes and their attributes, or characteristics, can help us recognize them and their usefulness in the real world.

1. Teacher says:
   - Work together as a group to make a triangle with the string.

2. Teacher asks students to justify in their own words that this is a triangle.
   Use probing questions to make sure they identify all the appropriate attributes:
   - How many sides does it have?
   - How many vertices does it have?
   - How many angles does it have?
   - Do the sides of a triangle always have to be equal?

3. Teacher instructs students to create a different triangle and then asks:
   - How is it the same as/different from the first triangle?

4. Teacher instructs students to make a square.

5. Teacher asks students to justify that the shape is square, using questions such as the following to identify all the appropriate attributes:
   - How many sides?
   - How many vertices?
   - What is special about the length of the sides of a square?
   - What is special about the angles?

6. Teacher instructs students to create a rectangle that is not a square.

7. Teacher asks students to justify that their shape is a rectangle but not a square. How are rectangles and squares alike/different?

8. Repeat the process for rhombus, trapezoid, a quadrilateral that is neither a parallelogram nor a trapezoid, pentagon, and hexagon.

9. Journal Prompt: Use a Venn diagram to compare and contrast a rectangle and trapezoid.

## Vocabulary
- Triangle
- Square
- Rectangle
- Rhombus
- Trapezoid
- Quadrilateral
- Pentagon
- Hexagon
- Side
- Vertex
- Angle

## Warm-up

**Two at a Time**

13 - △ = □

△ - 1 = □

Answers:

△ = 7

□ = 6

Adapted from **TEXTEAMS, PreK-K Institute**
**Duplicate My Creation**

<table>
<thead>
<tr>
<th>Materials Per pair</th>
<th>TEKS Student Expectation: The student is expected to name, describe, and compare shapes and solids using formal geometric vocabulary. (3.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Activity:</strong> Today we will work with partners to re-create designs made with pattern blocks. Becoming familiar with geometric shapes and their attributes helps us better describe things in the world around us.</td>
</tr>
<tr>
<td></td>
<td>Note: Students work as partners and are seated back to back or have some sort of barrier to bar visual contact.</td>
</tr>
<tr>
<td></td>
<td>1. Student 1 creates a design with 6 to 8 pattern blocks without the partner seeing it.</td>
</tr>
<tr>
<td></td>
<td>2. Student 1 then gives directions orally to the partner so that he/she can re-create the design without looking at it.</td>
</tr>
<tr>
<td></td>
<td>3. Student 2 may ask questions to clarify the shape they are attempting to duplicate.</td>
</tr>
<tr>
<td></td>
<td>4. Student 2 compares his/her completed design to the original.</td>
</tr>
<tr>
<td></td>
<td>5. Teacher asks:</td>
</tr>
<tr>
<td></td>
<td>- What words or phrases helped you re-create the design? (Record the geometric terms used.)</td>
</tr>
<tr>
<td></td>
<td>- What words or phrases confused you? Why?</td>
</tr>
<tr>
<td></td>
<td>- Can you think of better ways to explain the directions for making a design?</td>
</tr>
<tr>
<td></td>
<td>6. Activity is then repeated with partners switching roles.</td>
</tr>
<tr>
<td></td>
<td>7. Journal Prompt: Write to complete the sentence stem: <strong>Using geometry words helps me because __________________.</strong></td>
</tr>
</tbody>
</table>

**Vocabulary**
- Triangle
- Square
- Hexagon
- Trapezoid
- Rhombus
- Horizontal
- Vertical
- Adjacent

**Warm-up**

**Fact of the Day** is 8 x 8. What is the family of facts? What word problem can be answered using those facts?
### Materials
- **Per pair**
  - Solid figures (cube, square pyramid, triangular pyramid, rectangular prism, triangular prism).
  - Toothpicks
  - Clay (or raisins, marshmallows…)

### TEKS Student Expectation:
The student is expected to name, describe, and compare shapes and solids using formal geometric vocabulary. (3.8)

### Activity:
Today we will describe and build three-dimensional solids by combining 2-dimensional shapes. Since we live in a three-dimensional world, it is valuable to recognize the attributes of solids.

1. Students brainstorm a list of two-dimensional shapes. (Teacher records.)
2. Students work as partners. They select one of the three-dimensional figures and discuss how it is related to one or more of the two-dimensional shapes from the list.
3. Teacher asks:
   - How are the two-dimensional and three-dimensional shapes alike?
   - How are they different?
4. Partners duplicate one of the commercial solid figures using toothpicks and clay (or raisins, marshmallows, etc.).
5. Students generate a 4-column chart.

<table>
<thead>
<tr>
<th>Figure name</th>
<th>Faces</th>
<th>Edges</th>
<th>Vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Students show and describe their 3-dimensional figures, giving the figure name and the number of faces, edges, and vertices.
7. Journal Prompt: Write a definition of vertex that includes the words faces and edges.

### Vocabulary
- Cube
- Pyramid
- Prism
- Faces
- Edges
- Vertices

### Warm-up
**Flower Power**
The number is 88.
Mystery

Materials
For the group
• Solid figures
• Paper bag

Vocabulary
• Attribute
• Side
• Edge
• Vertex
• Cube
• Rectangular prism
• Triangular prism
• Cone
• Triangular pyramid
• Rectangular pyramid
• Cylinder

TEKS Student Expectation:
The student is expected to name, describe, and compare shapes and solids using formal geometric vocabulary. (3.8)

Activity: Today we will describe solids by attributes, using the sense of touch.

1. Teacher secretly places a solid figure into a bag and calls on a student to reach into the bag without looking and use the attributes of the shape to make up clues about what it is.

2. The student describes the solid to the rest of the students (detectives) by telling the number of faces, the shapes of the faces, the number of edges, and the number of vertices.

3. The students (detectives) discuss and piece together the clues to guess the mystery figure.

4. Teacher indicates to the students that they have either successfully solved the mystery or that perhaps a more thorough investigation is needed.

5. When the students correctly identify the figure, teacher secretly places another solid figure into the bag and a different student is called on.

6. Journal Prompt: If you reached into the bag and felt a circle on the shape, what might the figure be? How do you know?

Warm-up
Spotlight Number 24
• Can you make it by adding 4 numbers?
• Can you make it by multiplying 2 numbers?
• Can you make it by subtracting 2 numbers?
Geoboard Explore

Materials
Per student
• Geoboards

Vocabulary
• Congruent
• Similar

TEKS Student Expectation:
The student is expected to identify congruent shapes. (3.9A)

Activity: Today we will make shapes on the geoboard. We will decide whether or not they are the same size and shape.

1. On the geoboard, each student makes a shape where the rubber band touches 5 pegs. (The rubber band is the fence and the pegs are the fence posts.)

2. Students look at each other’s solutions, compare them, and then discuss the similarities and differences.

3. Teacher asks:
   • Did any two people make the same shape? Is it the same size also?
   • When two things are the same size and same shape, they are said to be congruent.
   • Let’s all make our geoboard shape congruent to (Student 1’s).
   • How can we be sure that our shapes are congruent?

4. On the geoboard, students make a four-sided polygon with all sides different lengths and check for any congruent shapes.

5. On the geoboard, each student makes five squares that are all different sizes.

6. Teacher asks:
   • Why are the five squares on the geoboard not congruent to each other?

7. Students create two different shapes on their geoboards that are not congruent.


Warm-up
Two at a Time
□ + △ = 8
5 - □ = 0
Answer:
△ = 3
□ = 5

Adapted from Marilyn Burns, About Teaching Mathematics

Answer:
### Tetrominoes

**Materials**
- Per pair
  - Color tiles (about 15)
  - 2-3 copies of inch squared grid paper
  - Scissors
  - Glue
  - 1 piece of construction paper

**TEKS Student Expectation:**
The student is expected to identify congruent shapes. (3.9A)

**Activity:** Today we will use tiles to create shapes. We will find all of the different shapes we can make with three or four tiles. We can use what we know about congruent figures to help us find the shapes.

**Note:** Each student should work with tiles that are all the same color.

1. Teacher says:
   - The one rule for making the shapes is that one whole side of each square touches at least one whole side of another. Teacher draws an example and a non-example.

2. Teacher asks students to find all possible arrangements using two tiles and following the rule. (1 possibility)

3. Teacher asks:
   - How can you decide if two arrangements are the same size and same shape?
   - What is the vocabulary word that means same size and same shape? (congruent)

4. Teacher introduces the words **reflection** (flip) and **rotation** (turn) and shows how two shapes are congruent when they are reflected or rotated.

5. Using the tiles, students follow the rule and find all of the possible arrangements for three tiles (triominoes).

6. Students show the two different possible combinations.

7. In pairs, students find out how many different arrangements can be made with four tiles (tetrominoes).
   - As each new arrangement is discovered, partners draw their new tetromino shape on grid paper and cut it out.
   - Pairs should check that each new shape is different from those already found by giving it the congruency test (reflecting and rotating the shape).
   - After partner pairs find all possibilities, they glue their tetrominoes onto a recording sheet. (There are five possible tetrominoes.)

**Vocabulary**
- Congruent
- Reflection (flip)
- Rotation (turn)

**Warm-up**
**Fact of the Day**
8 x 8
Write a word problem that could be solved using this fact.
8. Teacher asks:
   - How are the shapes different from one another? How are they alike?
   - How is size important when you check for congruence?
   - How is shape important when you check for congruence?
   - How can you check to make sure the arrangements are different from each other?

9. Journal Prompt: Explain how you know when two shapes are not congruent.
Hexa-Triangles

**Materials**
- Per pair
  - 24 pattern block green triangles
  - 2 copies of pattern block triangle paper
  - Scissors
  - Glue
  - 1 piece of construction paper

**Vocabulary**
- Congruent
- Reflected
- Rotated

**Warm-up**
*Flower Power*

**TEKS Student Expectation:**
The student is expected to identify congruent shapes. (3.9A)

**Activity:** Today we will learn more about congruent shapes by finding all of the arrangements we can make using four triangles.

1. Teacher displays four green pattern block triangles, as follows.

   ![Triangles](triangle.png)

   - The one rule for making the arrangements is that when triangles are connected, whole sides must touch.

2. Students build a different (non-congruent) arrangement using four triangles and display their designs.

3. Teacher asks:
   - Are there any arrangements displayed that are the same size and shape (congruent)?
   - How do you know?

4. Teacher selects two shapes that are congruent and shows students how to record one of them on triangle paper, cut it out, and then reflect (flip) or rotate (turn) it to check if it is exactly like the other. Teacher explains that these shapes are congruent (same size, same shape) and therefore are not considered different arrangements of the blocks. (Note: Only 2 additional arrangements can be made.)

