With Leaps and Bounds, mathematics intervention is as easy as 1, 2, 3!

**Step 1: Administer the diagnostic assessment**

**Step 2: Select the intervention pathway**

**Step 3: Choose an open-ended intervention or guided intervention based on your students’ learning preferences or your instructional situation**

For more information and full Table of Contents, visit www.nelson.com/leapsandbounds
Leaps and Bounds 7/8 covers all math strands. This sampler includes Topics 1 and 2 from the Number strand.

Strand: Number

Use the Diagnostic Tool in the Teacher’s Resource to determine the most appropriate pathway for each student for each topic.

Representing Large Whole Numbers
- Pathway 1: Using Decimals for Large Whole Numbers (Open-ended, Guided)
- Pathway 2: Representing Millions and Billions (Open-ended, Guided)
- Pathway 3: Representing Six-Digit Numbers (Open-ended, Guided)

Whole Number Operations
- Pathway 1: Order of Operations (Open-ended, Guided)
- Pathway 2: Dividing Whole Numbers (Open-ended, Guided)
- Pathway 3: Multiplying Whole Numbers (Open-ended, Guided)

Representing and Comparing Decimals
- Pathway 1: Decimals with Many Places (Open-ended, Guided)
- Pathway 2: Comparing Decimals (Open-ended, Guided)
- Pathway 3: Representing Decimal Thousandths (Open-ended, Guided)
- Pathway 4: Multiplying and Dividing by 10s (Open-ended, Guided)

Decimal Operations
- Pathway 1: Dividing Whole Numbers by Decimals (Open-ended, Guided)
- Pathway 2: Dividing Decimals by Whole Numbers (Open-ended, Guided)
- Pathway 3: Multiplying with Decimals (Open-ended, Guided)
- Pathway 4: Adding and Subtracting Decimals (Open-ended, Guided)

Relating Situations to Operations
- Pathway 1: Recognizing Division Situations (Open-ended, Guided)
- Pathway 2: Recognizing Multiplication Situations (Open-ended, Guided)
- Pathway 3: Recognizing Subtraction Situations (Open-ended, Guided)
Comparing Fractions
- Pathway 1: Fractions and Mixed Numbers
  - Open-ended 96
  - Guided 98
- Pathway 2: Proper Fractions
  - Open-ended 102
  - Guided 104
- Pathway 3: Equivalent Fractions
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  - Guided 110

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  - Open-ended 114
  - Guided 116
- Pathway 2: Adding and Subtracting Mixed Numbers
  - Open-ended 120
  - Guided 122
- Pathway 3: Subtracting Fractions
  - Open-ended 126
  - Guided 128
- Pathway 4: Adding Fractions
  - Open-ended 132
  - Guided 134

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  - Open-ended 138
  - Guided 140
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  - Guided 146
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  - Open-ended 150
  - Guided 152

Multiplicative Relationships
- Pathway 1: Divisibility Rules
  - Open-ended 156
  - Guided 158
- Pathway 2: Prime Numbers and Perfect Squares
  - Open-ended 162
  - Guided 164
- Pathway 3: Factors and Multiples
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  - Guided 169

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- Pathway 1: Subtracting Integers
  - Open-ended 173
  - Guided 175
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  - Open-ended 179
  - Guided 181
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  - Guided 187
**Strand: Patterns and Algebra**

Use the Diagnostic Tool in the Teacher’s Resource to determine the most appropriate pathway for each student for each topic.

**Patterns**
- Pathway 1: Linear Relations
- Pathway 2: Representing Patterns
- Pathway 3: Exploring Simple Patterns

**Algebra**
- Pathway 1: Solving Problems Using Equations
- Pathway 2: Solving Simple Equations
- Pathway 3: Using Variables

**Strand: Geometry**

Use the Diagnostic Tool in the Teacher’s Resource to determine the most appropriate pathway for each student for each topic.

**3-D Shapes**
- Pathway 1: Using Isometric Drawings
- Pathway 2: Using Different Views
- Pathway 3: Using Nets

**2-D Shapes**
- Pathway 1: Similar Shapes
- Pathway 2: Congruent Shapes
- Pathway 3: Sorting and Classifying Polygons

**Geometric Drawings**
- Pathway 1: Bisecting Angles and Line Segments
- Pathway 2: Drawing Circles
- Pathway 3: Drawing Lines and Polygons
- Pathway 4: Drawing Triangles

**Location**
- Pathway 1: Plotting Points in 4 Quadrants
- Pathway 2: Plotting Points on a Grid
**Strand: Measurement**

Use the Diagnostic Tool in the Teacher’s Resource to determine the most appropriate pathway for each student for each topic.

