### Effective Teaching Practices

1. Establish mathematics goals to focus learning.
2. Implement tasks that promote reasoning and problem solving.
3. Use and connect mathematical representations.
4. Facilitate meaningful mathematical discourse.
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning mathematics.
8. Elicit and use evidence of student thinking.  

-NCTM Mathematical Practices posted

### Ongoing fluency expectation:

5.NBT.B.5 Multi-digit multiplication

### Literacy Skills for Mathematical Proficiency:

1. Use multiple reading strategies.
2. Understand and use correct mathematical vocabulary.
3. Discuss and articulate mathematical ideas.
4. Write mathematical arguments.

### Domain → Cluster → TN Standard | Student Friendly “I Can” Statements

| 5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number or a fraction by a fraction. a. Interpret the product \( \frac{a}{b} \times q \) as \( a \times \left( \frac{q}{b} \right) \) (partition the quantity \( q \) into \( b \) equal parts and then multiply by \( a \)). Interpret the product \( \frac{a}{b} \times q \) as \( \left( a \times \frac{q}{b} \right) \) (multiply \( a \) times the quantity \( q \) and then partition the product into \( b \) equal parts). For example, use a visual fraction model or write a story. | I can multiply a fraction by a whole number.  
I can interpret the product when multiplying fractions.  
I can explain, construct and use a model to illustrate that \( \frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd} \).  
I can write a word problem that involves multiplying fractions.  
I can use manipulatives or models to determine the area of rectangles with fractional side lengths. |
**context to show that** \( \frac{2}{3} \times 6 \) **can be interpreted as** \( 2 \times (6 ÷ 3) \) **or** \( (2 \times 6) ÷ 3 \).

**Do the same with** \( \frac{2}{3} \times \frac{4}{5} \). **(In general,** \( \frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd} \).)**

**b.** Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.

<table>
<thead>
<tr>
<th>5.WCE.M.8</th>
<th>Memorize the formula for calculating the area of a rectangle ((A = lw \text{ or } A = bh)).</th>
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<tbody>
<tr>
<td><strong>I can</strong></td>
<td>determine the area of rectangles with fractional side lengths by multiplying the length by the width.</td>
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<thead>
<tr>
<th>5.NF.B.5</th>
<th>Interpret multiplication as scaling (resizing).</th>
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<tbody>
<tr>
<td><strong>a.</strong> Compare the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. For example, know if the product will be greater than, less than, or equal to the factors.</td>
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<tr>
<td><strong>b.</strong> Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explain why multiplying a given number by a fraction less than 1 results in a product less than the given number; and relate the principle of fraction equivalence ( \frac{a}{b} = \frac{a \times n}{b \times n} ) to the effect of multiplying ( \frac{a}{b} ) by 1.</td>
<td></td>
</tr>
<tr>
<td><strong>I can</strong></td>
<td>explain the relationship between two multiplication problems that share a common factor. (225 x 60 and 225 x 30)</td>
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<tr>
<td><strong>I can</strong></td>
<td>use compatible numbers to estimate products of fractions.</td>
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<tr>
<td><strong>I can</strong></td>
<td>compare the product to the two factors without multiplying. For example, the product of ( \frac{1}{2} ) and ( \frac{1}{3} ) will be smaller than each of the factors.</td>
</tr>
<tr>
<td><strong>I can</strong></td>
<td>explain why multiplying a fraction greater than one will result in a product greater than the given number.</td>
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<tr>
<td><strong>I can</strong></td>
<td>justify that multiplying a fraction by one, results in an equivalent fraction.</td>
</tr>
<tr>
<td><strong>I can</strong></td>
<td>explain why multiplying a given number by a fraction less than one will result in a product smaller than the given number. (2 x ( \frac{1}{4} ) &lt; 2)</td>
</tr>
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</table>

| 5.NF.B.6 | Solve real-world problems involving multiplication of fractions and mixed numbers by using visual fraction models or equations to represent the problem. |
| **I can** | solve real world problems involving multiplication of fractions and mixed numbers using models, equations, and words. |