5. With a partner, students see how many different arrangements they can make using six triangles and following the same rule about sides touching completely.
   - Pairs record each different arrangement on triangle paper, cut it out and test to be sure it is not congruent to any other arrangement.
   - After partner pairs find all arrangements, they glue them onto a recording sheet.

6. Teacher asks:
   - How do you know you have found all the possible arrangements?
   - How do the shapes differ from one another? How are they alike?

7. Journal Prompt: How did you check to make sure your arrangements were different from ones you already found?
# Congruent Shapes Hunt

## Materials
- Per pair
  - Approx. 40 pattern blocks
  - Crayons
  - Scissors
  - Paper
  - Glue

## TEKS Student Expectation:
The student is expected to identify congruent shapes. (3.9A)

## Activity:
Today we will find different ways to make a shape using different numbers and types of pattern blocks. Being able to cover the same area in many different ways allows you to construct many congruent designs.

1. Teacher shows students the following pattern block arrangement.

   ![Pattern Block Arrangement](image)

2. Students duplicate the design with their blocks.

3. Teacher asks students to make the same shape, but with a different arrangement or combination of blocks.

4. Teacher asks:
   - Are all of your designs the same size and shape?
   - How can we test this?

5. Teacher explains that the designs form shapes that are congruent (same size and same shape).

6. Partner pairs choose four pattern blocks and make a new design, following the rule that a complete side of each block must touch a complete side of another block.
   - Partners record their design by tracing it at the top of a piece of paper and coloring it.
   - Partners make other designs that are congruent (have the same size and shape). They may use blocks that are different from the original blocks or use the same blocks in a different way.
   - Students must find a way to check that the new design is congruent to the original design.
   - Students record each new design by tracing and coloring it. They make at least four different designs.

7. Students share their work with the group.
<table>
<thead>
<tr>
<th>8. Teacher asks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What strategies did you use for making congruent shapes?</td>
</tr>
<tr>
<td>• How did you check to make sure your shapes were congruent?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. Journal Prompt:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain how you know that all of your designs are congruent.</td>
</tr>
</tbody>
</table>
Congruent Concentration

Materials

For the group
- Congruent Concentration cards, cut out (Run on cardstock, or print the back of card to avoid seeing through the card if paper is used.)

Vocabulary
- Congruent

TEKS Student Expectation:
The student is expected to identify congruent shapes. (3.9A)

Activity: Today we will play a concentration game in which we match congruent figures.

1. Teacher shuffles the cards and spreads them face down on the table.
2. Students play concentration, saying "congruent" each time they find a match in order to claim the cards.
   - The first student turns over two cards. If the shapes are congruent, the student picks up the pair and says "congruent." If the cards are not congruent, or if the player does not say "congruent," the cards go face down again in the same spots.
   - The second student has a turn and follows the same procedure. He or she may choose a card that was already chosen or two new cards.
   - The game ends when all of the pairs are matched or when time is up. The player with the most card pairs wins. There is one card (a right triangle) that does not have a match!
3. Journal Prompt: What does it mean when we say two figures are congruent?

Warm-up
Lifesaver Math
Multiply by 6
Congruent Concentration (Can be used as a back for the cards.)
**Symmetry Patterns**

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per pair</td>
<td>The student is expected identify lines of symmetry in shapes. (3.9C)</td>
</tr>
<tr>
<td>Color tiles (approx. 8 of each color)</td>
<td>Activity: Today we will create and record symmetrical designs. In symmetrical designs, the two sides are mirror reflections of each other. Nature is one of the many places we find symmetry.</td>
</tr>
<tr>
<td>Symmetry Patterns sheet</td>
<td></td>
</tr>
<tr>
<td>Crayons</td>
<td></td>
</tr>
<tr>
<td>Mirrors (optional)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Symmetry</td>
<td></td>
</tr>
<tr>
<td>Line of symmetry</td>
<td></td>
</tr>
</tbody>
</table>

**Warm-up**

**More or Less**

79, 123

What is 800 more?
What is 2,000 less?

---

1. Teacher displays the following design: (B is blue, G is green, R is red.)

<table>
<thead>
<tr>
<th>G</th>
<th>R</th>
<th>R</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>R</td>
<td>R</td>
<td>G</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Students copy the design with tiles.

3. Teacher models how to record the design on the grid sheet and fold the recordings so that the fold line divides the design into two parts that match each other exactly.

4. Teacher asks students to compare the two parts made by the fold line and shows them how one part is like a reflection of the other in a mirror.

5. Teacher says:
   - When a design can be folded upon itself in this way, mathematicians say that the design has symmetry.
   - The fold line is called the line of symmetry.
   - Some designs have more than one line of symmetry. (Teacher uses recording above to show both a horizontal and vertical line of symmetry.)
   - These figures show the 4 possible lines of symmetry for a square design.

   - What lines of symmetry does this design have?

6. Partner pairs use color tiles to make designs with the following rules and record them on the grids.
   - Design A must have only 1 line of symmetry.
   - Design B must have only 2 lines of symmetry.
   - Design C must have 4 lines of symmetry.
   - Design D must have no lines of symmetry.

7. Partners can use a mirror to check their designs for line symmetry.

8. Journal Prompt: How can you tell if a design has line symmetry? How can you tell if a design has no symmetry?
## Symmetry is My Line

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the group</td>
<td>The student is expected to identify lines of symmetry in shapes. (3.9C)</td>
</tr>
<tr>
<td>Pattern blocks</td>
<td></td>
</tr>
<tr>
<td>(plenty of green</td>
<td></td>
</tr>
<tr>
<td>triangles)</td>
<td></td>
</tr>
<tr>
<td>Per student</td>
<td></td>
</tr>
<tr>
<td>Mirror</td>
<td></td>
</tr>
</tbody>
</table>

**Vocabulary**

- Symmetry
- Line of symmetry
- Reflection

### Activity: Today we will construct symmetrical figures using pattern blocks and identify lines of symmetry. Many trademarks and logos are made from symmetrical designs (like the golden arches of McDonalds).

1. Teacher instructs students to manipulate pattern blocks as directed: (Whenever asked to add blocks, the entire sides must match.)
   - Lay a yellow hexagon out in front of you.
   - Add one green triangle to make a shape that has a line of symmetry.
   - On a piece of paper, trace around your shape and draw in the line of symmetry.
   - Place a mirror along the line of symmetry to check. The reflection should complete the entire shape that you formed.

2. Continue adding green triangles to the design as instructed, each time tracing the new shape, drawing any lines of symmetry, and checking with a mirror.
   - Add two more green triangles to make a new symmetrical shape.
   - Add three more green triangles to make a different symmetrical shape.
   - Add four green triangles to make a new symmetrical shape.

3. Students create a shape using any combination of pattern blocks. They trace their shape, draw in the symmetry lines, and check using a mirror.

4. Students share.

5. **Journal Prompt:** What ideas that you have learned about symmetry did you think about as you created your symmetrical shapes?

### Warm-up

**Spotlight Number 56**

- Can you make it by adding 3 numbers?
- Can you make it multiplying 2 numbers?
- Can you make it subtracting 2 numbers?
### Materials
- Length of yarn strung across the classroom to be used as a number line
- Paper clips
- Index cards
- Markers
- Line It Up number cards, printed on card stock, and cut apart

### Vocabulary
- Number line
- Benchmark

### Activity: Today we will place numbers on a classroom sized number line. Understanding where numbers are located on a number line helps us understand number relationships.

1. Each student selects a Line It Up number card.

2. Teacher says:
   - 300 will be the beginning of the part of the number line we will use, and 400 will be at the end. We'll use arrows to show that there are numbers that come before 300 and after 400. (Clip 300, 400, and the arrows to the number line.)
   - What is your number?
   - How are you going to decide where to place your number on the number line?

3. Students line up along the classroom-sized number line in the position they feel is appropriate for their number card. They paper clip the number cards onto the line.

4. Each student explains why that position was chosen.

5. Teacher asks:
   - Could you decide where your number belongs if there were no other numbers marked on the number line?
   - Could you decide where your number belongs if _____ were the only number marked on the number line?
   - What are some benchmark numbers you think would be helpful to decide where your number goes?
   - How do you know your number is on this side of ______?
   - How did you know how far away from ______ to place your number?

6. Each student writes a whole number between 700 and 800 on an index card. Repeat steps 1 – 5, starting by placing 700 and 800 at the ends of the number line.

7. Journal Prompt: Write instructions to tell another student where 732 should be placed on a number line from 700 to 800.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>352</th>
</tr>
</thead>
<tbody>
<tr>
<td>361</td>
<td>346</td>
<td>334</td>
</tr>
<tr>
<td>321</td>
<td>398</td>
<td>377</td>
</tr>
<tr>
<td>318</td>
<td>322</td>
<td>349</td>
</tr>
<tr>
<td>385</td>
<td>350</td>
<td>367</td>
</tr>
<tr>
<td>355</td>
<td>400</td>
<td>300</td>
</tr>
</tbody>
</table>
**Number Line Hexagon**

| Materials | TEKS Student Expectation:  
The student is expected to locate and name points on a line using whole numbers and fractions such as halves. (3.10) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td>- Number Line Hexagon sheet</td>
</tr>
</tbody>
</table>
| For the teacher | - Number Line Hexagon  
Suggested Words and Clues  
Number Line Hexagon Code sheet (opt.) |
| Vocabulary | - Greater than  
- Less than |

**Activity:** Today we will use number lines as clues in a game of "Hexagon." The object is to decode the unknown word before the hexagon is completed.

1. The teacher explains how to play the game:
   - I will give clues one at a time.
   - You will look at the Number Line Hexagon sheet, find the number line that matches the clue, and say the letter of that number line.
   - If you are correct, I will place the letter in the appropriate blank(s). If you are not correct, I will draw one line of the hexagon.
   - We will continue this way until you win by telling the correct word. If you guess the wrong word before the blanks are all filled in, I will draw another line of the hexagon.

2. For the first game, the teacher draws the enough blanks for each letter in the word *subtraction* (11 blanks) and gives these clues.
   - Next whole number in this pattern: 10, 15, 20, 25 … (R)
   - Whole numbers greater than 2 and less than 7 (A)
   - Whole numbers greater than 4 and less than 11 (O)
   - Next whole number in this pattern: 65, 70, 75, 80 (C)
   - Whole number that represent 85 + 85 (T)
   - Whole number that represent 8 x 5 (N)
   - Whole number that represents 5 + 7 (I)
   - Whole number between 21 and 23 (U)
   - Even numbers greater than 2 and less than 12 (B)
   - Next 3 whole numbers in this pattern: 10, 20, 30, 40 (S)

3. Play again using sets of clues from the Number Line Hexagon – Suggested Words and Clues sheet. (You can make up additional words using the Number Line Hexagon Code Sheet.)