- **Perimeter and Area**
  - Pathway 1: Area of Circles
    - Open-ended
    - Guided
  - Pathway 2: Circumference of Circles
    - Open-ended
    - Guided
  - Pathway 3: Area of Composite Shapes
    - Open-ended
    - Guided
  - Pathway 4: Area of Parallelograms and Triangles
    - Open-ended
    - Guided
  - Pathway 5: Area and Perimeter of Rectangles
    - Open-ended
    - Guided

- **Volume and Surface Area**
  - Pathway 1: Volume of Prisms: Using a Formula
    - Open-ended
    - Guided
  - Pathway 2: Surface Area of Prisms
    - Open-ended
    - Guided
  - Pathway 3: Volume of Rectangular Prisms
    - Open-ended
    - Guided

- **Angles**
  - Pathway 1: Sums of Angles in Shapes
    - Open-ended
    - Guided
  - Pathway 2: Constructing Angles
    - Open-ended
    - Guided
  - Pathway 3: Measuring Angles
    - Open-ended
    - Guided

- **Metric Units**
  - Pathway 1: Renaming a Unit
    - Open-ended
    - Guided
  - Pathway 2: Selecting a Unit
    - Open-ended
    - Guided
Strand: Data and Probability

Use the Diagnostic Tool in the Teacher’s Resource to determine the most appropriate pathway for each student for each topic.

Displaying Data
- Pathway 1: Using Circle Graphs and Line Graphs
  - Open-ended
  - Guided
- Pathway 2: Bias and Sampling
  - Open-ended
  - Guided
- Pathway 3: Interpreting Graphs
  - Open-ended
  - Guided

Summarizing Data
- Pathway 1: Effects of Changing Data
  - Open-ended
  - Guided
- Pathway 2: Using Mean, Median, and Mode
  - Open-ended
  - Guided
- Pathway 3: Calculating the Mean
  - Open-ended
  - Guided

Probability
- Pathway 1: Probability: Independent Events
  - Open-ended
  - Guided
- Pathway 2: Theoretical Probability
  - Open-ended
  - Guided
- Pathway 3: Experimental Probability
  - Open-ended
  - Guided
A popular TV show had about 12.3 million viewers in one night.

12.3 million is between 12 million and 13 million.

The place value chart below shows that 12.3 million, written in **standard form**, is the whole number 12 300 000.

To explain why you can write a whole number using a decimal, you can think of 1 million as 1 unit.
– The 12 in 12 300 000 is 12 million, so it is 12 units.
– The 3 in 12 300 000 is 3 tenths of 1 million, or 0.3 units.

<table>
<thead>
<tr>
<th>Billions</th>
<th>Millions</th>
<th>Thousands</th>
<th>Ones</th>
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<tbody>
<tr>
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</table>

**Part A**
- Find 3 numbers that are written as a decimal number of millions.
  – Tell what each number describes.
  – Write each number in standard form.
  – Explain how you know you are right.

| Decimal number of millions | What it describes | Standard form | How you know |
|----------------------------|-------------------|---------------|--------------|--------------|
|                            |                   |               |              |              |
• Find 2 numbers greater than 1 million that are written in standard form.
  – Tell what each number describes.
  – Estimate the decimal form of each using units of 1 million.

<table>
<thead>
<tr>
<th>Standard form</th>
<th>What it describes</th>
<th>Estimate in decimal number of millions</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

Part B
• Repeat Part A for 3 numbers written as a decimal number of billions.

<table>
<thead>
<tr>
<th>Decimal number of billions</th>
<th>What it describes</th>
<th>Standard form</th>
<th>How you know</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

• Repeat for 2 numbers greater than 1 billion written in standard form.

<table>
<thead>
<tr>
<th>Standard form</th>
<th>What it describes</th>
<th>Estimate in decimal number of billions</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

Part C
• Write all 10 numbers from Parts A and B in order from least to greatest. Explain your thinking.
Recently, a gold and diamond smartphone case had a price of $3.2 million.

3.2 million is a number between 3 million and 4 million.

- You can see from the place value chart below that 3.2 million written in **standard form** is the whole number 3 200 000.

To explain why you can write a whole number using a decimal, you can think of one million as one unit.
- The 3 in 3 200 000 is 3 million, so it is 3 units.
- The 2 in 3 200 000 is 2 tenths of 1 million, or 0.2 units.