| 5.NF.B.3 | Interpret a fraction as division of the numerator by the denominator \( \frac{a}{b} = a ÷ b \). For example, \( \frac{3}{4} = 3 ÷ 4 \) so when 3 wholes are shared equally among 4 people, each person has a share of size \( \frac{3}{4} \). Solve contextual |
problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers by using visual fraction models or equations to represent the problem. For example, if 8 people want to share 49 sheets of construction paper equally, how many sheets will each person receive? Between what two whole numbers does your answer lie? (Q1, Q3)

| I can recognize that when I divide two whole numbers and get a remainder, the remainder and the quotient together are parts of a whole. | I can recognize that when I divide two whole numbers and get a remainder, the remainder and the quotient together are parts of a whole. |
| I can solve contextual problems involving the division of whole numbers that result in quotients that are in the form of fractions or mixed numbers. | I can solve contextual problems involving the division of whole numbers that result in quotients that are in the form of fractions or mixed numbers. |
| I can explain and illustrate my strategy when solving word problems that involve fractions by using visual fraction models or equations. | I can explain and illustrate my strategy when solving word problems that involve fractions by using visual fraction models or equations. |

5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

a. Interpret division of a unit fraction by a non-zero whole number and compute such quotients. For example, use visual models and the relationship between multiplication and division to explain that 
\[(1/3) ÷ 4 = 1/12\] 
because 
\[(1/12) x 4 = 1/3.\]

b. Interpret division of a whole number by a unit fraction and compute such quotients. For example, use visual models and the relationship between multiplication and division to explain that 
\[4 ÷ (1/5) = 20\]
because 
\[20 x (1/5) = 4.\]

c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3 cup servings are in 2 cups of raisins?

* Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division of fractions.
and division. But division of a fraction by a fraction is not a requirement at this grade.

### 5.G.B.3
Classify two-dimensional figures in a hierarchy based on properties.
Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*

**I can** justify that two-dimensional attributes can belong to several two-dimensional figures.
**I can** sort two-dimensional figures based on their properties.
**I can** recognize two-dimensional shapes can be classified into one or more categories becoming more specific.
**I can** classify two-dimensional figures into categories and/or sub-categories (hierarchy) based on their attributes. (i.e., a polygon, a quadrilateral, a parallelogram, a square).

### 5.MD.C.3
Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

**a.** Understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume and can be used to measure volume.

**b.** Understand that a solid figure which can be packed without gaps or overlaps using $n$ unit cubes is said to have a volume of $n$ cubic units.

**I can** explain what volume means and measure the volume of three-dimensional figures.
**I can** describe one cubic unit as a three-dimensional figure with length of 1 unit, width of 1 unit, and height of 1 unit.
**I can** demonstrate that unit cubes can be used to measure volume of three-dimensional shapes by packing a solid figure with unit cubes.

### 5.MD.C.4
Measure volume by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

**I can** measure the volume of a solid figure by counting the number of unit cubes.
**I can** label volume using appropriate cubic units.
### 5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume of right rectangular prisms.

**a.** Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent whole-number products of three factors as volumes (e.g., to represent the associative property of multiplication).

**b.** Know and apply the formulas $V = l \times w \times h$ and $V = B \times h$ (where $B$ represents the area of the base) for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real-world and mathematical problems.

**c.** Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.

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### *5.NBT.B.5 Fluently multiply multi-digit whole numbers (up to three-digit by four-digit factors) using appropriate strategies and algorithms. (Q1-4)*

**I can** multiply the height by the area of the base, in either order, to calculate the volume of a right rectangular prism.

**I can** justify that multiplication of the area of the base of a three-dimensional figure by its height gives its volume.

**I can** relate finding the product of 3 numbers to finding volume and relate both to the associative property of multiplication.

**I can** find the volume of an object presented in a problem.

**I can** identify a right rectangular prism according to its attributes.

**I can** demonstrate the volume of a right rectangular prism with whole number side lengths by packing it with unit cubes, then counting them.

**I can** explain how partial products or the distributive property relate to the steps in the standard algorithm.

**I can** fluently multiply multi-digit whole numbers (up to three-digit by four-digit factors) using appropriate strategies and algorithms.