4. Journal Prompt: Copy any number line from the Number Line Hexagon sheet and write a clue that matches it.

5. Students read their clues and others guess which number line is being described.

---

**Warm-up**  
**Fact of the Day**  
4 X 8  
What picture could you draw to represent this fact?

Adapted from Shirley Cunningham, *Math for the Fun of It,*
Number Line Hexagon - Suggested Words and Clues

Fraction (8 blanks)

Whole numbers greater than 2 and less than 7 (A)
Whole numbers greater than 4 and less than 11 (O)
Next whole number in this pattern: 65, 70, 75, 80, … (C)
Next whole number in this pattern: 10, 15, 20, 25, … (R)
Whole number that represents 8 x 5 (N)
Whole number that represents 5 + 7 (I)
Whole number that represents 85 + 85 (T)
Whole number between 9 and 11 (F)

Multiplication (14 blanks)

Whole number that represents 85 + 85 (T)
Whole numbers greater than 2 and less than 7 (A)
Whole number that represents 5 + 7 (I)
Whole number that represents 63 + 17 (L)
Whole number between 21 and 23 (U)
Whole numbers greater than 3 and less than 13 (M)
Next whole number in this pattern: 65, 70, 75, 80, … (C)
Whole numbers greater than 4 and less than 11 (O)
Whole number that represents 8 x 5 (N)

Rhombus (7 blanks)

Whole numbers greater than 3 and less than 13 (M)
Next whole number in this pattern: 10, 15, 20, 25, … (R)
Whole numbers greater than 4 and less than 11 (O)
Whole number between 21 and 23 (U)
Next 3 whole numbers in this pattern: 10, 20, 30, 40, … (S)
Even numbers greater than 2 and less than 12 (B)
Whole numbers less than 8 and greater than 12 (H)
A— whole numbers greater than 2 and less than 7
B— even numbers greater than 2 and less than 12
C— next whole number in this pattern: 65, 70, 75, 80, ...
D— whole number that represents 9 x 7
E— odd numbers greater than 9 and less than 15
F— whole number between 9 and 11
G— whole number that represents 11 - 6
H— whole numbers less than 8 and greater than 12
I— whole number that represents 5 + 7
J— odd numbers greater than 1 and less than 15
K— whole numbers greater than 14 and less than 22
L— whole number that represents 63 + 17
M— whole numbers greater than 3 and less than 13
N— whole number that represents 8 x 5
O— whole numbers greater than 4 and less than 11
P— whole numbers between 6 and 9
Q— next whole number in this pattern: 4, 8, 12, 16, ...
R— next whole number in this pattern: 10, 15, 20, 25, ...
S— next 3 whole numbers in this pattern: 10, 20, 30, 40, ...
T— whole number that represents 85 + 85
U— whole number between 21 and 23
V— whole numbers greater than 50 and less than 58
W— whole number that represents 50 + 50 + 50
X— whole number that represents 500 - 150
Y— whole number that represents 82 – 27
Z— whole numbers greater than 57 and less than 52
Number Line Hexagon

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Y

Z

Geometry and Spatial Reasoning 9/17/2011 Page 4 of 4
### Using a Ruler

**Materials**
- **Per student**
  - Using a Ruler rulers, cut apart
- **Per group**
  - Variety of objects to measure in inches (such as a book, a crayon, computer diskette, etc.)

**TEKS Student Expectation:**
The student is expected to estimate and measure length using standard units such as inch, foot, yard, centimeter, decimeter, and meter. (3.11A)

**Activity:**
Today you will use an inch chunk ruler to create a numbered ruler and measure different lengths. Measuring with a ruler helps you know long objects are.

1. Have students estimate the length of an object (for example, a book) and then use the inch chunk ruler to measure it to the nearest inch. Repeat with several more objects.

2. The students use the black and white inch chunk ruler to number the unnumbered ruler. Have students write a small zero at the beginning of the ruler.

3. The teacher asks:
   - How would you use this ruler to measure the same objects that we measured with the inch chunk ruler?
   - Do you think you will get the same answers as before?
   - Explain what the numbers on the rulers are for. (Make sure that each student understands that the numbers stand for the number of inch chunks there are from the beginning of the ruler.)

4. Students measure the same objects using the numbered ruler.

5. Teacher asks:
   - What do you do if the item you are measuring does not turn out to be exactly 5 inches or 7 inches, etc, but falls in between the numbers? (Discuss the options: round to the nearest whole inch or give a more exact measurement by showing the halfway marks.)

6. Students add half-inch marks to their numbered rulers by estimating the halfway point between each inch. Have students use a shorter mark for the half-inch points.

7. Give students the half-inch rulers and compare them to the ones they created.

8. Teacher says:
   - Now that we have whole inch and half inch marks on our rulers, we can measure some other objects.

9. Using some different objects, have students estimate the length of each object to the nearest inch or half-inch and then measure it.

**Vocabulary**
- Inch
- Half inch

**Warm-up**
**Flower Power**
54
10. Then ask:
   - How did you decide if the object was closer to the inch or the half-inch?
   - Can someone show us how they measured?

11. Journal Prompt: What is one important thing to remember when you are measuring with a ruler?

12. Share ideas written in the journals.
**Materials**
- Ruler marked in inches and centimeters
- Inching Along sheet, cut in half

**Per student**
- Ruler marked in inches and centimeters
- Inching Along sheet, cut in half

**Per group**
- Number cube
- Variety of objects to measure in inches and centimeters (paper clips, sticky notes, etc.)

**TEKS Student Expectation:**
The student is expected to estimate and measure length using standard units such as inch, foot, yard, centimeter, decimeter, and meter. (3.11A)

**Activity:** Today we are going to measure objects in inches and centimeters. It is important to have experience measuring objects in centimeters so we can use the metric system.

1. The teacher tells the students that they are to record the name of the object and the number of inches it measures.

2. The teacher asks questions such as:
   - How did you find the length of the sticky note?
   - Show us how you got your answer.
   - Did anyone find the answer a different way?

3. Review how to measure with a centimeter ruler.

4. Teacher asks:
   - How is it like an inch ruler and different from an inch ruler?
   - When we measure our objects again, will the answers be higher or lower than our measurements with the inch ruler? Why do you think so?

5. Students measure the objects with the centimeter ruler and record the results in the third column. Compare the results.

6. The teacher asks:
   - How can you explain that when we measure in centimeters the numbers are larger than when we measure in inches?

7. Conclude by having the students each roll a number cube (1-6). They are to find an object with approximately the length of that many inches or centimeters.

8. Journal Prompt: Compare the results you get when measure the same object with an inch ruler and a centimeter ruler.

**Vocabulary**
- Inch
- Centimeter
- Length
- Measure (linear measure)

**Warm-up**
**Function Machine**
Multiply by 10

<table>
<thead>
<tr>
<th>Item</th>
<th>Length of item in inches</th>
<th>Length of item in centimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>Item</td>
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<table>
<thead>
<tr>
<th>Item</th>
<th>Length of item in inches</th>
<th>Length of item in centimeters</th>
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</table>
# Measuring Me

**Materials**  
Per student:  
- Ruler  

**Vocabulary**  
- Foot  
- Feet  
- Inch

**TEKS Student Expectation:**  
The student will measure to solve problems involving length, [area], temperature and time. (3.11A)

**Activity:** Today we are going to measure longer distances using a ruler.

1. Teacher says: We are going to estimate and then measure ourselves using a ruler. Estimate and then measure each of the following distances. Record your estimate and actual measurement in feet and in inches in a table. Let's do one together. (Show students how to estimate and then measure the length of your arm.)

   Note: Students should estimate and then measure each time, rather than estimating all the measures first and then measuring them all. This provides students with an opportunity to improve estimation skills as they work.

   - Length of your arm  
   - Length of your leg  
   - Distance around your head  
   - Distance from your elbow to your finger tip  
   - Distance from your knee to the floor  
   - Your height  
   - Your arm span

2. Journal Prompt: How do you keep track of how many times you move the ruler when you measure?
## Get On Your Mark!

### Materials
- Per pair
  - Metric tape or ruler
  - 2 different colored pencils
  - Die
  - Get On Your Mark racing sheet

### Student Expectation:
To estimate and measure lengths using standard units such as inch, foot, yard, centimeter, [decimeter,] and meter. (3.11A)

### Activity:
Today we are going to play a game that uses centimeters to practice using the metric system.

1. Teacher rehearses the steps of the game with a student volunteer while the others observe.
   - Players roll the die to see who goes first.
   - Player 1 rolls the die, measures the number of centimeters rolled, and colors that distance on the racing sheet with his/her designated color.
   - Player 2 repeats the steps for her/his turn, but uses a different color to fill in the distance.
   - Play continues until the finish line is reached.

2. Play the game with partners. Race three times or until time is up.

3. Journal Prompt: Name three items that would be best measured in centimeters.

---

**Warm-up**

**Flower Power 72**
### Get on Your Mark!

<table>
<thead>
<tr>
<th>Race 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 1 cm</td>
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<tr>
<td>2 = 2 cm</td>
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<tr>
<td>3 = 3 cm</td>
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<tr>
<td>4 = 4 cm</td>
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<tr>
<td>5 = 5 cm</td>
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<tr>
<td>6 = 6 cm</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Race 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 1 cm</td>
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<tr>
<td>2 = 2 cm</td>
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<tr>
<td>3 = 3 cm</td>
</tr>
<tr>
<td>4 = 4 cm</td>
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<tr>
<td>5 = 5 cm</td>
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<tr>
<td>6 = 6 cm</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Race 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = 1 cm</td>
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<tr>
<td>2 = 2 cm</td>
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<tr>
<td>3 = 3 cm</td>
</tr>
<tr>
<td>4 = 4 cm</td>
</tr>
<tr>
<td>5 = 5 cm</td>
</tr>
<tr>
<td>6 = 6 cm</td>
</tr>
</tbody>
</table>
# Measuring Our Room

**Materials**
- Yardstick
- Meter stick

**TEKS Student Expectation:**
The student will measure to solve problems involving lengths, [area], temperature and time. (3.11A)

**Activity:** Today we are going to measure longer distances using a yard stick and a meter stick. Measuring longer distances is important to compare lengths like in a long jump contest or pole vault event.