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<thead>
<tr>
<th>Billions</th>
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<tr>
<td>3</td>
<td>2</td>
<td>0</td>
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</tbody>
</table>

- You can write some very large numbers using a billions unit instead of a millions unit.

For example, 4 650 000 000 is 4.65 billion.
The 6 in 4 650 000 000 is 0.6, or \( \frac{6}{10} \) of the billions unit.
The 5 in 4 650 000 000 is 0.05, or \( \frac{5}{100} \) of the billions unit.
So, the 65 in 4 650 000 000 is 0.65 units.

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</tr>
<tr>
<td>4</td>
<td>6</td>
<td>5</td>
<td>0</td>
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</tbody>
</table>

- What is 3.28 million written in standard form? How do you know?

**You will need**

- Place Value Charts (to Billions) (BLM 2)
- Internet access or Millions and Billions (BLM 1)
Try These

1. Show each number in standard form on the place value chart.

   a) 4.5 million

<table>
<thead>
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<th>Millions</th>
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   b) 12.0 million

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<th>Millions</th>
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</table>

   c) 4.13 billion

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<tr>
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</table>

   d) 0.5 billion

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<th>Billions</th>
<th>Millions</th>
<th>Thousands</th>
<th>Ones</th>
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</table>

2. Write each number in standard form.

   a) 7.12 billion

   b) 7.8 million

   c) 13.24 million

   d) 12.23 billion

3. Write each number using a decimal number of millions or billions, whichever makes more sense to you.

   a) 12 345 000

   b) 500 000

   c) 1 200 000 000

   d) 314 120 000 000
4. Use > or < to make each statement true.
   a) 4.1 million □ 3.24 million
   b) 5.3 million □ 0.9 billion
   c) 1.23 billion □ 9.0 billion
   d) 0.01 billion □ 12.4 million

5. In which number is the digit 5 worth the most? How do you know?
   4.5 billion □ 5.1 million □ 5.4 billion

6. Fill in the blanks. Use the place value chart to help you.
   a) 4.2 million = □ thousand
   b) 0.6 million = □ thousand
   c) 2.13 billion = 2130 □

<table>
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</table>

7. Of the 7.0 billion people who live in the world, about 1.3 billion live in China. Find at least 3 more real-world numbers that are expressed as decimal millions or billions. Tell what each number describes.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

8. Why are people more likely to write 3 100 000 as 3.1 million than to write 3100 as 3.1 thousand?

________________________________________________________________________

________________________________________________________________________
About 111 million people watched the Super Bowl on TV.

111 million can be written in **standard form** as 111 000 000.

<table>
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<tr>
<th>Billions</th>
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</table>

- Why does it make sense that the number of viewers was about 111 million and not about 111 billion?

**Part A**

- Write 5 numbers that are close to 111 million.
  - Write each number in standard form.
  - Include the digits 3, 5, 7, and 9 once in each number.
    You can use other digits as well.
  - Include numbers that are greater than 111 million and numbers that are less than 111 million.

- Tell how you would read each number.
Part A
• Explain how you know each number is close to 111 million.

Part B
• Write 5 numbers that are close to 278 billion. Include numbers that are less than and greater than 278 billion.

Part C
• Write all 10 numbers from Parts A and B in order from least to greatest. Explain your thinking.
When Kai was born, the population of Toronto was 2 503 281.

The number 2 503 281 is in **standard form**.
The spaces in the standard form of the number separate the billions, millions, thousands, and ones **periods**.

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<thead>
<tr>
<th>Billions</th>
<th>Millions</th>
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<td>8</td>
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</tbody>
</table>

You can use the periods and the place value chart to read, interpret, and rename large numbers.

- You can read 2 503 281 as *2 million 503 thousand 281*.
- You can estimate that 2 503 281 is about halfway between 2 million and 3 million.
- You can rename 2 503 281 as 2 million + 503 thousand + 281.
- You can also rename 2 503 281 in other ways.
  1 million = 1000 thousand
  So, 2 503 281 = 2000 thousand + 503 thousand + 281
  = 2503 thousand + 281

- Use a place value chart to help you read 250 000 003 281.

**Try These**

1. What is the same and what is different in how you would read 2 500 030 and 2 005 300?

   same: 

   different: 

---

**You will need**

- Place Value Charts (to Billions) (BLM 2)
- Millions and Billions (BLM 1)
2. Write each number in standard form on a place value chart.
   a) 22 million 312 thousand 21
      
      | Billions | Millions | Thousands | Ones |
      |----------|---------|-----------|------|
      | H        | T       | O         | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |

   b) 3 million 8 thousand 12
      
      | Billions | Millions | Thousands | Ones |
      |----------|---------|-----------|------|
      | H        | T       | O         | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |

   c) 17 billion 12 million 34 thousand
      
      | Billions | Millions | Thousands | Ones |
      |----------|---------|-----------|------|
      | H        | T       | O         | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |

   d) 100 billion 32 thousand
      
      | Billions | Millions | Thousands | Ones |
      |----------|---------|-----------|------|
      | H        | T       | O         | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |
      |           |         |           | H    |
      |           |         |           | T    |
      |           |         |           | O    |

3. Circle the greater number in each pair.
   a) 89 hundred thousand + 21 2 billion
   b) 153 million + 32 thousand 1 billion
   c) 110 million 312 thousand
   d) 42 million 42 hundred thousand

4. Estimate. Use a place value chart to help you.
   a) 4 128 756 is about ______________ million.
   b) 4 128 756 is about ______________ thousand.
   c) 1 834 567 109 is about ______________ billion.
   d) 1 834 567 109 is about ______________ million.
5. Write a number in standard form for each description.
   
   a) 1 hundred thousand more than 2 348 172 ______________
   
   b) 3 million more than 152 417 ______________
   
   c) 1 billion more than 3 425 617 ______________
   
   d) 2 million more than 8 413 465 ______________

6. How many digits are in a number that begins with each phrase?
   
   a) 42 million… ________
   
   b) 250 million… ________
   
   c) 20 billion… ________
   
   d) 300 thousand… ________

7. In which number is the digit 5 worth the most? How do you know?
   
   53 143 200 153 787 5 203 412 111

   ________________________________

   ________________________________

8. Use > or < to make each statement true.
   
   a) 4 000 003 □ 1 000 000 003
   
   b) 3 045 020 □ 3 450 200
   
   c) 2 781 235 □ 2 781 532
   
   d) 4 528 134 □ 528 478

   Explain your answer to part d): ________________________________

   ________________________________

   
   a) 4 million = _________ thousand

   4 million = _________ hundred thousand

   b) 2 billion = _________ million

   2 billion = _________ hundred million
10. Use < or > to make each statement true.
   a) 30 million __________ 40 hundred thousand
   b) 25 million __________ 260 hundred thousand
   c) 8 billion __________ 9000 million
   d) 2 billion __________ 200 million

   Explain your answer to part d):
   __________________________________________________________________________

11. The world population on February 28, 2011, was 7 090 669 275. On the same day, the population of China was 1 319 175 336. Describe 2 other real-world values that would likely be expressed in billions or millions.

   __________________________________________________________________________
   __________________________________________________________________________

12. Decide whether you agree or disagree. Explain your thinking.
   a) Any number greater than 1 billion is more than 900 million.

   __________________________________________________________________________

   b) Any number greater than 1 million is less than 1 billion.

   __________________________________________________________________________

   c) Any number of billions is always greater than any number of millions.

   __________________________________________________________________________
A car company had to recall about 750 thousand cars to have the transmissions checked.

750 thousand written in standard form is 750 000.

<table>
<thead>
<tr>
<th>Hundred thousands</th>
<th>Ten thousands</th>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
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<tbody>
<tr>
<td>7</td>
<td>5</td>
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</tbody>
</table>

• Write 5 numbers that are close to 750 thousand.
  – Write each number in standard form.
  – Use the digits 3, 5, 7, and 9 at least once in each number.
  – Include numbers greater than 750 000 and less than 750 000.

• Suppose 100 fewer cars than 750 000 were recalled.
  List 5 numbers that are close to that number. Use any digits.

• Write all 10 numbers above in order from least to greatest. Explain your thinking.
In 2006, the population of Edmonton was 730 372.

The number 730 372 is in **standard form**.