1. Teacher says: We are going to estimate and then measure distances in our room using a yardstick and a meter stick. Estimate and then measure each of the following distances to the nearest yard. Record your estimate and actual measurement in a table. Let's do one together. (Show students how to estimate and then measure the length of a classroom table.)

   **Examples:**
   - Distance from the teacher's desk to the pencil sharpener
   - Length of the chalk rail
   - Length of a bulletin board
   - Distance across the room
   - Height of the file cabinet
   - Height of the teacher
   - Distance to another 4th grade teacher's classroom

2. Repeat with a meter stick. How do the distances in meters and yards compare?

3. **Journal Prompt:** Write about a time that you might need to measure a distance in yards or meters.

**Vocabulary**
- Yard
- Meter

**Warm-up**

**Lifesaver Math**

Add 12
### Heel to Toe

#### Materials

- Loop of yarn that is 12 feet long
- 1-foot long strips of construction paper (multi-colored, approximately 20)

#### Vocabulary

- Perimeter
- Length

#### TEKS Student Expectation:

The student is expected to use linear measure to find the perimeter of a shape. (3.11B)

#### Activity:

Today we will measure geometric figures to find the perimeter. We measure perimeter to find how far it is around something.

### Part 1

1. The students stretch the loop of yarn into a triangle and tape it to the floor at the vertices.

2. The students take turns measuring the distance around the triangle using their own feet (heel to toe) and record their measurements.

3. Teacher asks:
   - Why are the results different for each person?
   - What can we do so that we would all get the same answer?
   - What unit should we use?

4. The teacher gives the students 1-foot strips of construction paper.

5. The students work cooperatively to measure the distance by laying the strips down around the triangle.

6. The teacher asks:
   - What are we measuring about the triangle? (the distance around it)
   - What is that called? (perimeter)
   - What is the perimeter of this triangle? (12 feet)

### Part 2

7. The students change the shape of the triangle to a square and tape it to the floor at the vertices.

8. Teacher asks:
   - What do you think the perimeter of the square will be?

9. The students measure the perimeter with the 1-foot strips and compare the result to the perimeter of the triangle.

#### Warm-up

**More or Less**

79, 123

What is 800 more?
What is 2,000 less?
<table>
<thead>
<tr>
<th>Part 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Teacher asks:</td>
</tr>
<tr>
<td>• If we change the shape to a hexagon, what will the perimeter be? (If students do not realize that the perimeter will not change, have them make a hexagon, find the perimeter, and compare the results.)</td>
</tr>
<tr>
<td>• Explain why the perimeter is the same regardless of the shape.</td>
</tr>
</tbody>
</table>

11. Journal Prompt: What does it mean to find the perimeter of a shape?
### Pe"rim"eter, Part 1

| Materials | TEKS Student Expectation:  
The student is expected to use linear measure to find the perimeter of a shape. (3.11B) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Per pair</td>
<td>Activity: Today we will build rectangular arrays with base ten blocks and find the perimeter. The perimeter gives us the distance around the outside of a figure.</td>
</tr>
</tbody>
</table>
| • Base ten blocks  
• 2-3 copies of centimeter grid paper | 1. Teacher asks:  
• What does perimeter mean? |
| Vocabulary | 2. Teacher writes pe"rim"eter on the board and states that this clue can help students remember that perimeter is finding the distance around the “rim” of a polygon. |
| • Perimeter | 3. Teacher displays this 11 x 11 array of base ten blocks and has students copy it with their blocks. |
| Warm-up | 4. Teacher pushes the blocks together to form a square and establishes that it is 11 centimeters long and 11 centimeters wide. Teacher labels each side. |
| Fact of the Day | 5. Students find the perimeter of the square. |
| 7 X 4 | 6. After students determine that the perimeter is 44 centimeters, teacher asks them to describe the different ways they arrived at their answers. |
| What is the family of facts? | 7. Students work with a partner to model a square with sides of 6 centimeters, record it on grid paper, label the sides, and determine the perimeter. |
| | 8. Students repeat step 7 building a square with sides of 10 units. |
9. Teacher asks:
   - What makes a shape a square?
   - How does knowing that help you find the perimeter?

10. Teacher draws a square with one side labeled 9 cm and asks:
    - If I know that one side of a square measures 9 cm, how can I use this information to find the square’s perimeter?
    - How can I find the perimeter of a square when the length of just one side is given?

11. Teacher draws another square and states that the perimeter is 36 centimeters.
    - If I know the perimeter of this square is 36 cm, how can I find the length of one side?
    - Is there a multiplication or division fact that can help me? Explain.

12. Journal Prompt: If the perimeter of a square is 24 centimeters, what is the length of one side? What attribute of squares helps you find the answer?
### Materials
Per pair:
- Base ten blocks
- 2-3 copies of centimeter grid paper

### Vocabulary
- Perimeter

### Warm-up
**Flower Power**

<table>
<thead>
<tr>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The student is expected to use linear measure to find the perimeter of a shape. (3.11B)</td>
</tr>
</tbody>
</table>

### Activity: Today we will build more rectangles with base ten materials and find the perimeter.

1. Teacher states:
   - Now let’s construct and find the perimeter of some rectangles that are not squares.

2. Teacher displays array of base 10 blocks and has students copy it with their blocks.

   ![Diagram of a rectangle with dimensions 3 by 12]

3. Teacher pushes the blocks together to form the rectangle and establishes that the rectangle is 12 centimeters long and 3 centimeters wide, labeling the lengths.

4. Students find the perimeter of the rectangle.

5. After students determine that the perimeter is 30 centimeters, teacher asks students to share the different ways they arrived at their answers.

6. Students work with their partners to build rectangles with the following dimensions, record them on grid paper, and determine the perimeter of each:
   - Length = 7 centimeters, Width = 4 centimeters
   - Length = 13 centimeters, Width = 8 centimeters

7. Teacher asks:
   - How does knowing the lengths of the sides of a rectangle help you find the perimeter?

8. Teacher draws a rectangle, labels the lengths of two sides and asks:
   - How can I find the perimeter of this rectangle with only two of its sides labeled?
   - (Erase the label that says 3 feet.) We know the perimeter is 28 feet. How can you find the missing length?

9. Journal Prompt: How is finding the perimeter of a rectangle like finding the perimeter of a square? How is it different?
### Puzzling Perimeter

**Materials**
- Per pair
  - Puzzling Perimeter cards, cut apart
  - 12 index cards

**TEKS Student Expectation:**
The student will use linear measure to find the perimeter of a shape. (3.11B)

**Activity:** Today we will solve puzzles about perimeter. You need to know the perimeter when you buy material to build a fence or frame a picture.

1. Teacher reviews the meaning of perimeter.

2. Students work in partners. They take a Puzzling Perimeter card and two index cards. On one index card, they write a problem situation that involves perimeter and matches the picture. On the other index card, they solve the puzzle.

3. Before students start, do Puzzle 1 together. For example the problem situation to write on an index card might be: Mr. McGregor has a garden that is 7 meters long and 4 meters wide. How much fence does he need for his garden? Solve the problem and write the solution on another index card.

4. Students solve the remaining puzzles and share their solutions to the puzzles.

5. Swap cards and match problem situations, puzzle cards, and solutions.

6. Journal Prompt: Finish the sentence, "Perimeter is…"
Puzzling Perimeter

Puzzle 1: This shape is a rectangle.

What is the perimeter?

7 meters
3 meters

Puzzle 2: The shape is a rectangle. The perimeter is 52 feet.

What is the width of the rectangle?

19 feet

Puzzle 3: The shape is square. The perimeter is 32 inches.

What is the length of each side?

Puzzle 4: The shape is a triangle. The perimeter is 24 centimeters.

What is the missing length?

Puzzle 5: Use the lengths shown to help you solve this puzzle.

How long is the side with a question mark?

20 m
8 m
20 m
10 m

Puzzle 6: The length and width are shown on the rectangle.

What is the perimeter if the width is increased by 3 inches?

14 inches
6 inches
<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td>The student is expected to use concrete models of square units to determine the area of shapes. (3.11C)</td>
</tr>
<tr>
<td></td>
<td>Activity: Today we will use color tiles to find the area of different shapes. Finding area is a skill we use when we buy carpet or tile to cover a floor.</td>
</tr>
<tr>
<td>Color Tiles (inch squares)</td>
<td>1. The students use color tiles to make a shape that has an area of 10 square inches.</td>
</tr>
<tr>
<td>Rearranging Area sheets</td>
<td>2. The students rearrange the tiles to create a different shape.</td>
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<tr>
<td>Scissors</td>
<td>3. The teacher asks:</td>
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<td></td>
<td>* What is the area of your new shape?</td>
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<tr>
<td></td>
<td>* How can shapes look different but still have the same area?</td>
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<td>4. Students use the color tiles to find the area of Shape 1 on the activity sheet. Share and compare.</td>
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<tr>
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<td>5. The students find the area of Shape 2. If they use the color tiles they may have a problem with the half units. Have students share strategies for figuring out the area.</td>
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<td>6. Have the students:</td>
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<td>* Cut out the tiles beneath Shapes 3 and 4. (Or cut them out ahead of time.)</td>
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<td></td>
<td>* Make a new shape with the cut out tiles and find the area.</td>
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<tr>
<td></td>
<td>* Use the cut out tiles to find the area of Shapes 3 and 4.</td>
</tr>
<tr>
<td></td>
<td>* Share and compare.</td>
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<td>7. Journal Prompt: What is the difference between area and perimeter? Give an example of when you need to find area and an example of when you need to find perimeter.</td>
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<table>
<thead>
<tr>
<th>Vocabulary</th>
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<tbody>
<tr>
<td></td>
<td>Area</td>
</tr>
<tr>
<td></td>
<td>Square units</td>
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</table>

<table>
<thead>
<tr>
<th>Warm-up</th>
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<tbody>
<tr>
<td>Function Machine</td>
<td>Multiply by 6</td>
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Rearranging Area