The space in the standard form of the number separates the thousands part of the number from the part that includes the hundreds, tens, and ones.

```
<table>
<thead>
<tr>
<th>Hundred thousands</th>
<th>Ten thousands</th>
<th>Thousands</th>
<th>Hundreds</th>
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<td>3</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>
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You can use the 2 parts of the number to read, interpret, and rename large numbers.

- You can read 730 372 as *730 thousand 372*.
- You can estimate 730 372 as about 730 thousand.
- You can rename 730 372 as 730 thousand + 372.
- Use the place value chart to help you read the number 503 020.

**Try These**

1. What is the same and what is different in how you would read 402 030 and 420 030?

   same: ____________________________________________

   ____________________________________________

   different: ____________________________________________

   ____________________________________________
2. Write each number in standard form on a place value chart.

   a) 300 thousand 78

<table>
<thead>
<tr>
<th>Hundred thousands</th>
<th>Ten thousands</th>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
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   b) 420 thousand 10

<table>
<thead>
<tr>
<th>Hundred thousands</th>
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<th>Thousands</th>
<th>Hundreds</th>
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   c) 10 thousand 312

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<thead>
<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Circle the number in each pair that has more digits when written in standard form.

   a) 58 hundred 22 thousand
   b) 20 ten thousand 80 thousand
   c) 6 hundred thousand 50 hundred

4. Estimate. Use a place value chart to help you.

   a) 562 103 is about ______ hundred thousand.
   b) 493 127 is about ______ hundred thousand.
   c) 213 856 is about ______ thousand.
   d) 478 100 is about ______ thousand.

5. Write a number in standard form for each description.

   a) 100 000 more than 203 652 ___________________________
   b) 10 000 less than 243 652 __________________________
   c) 8000 more than 483 622 __________________________
   d) 5000 less than 453 000 __________________________
6. In which number is the digit 5 worth most? How do you know?

503 207    953 218

7. Use > or < to make each statement true.

a) 202 020  92 999    c) 882 135  885 134

b) 410 014  140 410    d) 711 234  79 929

8. Suppose the name for a whole number includes these words:

twenty    thirty    thousand    hundred    four    two

How many digits might the number have? Explain your thinking.

9. How many $100 bills is each amount?

a) $20 000 is  ______  $100 bills.

b) $530 400 is  ______  $100 bills.

c) $300 000 is  ______  $100 bills.

d) $904 900 is  ______  $100 bills.

10. Describe 2 or more real-world situations that might involve numbers in the hundred thousands. Consider populations or money situations.

Being able to understand large numbers is useful, since large numbers appear frequently in the media.
Mathematicians have created rules for the order of operations so that everyone gets the same answer to an expression.

Create Expression 1
• Choose 6 numbers and put operation signs between the numbers. Include 3 different signs.
  – Insert a pair of brackets around 2 or 3 of the numbers.
  – Calculate the value of your expression. Estimate if the answer is not a whole number.
  – Show or describe the order you used to calculate the value of the expression.

Create Expression 2
• Move brackets in Expression 1 so that the value is much greater. Calculate the value of your expression.
  – Show or describe the order you used to calculate it.

Create Expression 3
• Rearrange the operation signs and move the brackets in Expression 1 so that the value is less. Calculate.
  – Show or describe the order you used to calculate it.
Kevin will win a prize if he answers a skill-testing question correctly. He thought about 2 ways to calculate the expression $32 - 4 \times 6$. When he tried it both ways he got different answers.

So that everyone gets the same answer, mathematicians have created rules for the order of operations called **BEDMAS**. Kevin must use these rules to calculate.

- You can use the order of operations to calculate $32 - 12 \div (2 + 2) + 8 \times 2$.
  **BEDMAS**: Do calculations inside Brackets first.
  So, calculate $(2 + 2)$ first.
  $32 - 12 \div (2 + 2) + 8 \times 2 = 32 - 12 \div 4 + 8 \times 2$

  **BEDMAS**: Divide and Multiply in order from left to right.
  So, calculate $12 \div 4$ and then $8 \times 2$ before adding or subtracting.
  $32 - 12 \div 4 + 8 \times 2 = 32 - 3 + 16$

  **BEDMAS**: Add and Subtract in order from left to right.
  So, calculate $32 - 3$ before adding $16$.
  $32 - 3 + 16 = 29 + 16$
  $= 45$

- Calculate $32 - 4 \times 6$. Show or describe how you used the order of operations to calculate.

**Try These**

1. Use BEDMAS to decide which calculation you would do first in each expression. Circle it.

   a) $53 - 8 \times (4 + 9) \times 2$
   d) $53 - 8 \times 4 + 9 \times 2$

   b) $(53 - 8) \times 4 + (9 \times 2)$
   e) $53 - 8 + 4 + 9 \times 2$

   c) $53 - (8 \times 4) + 9 \div 2$
   f) $53 - 8 \times (4 + 9 \times 2)$
2. Show or describe how to calculate each expression below. What is different about the calculations?

\[ 5 \times 6 + 8 \quad 5 \times (6 + 8) \]

3. For the expression \( 75 + (4 \times 2) - (3 \times 8) \), Ry multiplied \( 4 \times 2 \) first. Hu multiplied \( 3 \times 8 \) first. How can they both be right?

4. Katrina said that \( 4 + 8 \times 9 \) is equal to 108. Do you agree? Explain your thinking.

5. Calculate. Show your work.
   a) \( 4 + 6 \times 8 - 30 \div 2 \)
   b) \( 4 + (6 \times 8 - 30) \div 2 \)
   c) \( (4 + 6) \times 8 - 30 \div 2 \)
   d) \( 36 \div (5 + 4) \times 3 \)
   e) \( 36 \times 3 \div (5 + 4) \)
   f) \( 36 - (5 + 4) \times 3 \)

**Remember**

- **BEDMAS** is a way to remember the order for calculating an expression:
  - Brackets,
  - Division and Multiplication,
  - Addition and Subtraction

- It does not matter if the Division comes before or after the Multiplication—you always calculate from left to right.
- It does not matter if the Subtraction comes before or after the Addition—you always calculate from left to right.
6. Why are the answers to Questions 5b) and c) different, even though the numbers and operations are the same?

7. Start with the number 10. Complete the 3 operations below in different orders. There are 6 possible orders.


Write all the possible answers you can get. Show or describe how you got each answer.

8. Insert brackets so that each expression is equal to 5.
   a) \(40 \div 3 + 5\)
   b) \(4 \times 30 + 5 \div 17 + 8\)
   c) \(64 \div 15 + 1 + 1\)

9. To calculate \(5 \times 8 \div 5 + 8\), you go from left to right.
   a) Create 2 other expressions that would work this way. Include 3 different operations in each.

b) How did you create your expressions?

10. Do you think it is possible to add brackets to an expression without changing the answer? Explain using an example.

Knowing the order of operations is useful when there is no problem situation to help you decide which calculations in an expression are supposed to be done first, second, and so on.
There are 350 to 450 students in Leah’s school.
There are 1200 to 1300 students in her brother Zack’s school.

Part A: Grouping Students

• Choose a number of students for each school.

Leah’s school: ____________

Zack’s school: ____________

• 7 teachers supervise equal-sized groups of students.
Estimate the number of students that each teacher supervises.
Explain each estimate.

Leah’s school: about _______ students per teacher

Zack’s school: about _______ students per teacher

Remember

• You can use division to figure out how a total can be divided into equal groups.
Part B: Forming Teams
• Use the number of students from Part A for Leah’s or Zack’s school. Then choose a team size of 5, 6, 8, 12, or 15.

number of students: ___________ team size: ___________

• Estimate the number of teams that can be formed. Explain your estimate.

• Determine the number of teams. Show your work. Check that your answer is correct, and show how you checked.

Part C: Forming Different Teams
• Repeat Part B, using a different number of students and team size.

number of students: ___________ team size: ___________

• Estimate the number of teams. Explain your estimate.

• Determine the number of teams. Show your work. Check that your answer is correct and show how you checked.
Parents were making 291 sandwiches for a special lunch at school. They wanted equal numbers of ham, chicken, and veggie sandwiches, and they wanted 8 sandwiches on each plate.

How many sandwiches of each type are needed?

- You can estimate the number of each type of sandwich.
  Since \(3 \times 100 = 300\) and there are 291 sandwiches, there will be just less than 100 of each type.

- To get an exact quotient for \(291 \div 3\), you can use base ten blocks.
  - Model 291 with base ten blocks, and draw 3 sharing boxes.

\[
\begin{array}{c}
\square \square \\
\square \square \\
\square \square \\
\end{array}
\]

- There are not enough hundreds to share among the 3 boxes. So, regroup the 2 hundreds using 20 tens. Share as many of the 29 tens as possible so each box has the same number. Record the division.

\[
\begin{array}{c}
\text{9} \\
\text{3}\overline{291} \\
\text{270} \\
\text{21} \\
\end{array}
\]

- Regroup the 2 tens that were left over using 20 ones. Share the 21 ones among the 3 boxes. Record the division.

\[
\begin{array}{c}
\text{97} \\
\text{3}\overline{291} \\
\text{270} \\
\text{21} \\
\text{0} \\
\end{array}
\]

The parents need 97 sandwiches of each type. That seems reasonable, since the estimate was about 100.
• You can also calculate $291 \div 3$ using reasoning.

If there were 300 sandwiches, there would be 100 of each type. There are 9 fewer sandwiches than that, so there would be 3 fewer than 100, or 97 sandwiches of each type.