Shape 3

Shape 4

Cut out these tiles to use to find the area of Shapes 3 and 4
Crazy Rugs

<table>
<thead>
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<tbody>
<tr>
<td>Per student</td>
<td>The student is expected to use [concrete] models of square units to determine the area of shapes. (3.11C)</td>
</tr>
<tr>
<td>• Color tiles</td>
<td></td>
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<tr>
<td>• Crazy Rugs sheets (one-sided)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Activity: Today we are going to use square tiles to measure the area of different rugs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Area</td>
<td>1. Teacher says:</td>
</tr>
<tr>
<td>• Congruent</td>
<td>• We can measure to figure out how big a rug must be to cover the floor, or how much wrapping paper we need to cover a box. For the rug or the wrapping paper, we want to know how much flat space something covers. We don’t want to measure just around the edges; we want to measure all the space. Flat space is often measured with square units, and that's what we’re going to do. We will be finding area.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Warm-up Lifesaver Math Subtract 10</th>
<th>2. Teacher shows Crazy Rugs and says:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Welcome to my Crazy Rugs store! In my store, I have many rugs in different shapes and sizes. I also have lots of customers who want a rug with a certain area. We’re going to use square tiles to measure the rugs.</td>
</tr>
</tbody>
</table>

| | 3. Students use color tiles to answer the following questions. |
| | • Which rugs are 10 square units? Are these rugs congruent? Why or why not? |
| | • Which rug is 8 square units? Which rug is 2 square units? How much larger is the larger rug? |
| | • Which rug is 5 square units? Which rug is 9 square units? How much smaller is the smaller rug? |
| | • I have a customer who needs two rugs with a total area of 11 square units. Which two rugs can I sell the customer? |

| | 4. Teacher chooses one of the rug cards and asks: |
| | • If each square unit costs $3, how much would this rug cost? |
| | • Can you find a rug with a smaller area than this rug? |
| | • Can you find a rug with a bigger area than this rug? |

| | 5. Teacher says: |
| | • You did a great job finding rugs for my customers. Now I’d like you to make a rug for my store. Please use 12 tiles. Let’s see how many different shaped rugs you can make with 12 tiles. |

| | 6. Students use 12 tiles to make their own crazy rugs. |

| | 7. Journal Prompt: Record three ways you used 12 tiles to make your own crazy rug. |

Adapted from The Super Source: Cuisenaire Rods, Grades 3-4
### Telling Time 1

<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per student</td>
<td>The student is expected to tell and write time shown on traditional and digital clocks. (3.12A)</td>
</tr>
<tr>
<td>- Mini Clocks</td>
<td></td>
</tr>
<tr>
<td>- Telling Time 1 sheet</td>
<td></td>
</tr>
<tr>
<td>For the teacher</td>
<td>Activity: Today we will review how we keep track of the minutes on a clock.</td>
</tr>
<tr>
<td>- Demonstration clock with gears</td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td>1. The teacher asks the students to tell what activity they can do that takes about one minute.</td>
</tr>
<tr>
<td>- Half hour</td>
<td>2. Have the students predict how many times they can write their name in one minute. Then have the students write their name over and over for one minute.</td>
</tr>
<tr>
<td>- Quarter hour</td>
<td>3. Discuss how a clock keeps track of minutes for us. Each time a minute goes by, the minute hand moves one space.</td>
</tr>
<tr>
<td>Warm-up</td>
<td>4. The students follow the directions on the activity sheet. Students should shade from number to number around the edge of the clock.</td>
</tr>
</tbody>
</table>

#### My Product Is

72
Start shading at the 12.
Shade in a clockwise direction.

1. Shade 5 minutes red.

2. Shade 5 more minutes blue.
   How many minutes are shaded now? ______

3. Shade 5 more minutes red.
   How many minutes are shaded now? ______

4. Shade 5 more minutes blue.
   How many minutes are shaded now? ______

Continue this pattern.

5. How many minutes are between each number on the clock? ______

6. How many minutes in one hour? ______
Start shading at the 12.
Shade in a clockwise direction.

7. Shade a quarter of an hour red.
   Shade half an hour more blue.
   How many minutes are shaded now? ________

8. Shade 10 more minutes.
   How many minutes are shaded now? ________

9. How many more minutes until the hour is completely full? ________

10. How many minutes in a half hour? ________

11. How many minutes in a quarter hour? ________
| Materials | TEKS Student Expectation:  
The student is expected to tell and write time shown on traditional and digital clocks. (3.12A) |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Per student</td>
<td>Activity: Today we are going to demonstrate different times on clocks. It is important to be able to tell time on traditional and digital clocks.</td>
</tr>
</tbody>
</table>
| Mini clocks, Telling Time 2 sheet | 1. Teacher asks the students to demonstrate a variety of times on their clocks. For example:  
   - 4 o'clock  
   - 5 minutes after 4  
   - Quarter after 4:00  
   - Half past 4  
   - 4 forty five  
   - 5 minutes until 5:00  
2. Students show times on their clocks as they read the digital clocks on the Telling Time 2 sheet.  
3. Follow-up questions:  
   - What happens to the hour hand when the minute hand moves half way around the clock?  
   - What happens to the hour hand when the time is almost back on the 12?  
   - How do you know where the minute hand is when the time is 7:25?  
   - How do you know where the minute hand is when the time is 9:12?  
   - How do you know where the hour hand is when the time is 7:25?  
4. Journal Prompt: Write three times that are between 1:15 and 2:15. |
| For the teacher | Vocabulary  
   - Minute hand  
   - Hour hand  
   - Traditional clock  
   - Digital clock |
| Demonstration clock with gears | Warm-up  
**Spotlight Number 6**  
Can you make it by adding 3 numbers?  
Can you make it by multiplying 2 numbers?  
Can you make it by dividing 2 numbers? |
Telling Time 2

12:35
8:03
1:12
6:23
3:15
11:47
9:18
5:25
**Clock Talk**

| Materials | TEKS Student Expectation:  
The student is expected to tell and write time shown on traditional and digital clocks. (3.12A) |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Per student</td>
<td></td>
</tr>
<tr>
<td>- Mini clocks</td>
<td></td>
</tr>
<tr>
<td>- Individual response boards (optional)</td>
<td></td>
</tr>
<tr>
<td>For the teacher</td>
<td></td>
</tr>
<tr>
<td>- Demonstration clock with gears</td>
<td></td>
</tr>
<tr>
<td>Vocabulary</td>
<td></td>
</tr>
<tr>
<td>- Analog</td>
<td></td>
</tr>
<tr>
<td>- Hour</td>
<td></td>
</tr>
<tr>
<td>- Minute</td>
<td></td>
</tr>
<tr>
<td>- Quarter past</td>
<td></td>
</tr>
<tr>
<td>- Quarter ‘til</td>
<td></td>
</tr>
<tr>
<td>- Half past</td>
<td></td>
</tr>
<tr>
<td>- Noon</td>
<td></td>
</tr>
<tr>
<td>- Midnight</td>
<td></td>
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<tr>
<td>Warm-up</td>
<td></td>
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<tr>
<td><strong>Two at a Time</strong></td>
<td></td>
</tr>
<tr>
<td>[\triangle + \square = 9]</td>
<td></td>
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<tr>
<td>[\triangle + \triangle + \triangle + 1 = \square]</td>
<td></td>
</tr>
<tr>
<td>Answer:</td>
<td></td>
</tr>
<tr>
<td>[\triangle = 2]</td>
<td></td>
</tr>
<tr>
<td>[\square = 7]</td>
<td></td>
</tr>
</tbody>
</table>

**Activity:** Today we will use clocks to tell time and solve problems. Measuring time helps us know when something begins or ends, or how long it lasts.

1. Students use their play clocks for the following activities:
   - The big hand is pointing to the 7. The small hand is between 5 and 6. What time is it? (5:25)
   - The hour hand is just a little past the 8. The minute hand is pointing to the 1. What time is it? (8:05)
   - The hour hand is between 6 and 7, and the minute hand is pointing to the 6. What time is it? (6:30)
   - Show me a quarter past 5:00.
   - Show me quarter ‘til 2:00.
   - Show me half past 3:00.
   - Show me noon.
   - Show me midnight.
   - Show me 10 ‘til 4:00.
   - Show me a time between 6:00 and 6:30.
   - Show me a time between 2:00 and 3:15.
   - At 1:10, I left for soccer practice. I was gone for 3 hours and 15 minutes. What did the clock look like when I got home? I started my homework at 4:15. I stopped at 5:45. How long did I do my homework?

2. Teacher shows each of the following times on his/her clock. Students write the correct times: 1:10, 4:45, 6:55, 9:15, 11:20

3. **Journal Prompt:** Solve this problem in your journal:

   I started soccer practice at 6:45, and practice ended at 8:10. How long was practice?
### Reading a Thermometer

**Materials**
- **Per student**
  - Reading a Thermometer sheet
  - Thermometer (real)
- **For the teacher**
  - Reading a Thermometer

**Vocabulary**
- Temperature

**TEKS Student Expectation:**
The student is expected to use a thermometer to measure temperature. (3.12B)

**Activity:** Today we will use a number line to help us learn to read a thermometer. Reading a thermometer helps us know how hot or cold something is.

1. Students solve the questions for the first number line on the “Making a Thermometer” activity sheet.
2. Students share and compare strategies.
3. Students study the second number line and compare how the two are the same and different. (Be sure students understand that the increments have changed.)
4. Students answer the questions for the second number line and share strategies.
5. Teacher holds up the teacher sheet so the number line is horizontal, then turns it so the line is vertical. Discuss how the line remains the same.
6. Teacher passes out real thermometers. Discuss how a thermometer is like a number line.
7. Students answer questions using the thermometer/number line.
   - What would the thermometer look like if it were inside a refrigerator that was 24 degrees?
   - What would the thermometer look like if it were outside the window on a 45-degree day?
   - What would the thermometer look like if the temperature dropped 7 degrees?
8. Students use the real thermometer to find the temperature of the room. Then have the students hold the thermometers in their fists to warm them up and measure the temperature again.
9. Journal Prompt: How is a thermometer like a number line?

---

**Warm-up**

**Fact of the Day**
8 X 9
What is a word problem that could be answered using this fact?
Reading a Thermometer

Put a dot on the number line at the place where 8 should go.

Put a dot on the number line at the place where 21 should go.

What number should go where you see the square? _________

What number should go where you see the triangle? _________

Put a dot on the number line at the place where 8 should go.

Put a dot on the number line at the place where 21 should go.

What number should go where you see the square? _________

What number should go where you see the triangle? _________
## Understanding a Thermometer

### Materials
- Per student
  - Understanding a Thermometer sheets

### TEKS Student Expectation:
The student is expected to use a thermometer to measure temperature.
(3.12B)

### Activity:
Today will learn about different scales that can be used to measure temperature. Different thermometers have different scales. Being able to read a temperature means that you understand the scale on the thermometer.

1. Teacher asks:
   - Do you have any idea what the outside temperature is today?
   - What would you estimate the temperature is inside? (Students should look at the thermostat or read a thermometer to get the temperature.)

2. Explain how the thermometers on the activity sheets show both Fahrenheit and Celsius scales for measuring temperature. (Degrees Fahrenheit are on the left and indicated with an F. Degrees Celsius are on the right and indicated with a C.) Ask students what else they observe.

3. Tell students that the Celsius scale is used more often in other countries than here. At the same temperature, each scale will show a different number, but the actual temperature is still the same. For example, water freezes at 32 degrees Fahrenheit and 0 degrees Celsius. The water itself is the same temperature.

4. Students shade the thermometers on the “Making a Thermometer” activity sheet to show the given temperatures.

5. Students share strategies for find the correct place on the thermometer.

6. Journal Prompt: You can pick one question to answer in your journal:
   - How is the Celsius scale the same as the Fahrenheit scale?
   - How is the Celsius scale different from the Fahrenheit scale?

7. Students share what they have written in their journals.
Understanding a Thermometer

Shade to show 15°C.
Show that the temperature rises 10°.

Shade to show 60°F.
Show that the temperature rises 5°.
Shade to show 2° C.
Show that the temperature has risen 9°.

Shade to show 95° F.
Show that the temperature reaches more than 100°.
# Length Problems

**Student Expectation:** The student is expected to measure to solve problems involving length, area, temperature, and time (3.13)

**Activity:** Today we are going to solve some problems using inches, feet, and yards. Sometimes you need to think about the length in two ways to solve the problem.

1. Give each group of students a piece of yarn that is 2 feet long. Tell them that it is 2 feet long, but have them measure to check.

2. Then give them another piece of yarn that is 2 inches long. Tell them that it is 2 inches long, and have them measure to check.

3. The teacher asks the students to find the sum of the two lengths of yarn.
   - Should we add 2 + 2?
   - Why would that not work?
   - What should we do to get the total?

4. Teacher demonstrates that the 2-foot length of yarn can be measured in inches. Then it is possible to add 24 + 2 to get the total length.

5. Repeat activity with a 2-yard length of yarn and a 3-foot piece of yarn.

6. Teacher asks:
   - What is the total length?
   - How do you know?
   - Could you measure the total length in yards?
   - Could you measure the total length in feet?
   - Could you measure the total length in inches?
   - Why do you have to think about the different units? (Because you have to use one unit in order to get the total.)

7. Journal Prompt: Rick had 3 feet of licorice. He ate 2 inches of it. How much licorice does he have left? Explain why you cannot solve this problem by doing 3 – 2 = 1.
### Length on a Map, Part 1

<table>
<thead>
<tr>
<th>Materials</th>
<th>Student Expectation: The student is expected to measure to solve problems involving length, area, temperature, and time (3.13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the group</td>
<td>Activity: Today we are going to solve problems about length. People use measuring all the time in their homes and at work. We will compare our heights and then solve more problems using a map.</td>
</tr>
<tr>
<td>• Yardstick or measuring tape</td>
<td>1. Students all stand up and determine who is the tallest in the group and who is the shortest in the group.</td>
</tr>
<tr>
<td>Per pair</td>
<td>2. The students solve this problem: How much taller is _________ than _________?</td>
</tr>
<tr>
<td>• Length on a Map, Part 1 sheet</td>
<td>3. The teacher asks:</td>
</tr>
<tr>
<td>• Inch ruler</td>
<td>• What does this question mean? (Discuss the concept of comparing.)</td>
</tr>
<tr>
<td></td>
<td>• What tools will we need?</td>
</tr>
<tr>
<td></td>
<td>• What strategies should we use? (Strategies may vary.)</td>
</tr>
<tr>
<td></td>
<td>• Show me what you would do. What unit of measure can we use?</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>4. Emphasize these two strategies if students do not make these suggestions:</td>
</tr>
<tr>
<td>• Inch</td>
<td>Strategy 1 → Measure student A. Measure student B. Subtract the two measurements to find the difference.</td>
</tr>
<tr>
<td>• Compare</td>
<td>Strategy 2 → Have students A and B stand back to back. Measure the distance from the top of student B’s head to the top of student A’s head to find the difference.</td>
</tr>
<tr>
<td>• Difference</td>
<td>5. Students work in pairs to solve the problems on the Comparing Length 1 handout. Emphasize that estimation will be used because the map does not show exact points for the different locations. Be sure students find and use the scale.</td>
</tr>
<tr>
<td>Warm-up</td>
<td>6. Students share and compare strategies with other students.</td>
</tr>
<tr>
<td><strong>More or Less</strong> 23,487</td>
<td>7. Journal Prompt: How did you use your ruler and the scale on the map to solve the biking problems?</td>
</tr>
<tr>
<td>• What is 7,000 more?</td>
<td></td>
</tr>
<tr>
<td>• What is 50 less?</td>
<td></td>
</tr>
</tbody>
</table>

---

**Vocabulary**

- Inch
- Compare
- Difference
1. Mary is going to ride her bike from her house to Joan’s house and then go with Joan to the pool. When she is finished swimming, she will go back to Joan’s house. Joe is going to ride his bike from his house to the ice cream shop and then go to Tom’s house.

   Who is biking more miles, Mary or Joe? ____________ How many more? ___________

2. If Dan bikes from his house to the park and back, how many miles will he bike? ______

3. Mary rides her bike to school every day. How far does she travel in a week? __________
### Materials
- For the group
  - Pencils of different lengths
- Per student
  - Centimeter ruler
  - Length on a Map, Part 2 sheet

### Vocabulary
- Centimeter
- Compare
- Difference
- Scale

### Warm-up
**Spotlight Number 50**
Can you make it by adding 4 numbers together?
Can you make it multiplying 2 numbers together?
Can you make it subtracting 2 numbers?

### Student Expectation:
The student is expected to measure to solve problems involving length, area, temperature, and time (3.13)

### Activity:
Today we are going to solve the biking problems again, but we are going to use a different unit. We are going to use centimeters from the metric system.

1. Give each student a pencil to measure.

2. The teacher asks:
   - What tools will we need?
   - What strategies should we use?
   - Show me what you would do.
   - What unit of measure did you use?
   - Does it take more inches or more centimeters to measure the pencil?
   - Why do you think this is true?

3. Tell the students that they are going to use centimeters today to solve the biking problems. Emphasize that estimation will be used because the map does not show exact points for the different locations. Be sure students find and use the scale on the map.

4. Students work in groups to solve the problems on the Comparing Length 2 handout.

5. Students share and compare strategies with other students.

6. Journal Prompt: Explain why the answers to the same biking problem situations are different when we measure in centimeters and in inches.
1. Mary is going to ride her bike from her house to Joan's house and then go with Joan to the pool. When she is finished swimming, she will go back to Joan's house. Joe is going to ride his bike from his house to the ice cream shop and then go to Tom's house.

Who is biking more kilometers, Mary or Joe? _______________

How many more? __________

2. If Dan bikes from his house to the park and back, how many kilometers will he bike? ______

3. Mary rides her bike to school every day. How far does she travel in a week? __________

Each centimeter is equal to one kilometer.
### Materials

Per pair
- Cup of ice water
- Cup of hot water
- 2 Thermometers

### TEKS Student Expectation:
The student is expected to measure to solve problems involving length, area, temperature, and time. (3.13)

### Activity:
Today we are going to use thermometers to measure the temperature of hot and cold water. It is important to be able to read a thermometer so that you can tell how hot or cold something is.

Safety Note: Hot water should be at a safe temperature.

1. Teacher gives each pair a cup of hot water, a cup of cold water, and two thermometers. Student 1 will collect data for the cup of hot water and Student 2 will collect data for cold water.

2. Teacher says: Today we will be measuring the temperature of water to determine whether it cools off or warms up more in ten minutes. Which do you think it will be?

3. Students put thermometers in the cups of water and wait a minute or so.

4. Teacher says: Now take the thermometer out, read it, and then record the temperature.

5. Repeat every minute for ten minutes.

6. Discuss the results of the experiment. Did all the partners get the same results? If not, what might have caused the variation?

7. Journal Prompt: Complete the sentence: To read a thermometer correctly, be sure to….
<table>
<thead>
<tr>
<th>Who is the Hottest?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials</strong></td>
</tr>
<tr>
<td>Per student</td>
</tr>
<tr>
<td>• Who is the Hottest? thermometer</td>
</tr>
<tr>
<td>• Red pencil or crayon</td>
</tr>
<tr>
<td>Per group</td>
</tr>
<tr>
<td>• Who is the Hottest? cards, cut apart</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
</tr>
<tr>
<td>• Increase</td>
</tr>
<tr>
<td>• Decrease</td>
</tr>
<tr>
<td>• Fahrenheit</td>
</tr>
<tr>
<td>• Celsius</td>
</tr>
<tr>
<td>• Scale</td>
</tr>
<tr>
<td><strong>TEKS Student Expectation:</strong></td>
</tr>
<tr>
<td>The student will measure to solve problems involving length, area, temperature, and time. (3.13)</td>
</tr>
<tr>
<td><strong>Activity:</strong> Today you will make up your own problems about temperature and solve each other's problems. You will get to color in five degrees on your thermometer every time you solve a problem. The person who is the hottest at the end of the game is the winner.</td>
</tr>
<tr>
<td>1. Teacher leads discussion of what temperature it might be on a hot day or on a cold day.</td>
</tr>
<tr>
<td>2. Teacher says:</td>
</tr>
<tr>
<td>• You will get a card with a problem on it, but the data is missing.</td>
</tr>
<tr>
<td>• It is your job to fill in the missing data in a way that makes sense.</td>
</tr>
<tr>
<td>• Be sure to write °F or °C as part of the data where it is needed.</td>
</tr>
<tr>
<td>• Let's enter the data on the first one together. (Do a sample problem.)</td>
</tr>
<tr>
<td>• When you have finished the problems, we will all solve them together.</td>
</tr>
<tr>
<td>3. When the problems are ready, the teacher passes out a thermometer and a red pencil (or crayon) to each student.</td>
</tr>
<tr>
<td>4. Teacher says:</td>
</tr>
<tr>
<td>• We want to see who ends up with the highest temperature.</td>
</tr>
<tr>
<td>• Every time you solve a problem correctly, you can color in five degrees on your thermometer beginning at 0 °F.</td>
</tr>
<tr>
<td>5. Teacher reads the problems one at a time. Students solve the problem and the group checks. Students who correctly solve the problem shade their thermometers.</td>
</tr>
<tr>
<td>6. Journal Prompt: Pick one of the problems from the game and solve it in your journal.</td>
</tr>
</tbody>
</table>

**Warm-up More or Less**
511,143
What is 40,000 more?
What is 300,000 less?
### Who is the Hottest?

1. It was a hot summer day in Texas. The thermometer showed _____. Then the clouds went away, and it got even hotter. Now the thermometer shows _____. How much did the temperature rise?