**How many plates are needed?**

• You can estimate the number of plates.

$291 \div 8$ is about $320 \div 8 = 40$.

• To get an exact quotient for $291 \div 8$, you can create groups of 8 until no sandwiches are left.

\[
\begin{array}{rll}
8 & \overline{)291} & \\
& 240 & - 240 \text{ plates of 8} \\
& 51 & \\
& 48 & + 6 \text{ plates of 8} \\
& 3 & 36 \text{ plates of 8} \\
\end{array}
\]

36 plates are needed, which is about 40. The 3 leftover sandwiches could go on a 37th plate.

• You can also calculate $291 \div 8$ by breaking 291 into parts that are multiples of 8 and then dividing each part by 8.

\[
291 = 240 + 40 + 8 + 3
\]

\[
30 \times 8 = 240, \text{ so 30 plates for 240 sandwiches}
\]

\[
5 \times 8 = 40, \text{ so 5 plates for 40 sandwiches}
\]

\[
1 \times 8 = 8, \text{ so 1 plate for 8 sandwiches}
\]

That is 36 plates and 3 leftover sandwiches.

**Try These**

1. a) Match each division to an estimate. One estimate has no match.

<table>
<thead>
<tr>
<th>Division</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>278 items in groups of 9</td>
<td>about 45</td>
</tr>
<tr>
<td>417 items in groups of 4</td>
<td>about 25</td>
</tr>
<tr>
<td>638 items in groups of 3</td>
<td>about 30</td>
</tr>
<tr>
<td>512 items in groups of 11</td>
<td>about 210</td>
</tr>
<tr>
<td>311 items in groups of 5</td>
<td>about 100</td>
</tr>
<tr>
<td></td>
<td>about 60</td>
</tr>
</tbody>
</table>

b) For the estimate in part a) that has no match, write a possible division statement.

\[
\boxed{\quad \text{items in groups of \quad} \quad \text{is about \quad} \quad}.
\]
2. Show or explain how to use each block model to divide.

a) Divide 500 into groups of 50.

b) Divide 611 into 4 equal groups.

c) Divide 400 into groups of 5.

3. Estimate each quotient.

a) $415 \div 8$ is about _______.  
   c) $5132 \div 7$ is about _______.

b) $3021 \div 7$ is about _______.  
   d) $5702 \div 6$ is about _______.

4. a) Create a problem that could be solved using $415 \div 8$.

b) Create a different problem that could be solved using $5132 \div 7$.

5. a) To calculate $645 \div 3$, you could break 645 into $600 + 30 + 15$ or $500 + 100 + 45$. Why would it be better to use $600 + 30 + 15$?

b) Show a way to break 718 into parts for each calculation.

    $718 \div 7$ __________________________  
    $718 \div 9$ __________________________
6. Calculate. Show your work.
   a) $318 \div 2 = \underline{\hspace{2cm}}$
   b) $814 \div 3 = \underline{\hspace{2cm}}$
   c) $362 \div 4 = \underline{\hspace{2cm}}$
   d) $248 \div 8 = \underline{\hspace{2cm}}$

7. Each calculation below involves a three-digit number greater than 500 divided by a one-digit number. Fill in the blanks to make each equation true.
   a) \[\underline{\hspace{2cm}} \div \underline{\hspace{1cm}} = 83\]
   b) \[\underline{\hspace{2cm}} \div \underline{\hspace{1cm}} = 58\]

8. To calculate $4020 \div 20$, you can calculate $402 \div 2$ and get the same quotient. Why does this work?

9. $405 \div 3$ is close to $406 \div 3$ but $405 \div 3$ is not close to $405 \div 4$. Why?

10. Do you agree with Tanis? Explain your thinking.
Packages of cookies have 25 to 40 cookies. There are 11 to 50 packages of cookies of each kind.

Suppose you needed to buy many packages of the same kind of cookie.

Part A

• Choose a number of cookies for your package.
  
  _______ cookies in each package

• Choose a number of packages to buy.
  
  _______ packages

• Estimate the total number of cookies. Explain how you estimated.

• Exactly how many cookies would that be? Show your work.
**Part B**

- Repeat Part A but change the number of cookies in each package and change the number of packages.

  ________ cookies in each package

  ________ packages

- Estimate the total number of cookies. Explain how you estimated.

- Exactly how many cookies would that be? Show your work.

**Part C**

- Repeat Part A but change the number of cookies in each package and change the number of packages again.

  ________ cookies in each package

  ________ packages

- Estimate the total number of cookies. Explain how you estimated.

- Exactly how many cookies would that be? Show your work.
A group of kangaroos is called a mob. How can you figure out the number of kangaroos in 13 mobs, if each mob has 52 kangaroos?

- You might estimate first.
  13 groups of 52 is more than $10 \times 50 = 500$.

- You can calculate the exact **product** by multiplying $13 \times 52$, using a base ten block model.

Build a rectangle with the length as the number of kangaroos and the width as the number of mobs. Each row represents 1 mob of 52 kangaroos. The 13 rows represent 13 mobs of 52, which is $13 \times 52$.

![Diagram of 13 rows of 52]

Count the hundreds, tens, and ones, and then add them. $500 + 150 + 20 + 6 = 676$, so there are 676 kangaroos.

- You can also sketch the rectangle model above to show the 4 parts and then use it to calculate the product of $13 \times 50$.

Label the sketch with the tens and ones parts of each number along the top and along the left side.

![Rectangle model with labels]

Determine the area of each part of the rectangle.