2. One hot summer day in Texas, the radio station reported that the temperature was _____. Judy jumped into the pool to cool off. The water in the pool was _____. How much cooler was the pool?

3. On a perfect fall morning in Texas the temperature was _____. As the day went on, the high reached _____. How much did the temperature rise during the day?

4. One chilly fall day in Texas the temperature was _____. Then a cool front came through and the temperature dropped _____. What was the temperature after the cool front?

5. One beautiful spring day in Texas, the newspaper forecast that the high would be _____. The actual high was _____. What was the difference between the forecast and the actual high?

6. The Field Day was scheduled for a warm spring day. The temperature outside was ____. By the end of school the temperature had risen ____ degrees. What was the temperature outside then?

7. One cold winter afternoon in Texas, the high temperature was _____. The high was ______ degrees warmer than the morning temperature reported on the weather channel. What was the temperature reported in the morning?

8. One icy winter day in North Texas the temperature was ____ in Fort Worth. The temperature in Dallas was _____. What was the difference between the temperature in the two cities?
<table>
<thead>
<tr>
<th>Class Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials</strong></td>
</tr>
<tr>
<td>Per student</td>
</tr>
<tr>
<td>- Class Time schedule—either the prepared one or your own.</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
</tr>
<tr>
<td>- Elapsed time</td>
</tr>
<tr>
<td><strong>TEKS Student Expectation:</strong></td>
</tr>
<tr>
<td>The student is expected to measure to solve problems involving length, area, temperature, and time. (3.13)</td>
</tr>
<tr>
<td><strong>Activity:</strong> Today we will use our class schedule to solve problems about time.</td>
</tr>
<tr>
<td>1. Students work as partners to calculate the length in hours and/or minutes of each subject or activity.</td>
</tr>
<tr>
<td>2. Students use that information to answer the following questions:</td>
</tr>
<tr>
<td>- How much time passes between the starting and ending times of the first and second subjects or activities?</td>
</tr>
<tr>
<td>- What are you doing when it is 35 minutes after 9:15 AM?</td>
</tr>
<tr>
<td>- How much time passes from the end of math to the start of recess?</td>
</tr>
<tr>
<td>- What are you doing when it is 1 hour and 30 minutes after lunch?</td>
</tr>
<tr>
<td>- How much time passes from the time school begins until you leave school at the end of the day?</td>
</tr>
<tr>
<td>3. Students create two more time elapsed questions to pose to other students.</td>
</tr>
<tr>
<td>4. Journal Prompt: Exchange problems and record the solution to your new problem in your journal.</td>
</tr>
</tbody>
</table>

**Warm-up:**

**My Product Is**

100
<table>
<thead>
<tr>
<th>Time</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00</td>
<td>Mathematics</td>
</tr>
<tr>
<td>9:30</td>
<td>Language Arts</td>
</tr>
<tr>
<td>11:30</td>
<td>Lunch</td>
</tr>
<tr>
<td>12:00</td>
<td>Recess and Wellness</td>
</tr>
<tr>
<td>12:30</td>
<td>Science and Social Studies</td>
</tr>
<tr>
<td>1:45</td>
<td>Fine Arts and Physical Education</td>
</tr>
<tr>
<td>2:30</td>
<td>Learning Stations</td>
</tr>
<tr>
<td>3:00</td>
<td>See you tomorrow!</td>
</tr>
</tbody>
</table>
## Is It Time Yet?

| Materials | TEKS Student Expectation:  
| Per student | The student is expected to measure to solve problems involving length, area, temperature and time. (3.13) |

| Vocabulary | Activity: Today we will solve problems about elapsed time using the television listing. Knowing how long shows last and what time they end can help you plan your evening so that you have time to do your homework.  
| - Elapsed time | 1. Students read over the television listing.  

|  | 2. Teacher asks:  
| - What does a television listing tell us?  
| - Where are the times located? (At the top of each column)  
| - What amount of time does each cell in the table represent?  
| - How long does Smart Dogs last? How do you know?  
| - How long does Disney World last? How do you know?  
| - How long does Toy Story last? How do you know?  

|  | 3. Students as partners find shows that last for:  
| - 1 hour  
| - 30 minutes  
| - More than 1 hour.  

|  | Students name the show, the beginning time, and the ending time.  

|  | 4. Teacher asks:  
| - If it is now 6:30 and you’ve been watching a TV program for 45 minutes, what time did you start and what program might you have been watching?  

|  | 5. Journal Prompt:  
| - Your parents are allowing you to watch TV for only 90 minutes the entire evening. What shows will you watch and at what times?  

**Warm-up**  
**Spotlight Number** 72  
Can you make it by adding 2 numbers?  
Can you make it by multiplying 2 numbers?  
Can you make it by subtracting 2 numbers?
# Tuesday Evening Television

<table>
<thead>
<tr>
<th>Channel</th>
<th>5:00</th>
<th>5:30</th>
<th>6:00</th>
<th>6:30</th>
<th>7:00</th>
<th>7:30</th>
<th>8:00</th>
<th>8:30</th>
<th>9:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 KLEW</td>
<td>Funniest Animals</td>
<td>Happy Days</td>
<td>Spy Kids</td>
<td>Goof Troop</td>
<td>Cartoon Corral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 KPLA</td>
<td>Hey Arnold!</td>
<td>The Munsters</td>
<td>Toy Story</td>
<td>I Love Lucy</td>
<td>Disney World</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 KDEN</td>
<td>Animal Rescue</td>
<td>Crocodile Hunter</td>
<td>Cowboys Football</td>
<td>American Idol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 KPLD</td>
<td>Rainbow Fish</td>
<td>Holes</td>
<td>Smart Dogs</td>
<td>Spiderman</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Materials
- "Oops! I Did It Again" graph sheet, cut into individual graphs
- Graph Information sheet, cut apart

### Per Pair
- Graph Titles list

### Vocabulary
- Graph title
- Graph labels

### Warm-up

**Two at a Time**

\[
\begin{align*}
\triangle + \triangle + \triangle &= 2 \square \\
\triangle - 2 &= \square
\end{align*}
\]

**Answer:**
- \(\triangle = 9\)
- \(\square = 7\)

Adapted from: **TEXTEAMS Institute** for PK-K

## TEKS Student Expectation:
The student is expected to interpret information from pictographs and bar graphs. (3.14B)

### Activity:
Today you will help me solve a problem with some important documents. Understanding graphing will help you with this problem and will help you read and interpret information organized this way.

1. **Teacher says:**
   - I need your assistance. Some water has accidentally been spilled on some very important graphs and your assistance is very much needed to help determine the missing information that is now illegible. A master list of the graph titles was undamaged and therefore can help in the quest.

2. **Teacher gives one "damaged" graph to each student and a list of the possible titles to each pair of students.

3. **Working as partners, students:**
   - Discuss the graphs and select the title they feel matches each of their graphs. (Teacher affirms or redirects students with their matches, allowing them to attempt as many times as necessary until they get the correct title.)
   - When they have determined the correct title, they get the appropriate pieces of the Graph Information sheet about their graphs to discuss.
   - Students then complete their graphs by adding a title and other missing information.
   - Partners create two questions about each of their graphs.
   - Students share graphs and questions.

4. **Teacher asks:**
   - How did you determine which title went with which graph?
   - What clues helped you?
   - How did you figure out what the missing information was on your graph?

5. **Journal Prompt:** Explain why titles and labels on graphs are important.
Oops! I Did It Again – Graph Information

**Hours of Playtime Outside**
Tim kept a record to help him determine the number of hours that he played outside during November, December, January and February. He made this graph which showed that he played the least amount of time in February.

**Books Read by Fourth Graders**
The fourth grade keeps a chart of the number of books read by each student. The teacher made this graph to show the results of four of her students.—Jerome, Darian, Teng and Tyla.

**Rainy Days In Dallas**
The weather bureau keeps records of all kinds of weather information. This graph showed the number of days it rained during four consecutive months in Dallas.

**Drinks for the Soccer Game**
Suzie made a graph to show her mother the number of each kind of drink that she needed to bring to the soccer game. She wanted to make sure that she bought more cherry drink than grape drink.

**Soccer Games Won**
The Blaze, Lions, Tigers, and Sharks made a graph to show the number of soccer games that their teams won during the season. The top two teams advanced to the finals.

**Socks in Sarina’s Drawer**
Before going shopping with her mother, Sarina made a graph to show the pairs of socks in her drawer. She wanted some other color besides the red, blue, black, and white socks she already has.

**Pets in the Fourth Grade**
The fourth grade class took a survey of the different kinds of pets that each classmate had. They discovered that the same amount of people had rats as had fish.
Oops! I Did It Again

Graph Titles

Hours of Playtime Outside
Books Read by Fourth Graders
Rainy Days in Dallas
Drinks for the Soccer Game
Soccer Games Won
Socks in Sarina’s Drawer
Pets in the Fourth Grade
Oops! I Did It Again – Graphs

- **Graph 1:**
  - Categories: cola, cherry, orange
  - Values: 6, 5, 4

- **Graph 2:**
  - Categories: red, black, blue
  - Values: 1, 8, 6

- **Graph 3:**
  - Months: November, December, January
  - Values: 70, 60, 50
Oops! I Did It Again – Graphs

1. Sharks, Lions, Blaze
2. January, February, March
3. Jerome, Darian, Tyla
4. fish, cat, gerbil, dog
### Show Me The Candy

**Materials**
- Show Me the Candy sheets
- Scissors
- Tape
- Crayons
- Glue

**TEKS Student Expectation:**
The student is expected to collect, organize, record and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data. (3.14 A/B)

**Activity:** Today we are going to create a pictograph using pictures to represent pieces of candy.

1. Hand out the sheet of candies and the blank pictograph.
2. The teacher says:
   - Fifteen candies are cherry, five are lime, twenty are orange and ten are grape.
3. Write the flavors and numbers on the board. Then have students cut out a strip of candy pictures to show the number of each flavor. (They can tape strips together as needed.)
4. Teacher says:
   - We are going to make a pictograph of the candies.
   - Place the candies for each flavor on the graph, starting on the horizontal line.
   - What is the problem we have with fitting the strips of candies on the graph? (They are too long.)
   - How could we solve that problem? Could we make each picture represent more than one piece of candy so the data will fit on the page? (Let each picture represent five pieces of candy.)
5. Teacher says:
   - We are going to color the pictures of candy to match the flavors.
   - If each picture represents 5 candies, how many pictures do you need to color for cherry? (3); lime? (1); orange? (4); grape? (2).
   - How will some one know that each picture represents five pieces of candy? (Make a key.)
6. Have students complete the pictograph by gluing the pictures onto the graph, labeling it, and writing a title.
7. Teacher says:
   - What title did you put on the graph?
   - What labels did you put on the graph? (Names of the candies.)

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**Vocabulary**
- Pictograph
- Key
- Data
- Labels
- Title
- Horizontal

**Warm-up**
**Fact of the Day**
8 X 6
What picture could you draw to represent this fact?
8. Teacher asks:
   - How can you tell how many of a certain flavor of candy there are by looking at your graph?
   - Use your graph to tell me how many more cherry candies there are than grape candies.
   - If John only likes grape and orange candy, how many candies would he like to eat?
   - Suzie ate all of the lime and grape candies. How many candies are left?

9. Journal Prompt: Write two more questions that could be answered from the graph.

NOTE: Save pictographs for Show Me the Candy Again.
Show Me The Candy - Pictograph

Key
### Materials
- Pictograph from “Show Me The Candy?”
- Show Me the Candy Again sheet
- Crayons

### TEKS Student Expectation:
The student is expected to collect, organize, record and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data. (3.14 A/B)

### Activity:
Today we are going to use the data from the pictograph that we made last time and make a bar graph. It is important to be able to represent the same data in different ways.

1. **Teacher says:** (Note: the answers below are appropriate for a vertical graph. If your pictographs are horizontal, change the answers accordingly.)
   - Look at the blank graph.
   - What should the horizontal line be labeled? (Flavors)
   - What should the vertical line be labeled? (Number of Candies)
   - How should we number the vertical line? (By fives)
   - Should we change the title? Why or why not?

2. Complete the graph by drawing and coloring the bars and completing the scale on the vertical line.

3. **Teacher says:**
   - Can you tell from the bar graph how many candies there are all together? Explain how you could find the total.
   - Can you tell from the graph how many more cherry candies there are than grape candies? How can you tell?
   - If all of the candies are placed in a jar, is it more or less likely that you would pick a cherry candy from the jar if you couldn’t see inside?
   - Is the information the same on the bar graph and pictograph? Why?

4. Have students contribute questions that could be answered from the information on the graph.

5. **Journal Prompt:** How are the bar graph and the pictograph alike? How are they different?

### Vocabulary
- Bar graph
- Labels
- Horizontal
- Vertical
- Title
- Data

### Warm-up
**Flower Power**
100
Show Me The Candy Again – Bar Graph
## Rolling Sums

### Materials
- **For the group:**
  - 2 dice
- **Per student:**
  - Markers
  - Rolling Sums sheet

### TEKS Student Expectation:
The student is expected to [collect], organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data. (3.14A)

### Activity:
Today we will play a game involving addition facts and record the results in a bar graph. A bar graph gives us a picture of the data.

1. Teacher writes the numbers 0-13 vertically on the board, leaving room next to each number for tallies to be made.

2. Students take turns rolling two dice. After a student rolls both dice, he/she says the sum of the two numbers rolled. (For example, if a student rolls 2 and 5, he/she says, “The sum is 7.”)

3. The sum of each roll is recorded with one tally on the board. Record the tallies for twenty rolls.

4. Teachers says:
   - I’m going to give each of you a paper to construct a bar graph.
   - On the paper, you will record the data from our tallies.
   - Each cell on our graph will be equal to 2 rolls of the dice. (Use your own data for the example: For example, if the sum of 4 was rolled six times, then we will color in 3 cells on our bar graphs.) How many cells would we color to represent 8 of a certain sum? (4) How would we show that a certain sum came up 5 times? (Color 2 and a half cells.)
   - What should the label on the horizontal line be?
   - What should the label on the vertical line be?
   - How should we number the horizontal lines?
   - What title should we put on the graph?

5. Students complete their bar graphs.

6. Teacher asks:
   - Which sum was rolled most often?
   - Is this easier to see on the tally sheet or on the bar graph?
   - Which number was rolled the least?
   - Is this easier to see on the tally sheet or on the bar graph?
   - How many more (or less) times did we roll a sum of 7 than a sum of 10?
   - Is this easier to see on the tally sheet or on the bar graph?
   - From the data, which sum is more likely to be rolled, 7 or 2?

7. Journal Prompt: Finish this statement: “The advantage of a graph over a tally sheet is…”

### Vocabulary
- Data
- Tally sheet
- Sum
- Bar graph
- Cell

### Warm-up
**Function Machine**
Add 6

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Adapted from *Tex Teams Lesson Plan*
## Rolling Sums

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</table>
# Give It a Lick

## Materials
- Give It a Lick sheets (See note.)
- Scissors
- Markers or crayons
- Glue stick

## TEKS Student Expectation:
The student is expected to interpret information from pictographs and bar graphs. (3.14B)

## Activity:
Today we will make a pictograph in which the picture represents more than one item. Using symbols to represent more than one item allows us to display data on a pictograph when the number of items is too large to fit on the graph.

Note: You may wish to have students recreate the blank graph on manila paper to have more room.

1. The teacher reads this story:
   - Down at Elmo’s Ice Cream Shop, Cookie and Oscar decided to record the flavors of ice cream that Elmo sold in one day.
   - They recorded:
     - 30 scoops of rocky road
     - 6 scoops of cookie dough
     - 12 scoops of vanilla
     - 15 scoops of peanut butter
     - 24 scoops of chocolate chunk.
   - Make a record so students can see.

2. Teacher says:
   - Each cone on the worksheet represents 3 scoops. Color the ice cream cones on the worksheet to represent the number of scoops of each flavor. Use a different color for each flavor and remember that 1 cone = 3 scoops.
   - How many cones will you need to color for rocky road?
   - How many for cookie dough?
   - Use the blank graph (or manila paper) to make a picture graph of the data. (The cones can be cut in strips).
   - What is a good title? Be sure to fill in the key and label the horizontal (number of scoops) and vertical lines (flavors).

3. When the graph is complete ask the students the following questions:
   - What was the total number of ice cream scoops sold?
   - How many more chocolate chunk scoops were sold than vanilla?
   - Were there more vanilla and peanut butter sold than rocky road?
   - What is the favorite flavor of the customers?
   - Write 2 questions about the data that Oscar and Cookie collected.

4. Journal Prompt: Write two statements that can be supported by the data in the graph.

## Vocabulary
- Pictograph
- Data
- Title
- Key
- Label

## Warm-up
**Lifesaver Math**
Multiply by 8

Adapted from Frances R Curclo, *Developing Data-Graph Comprehension in Grades K-8*
Give It a Lick

Rocky road
Cookie dough
Vanilla
Peanut butter
Chocolate chunk

KEY

= scoops
<table>
<thead>
<tr>
<th>Materials</th>
<th>TEKS Student Expectation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>For the group</td>
<td>The student is expected to use data to describe events as more likely, less likely, or equally likely. (3.14C)</td>
</tr>
<tr>
<td>- Color tiles</td>
<td></td>
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<tr>
<td>- 3 prepared bags (See steps 1, 4, and 5.)</td>
<td></td>
</tr>
<tr>
<td>- Markers</td>
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<tr>
<td>Per student</td>
<td>Activity: Today we will draw colored tiles from a bag and explore the chances of drawing various colors. Probability helps us understand how likely it is that something will happen.</td>
</tr>
<tr>
<td>- 1 bag</td>
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</table>

**Vocabulary**
- More likely
- Least likely
- Equally likely
- Impossible

**Warm-up**
**More or Less**
- 704, 506
- What is 20,000 more?
- What is 500 less?

1. Teacher puts 10 color tiles in a bag. (1 blue, 2 reds, 2 yellows, 5 greens) On the front of the bag, teacher draws and colors the tiles that are in the bag, for the students to use when answering the following questions.

2. Teacher asks:
   - Are we more likely, less likely, or equally likely to pull out a red tile than any other color?
   - Which color are we most likely to pull out?
   - Which color are we least likely to pull out?
   - Which colors are equally likely to be pulled out?

3. Students take turns pulling out one tile. The result is tallied, and tile is put it back in the bag. Do this 10-20 times. Discuss the results.

4. Repeat the activity with a different bag of tiles, using a different combination of colors.

5. Teacher shows a bag with a "?" on the front. (Inside the bag, there are: 6 blues, 0 red, 3 yellow, 3 greens. But, this time the teacher does not tell the students what's in the bag.)

6. Teacher says:
   - I have 12 tiles in my Mystery Bag.
   - It is impossible to pull out a red.
   - It is most likely that I’d pull out a blue.
   - Yellow and green are equally likely to be pulled out.
   - Can you give some possibilities for what’s in my bag?

7. Students draw what they think is in the bag. The teacher repeats the clues, and students check to be sure their predictions match the clues. Open the bag and discuss how the predictions fit the clues.

8. Journal Prompt: Take a bag and some tiles and write a set of clues for your Mystery Bag using the words "most likely," least likely," and equally likely."

9. Students guess what is in each other's Mystery Bags.
<table>
<thead>
<tr>
<th>Materials Per student</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Spinning Spinners sheet</td>
</tr>
<tr>
<td>• Paperclip for spinner (use with pencil)</td>
</tr>
</tbody>
</table>

**TEKS Student Expectation:**
The student is expected to use data to describe events as more likely, less likely, or equally likely. (3.14C)

**Activity:** Today we will use spinners to predict the probability of spinning various colors as more likely, less likely, or equally likely to occur. Using data makes predictions more accurate.

1. Teacher says:
   - Spin each spinner six times and use tallies to record the data below the spinner.

2. Once students have finished, collect all of the data from the group for each spinner.

3. Teacher says:
   - According to the data, are you less likely, more likely or equally likely to spin white or gray on spinner 1?
   - According to the data, are you less likely, more likely or equally likely to spin white or gray on spinner 2?
   - According to the data, are you more likely to spin grey on spinner number 1 or spinner number 2?
   - According to the data, are you equally likely to spin white on spinners 3 and 4?

4. Teacher models and then students take turns making statements such as, "According to the data, on spinner 2 you are more likely to spin white than gray."

5. **Journal Prompt (must be written out so students can refer to it):**
   Once I had a spinner that was red, yellow, green and blue. When I spun the spinner, it was equally likely that I would land on red or yellow. It was less likely that I would land on green and more likely that I would land on blue. What do you think my spinner looked like? Draw and color the spinner and explain your work.

**Vocabulary**
- More likely
- Less likely
- Equally likely
- Data

**Warm-up**
**My Product Is 25**

Adapted from Texteams Lesson Plan