```
<table>
<thead>
<tr>
<th></th>
<th>52</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
```

$10 \times 50 = 500 \quad 10 \times 2 = 20$

$3 \times 50 = 150 \quad 3 \times 2 = 6$

$500 + 20 + 150 + 6 = 676$, so there are 676 kangaroos.
You can also multiply $13 \times 52$ by calculating in parts.

$13 \times 52 = 10 \times 52 + 3 \times 52$  or  $52$

$=$ $520 + 156$  or  $13$

$=$ $676$  

$+$ $520$

$=$ $676$

Try These

1. Match each grouping to the best estimate.  
   One estimate has no match.

   - 15 mobs of 72 kangaroos  
   - 31 mobs of 39 kangaroos  
   - 16 mobs of 78 kangaroos  
   - 21 mobs of 98 kangaroos  
   - 13 mobs of 42 kangaroos  
   - about 1200  
   - about 500  
   - about 1000  
   - about 4000  
   - about 1200  
   - about 2100

2. Model each multiplication.

   a) 12 groups of 38

   b) 37 groups of 25

   c) 18 groups of 23
3. Estimate each product.
   a) \(17 \times 28\) is about \__________\.
   b) \(35 \times 49\) is about \__________\.
   c) \(15 \times 32\) is about \__________\.
   d) \(26 \times 41\) is about \__________\.

4. a) Create a problem situation that could be solved using \(17 \times 28\).

   \____________________________________________________

   \____________________________________________________

   b) Create a problem situation that could be solved using \(15 \times 32\).

   \____________________________________________________

   \____________________________________________________

5. Why might you break \(24\) into \(20 + 4\) to calculate \(24 \times 48\)?

   \____________________________________________________

6. Each calculation is a two-digit number multiplied by a two-digit number. Fill in the blanks to make each statement true.
   a) \[
   \boxed{ \underline{3} \underline{5} } \times \boxed{ \underline{3} \underline{2} } = 500
   \]
   b) \[
   \boxed{ \underline{2} \underline{4} } \times \boxed{ \underline{3} \underline{2} } = 684
   \]

7. One student multiplied \(32 \times 46\) and wrote the product \(1212\). Is the calculation correct? Explain your thinking.

   \____________________________________________________
8. a) Choose 2 two-digit numbers and multiply them.
\[
\square \square \times \square \square = \underline{\ \ \ \ \ \ } \\
\]

b) Increase the greater number by 1 and decrease the smaller number by 1. Predict whether the product will increase or decrease. Explain your prediction.

\[
\underline{\ \ \ \ \ \ } \\
\underline{\ \ \ \ \ \ } \\
\underline{\ \ \ \ \ \ }
\]

c) Calculate the product for part b).
\[
\square \square \times \square \square = \underline{\ \ \ \ \ \ } \\
Was your prediction correct? _______
\]

9. You multiply 2 different two-digit numbers and the answer is ■■5■.

a) What numbers could you have multiplied?
\[
\square \square \times \square \square = \underline{\square \ 5 \square} \\
\]

b) Explain how you decided which numbers would work.

\[
\underline{\ \ \ \ \ \ } \\
\underline{\ \ \ \ \ \ } \\
\underline{\ \ \ \ \ \ }
\]

10. Explain why the product of 2 two-digit numbers could have only 3 digits or 4 digits.

\[
\underline{\ \ \ \ \ \ } \\
\underline{\ \ \ \ \ \ } \\
\underline{\ \ \ \ \ \ }
\]
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