

**Understanding by Design: School: Mountain Home School District**

**Designer Name(s):** 4<sup>th</sup> Grade Team

**Date:**

**Subject Area:** Math

**Grade Level(s):** 4<sup>th</sup>

**Unit Title/Focus:** Lessons 61-70, Investigation 7

**Estimated Amount of Instructional Time:** 13 days (1 day per lesson/investigation, 1 day for testing, 1 day for Performance Task Activity)

**Stage 1 – (Desired Results)**

***State Content and Skill Standards:***

**4.OA (Operations and Algebraic Thinking)**

2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.
3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

**4.NBT (Numbers and Operations in Base Ten)**

1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
3. Use place value understanding to round multi-digit whole numbers to any place.
4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

**4.NF (Numbers and Operations-Fractions)**

4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
  - b. Understand a multiple of  $a/b$  as a multiple of  $1/b$ , and use this understanding to multiply a fraction by a whole number.
  - c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.
6. Use decimal notation for fractions with denominators 10 or 100.

**4.MD (Measurement and Data)**

1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

**4.G (Geometry)**

2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

***Enduring Understandings:*** (what are the big ideas, what are the specific understandings desired)

Students will understand that...

- There are universal divisibility rules.

***Essential Questions:*** (what questions will foster inquiry, understanding, and transfer of learning)

- What are the divisibility rules?

- A fraction is a number that is expressed with a numerator and denominator.
- Centimeters can be converted to millimeters using fractions and decimals.
- Transformations can be used to verify that two figures are congruent.

- What do we call a number that is expressed with a numerator and denominator?
- How can fractions and decimals be used to convert centimeters to millimeters?
- How can transformations verify that two figures are congruent?

### Big Idea(s)

Use place value understanding and properties of operations to perform multi-digit arithmetic. Solve problems involving measurement and conversion of measurements from a larger unit to a small unit.

#### *What Students will know: (what knowledge will they acquire)*

Math Vocabulary – circle, equation, fraction, product, base, exponent, area, Associative Property of Multiplication, factor, formula, week, decagon, hexagon, octagon, pentagon, polygon, quadrilateral, regular polygon, triangle, angle, line segment, rectangle, side, square, vertex, digit, formula, multiple, product, quotient, remainder, acre, dividend, division, quotient, digit, division, multiple, similar, congruent, decimal number, whole number, compatible numbers, divisor, estimate, centimeter, decimal number, estimate, metric, millimeter, mixed number, scale, fourths, half, thirds, bias, data, population, sample, survey, tally mark, estimate, pictograph

- Understand how to utilize the known portion of a fraction to figure out the unknown portion of a fraction.
- Understand that some problems have 2 steps that need to be solved before you arrive at the desired answer.
- Understand that when multiplying by 3 or more factors there will be more than 1 step to arrive at the answer.
- Understand that polygons are closed shapes formed by line segments (triangles, quadrilaterals, pentagon, hexagons, and octagons).
- Understand the steps for solving two-digit division with or without a remainder using paper and pencil.
- Understand that multiplication can be used to check if your answer to the division problem is correct.
- Understand the properties of similar and congruent figures so that shapes can be sorted into the appropriate categories.
- Understand that each multiple of 10 is 10 times the number in the 10's place so... 30 is 10 times 3 and 80 is 10 times 8.
- Understand that when multiplying by a multiple of 10 that you can multiply by the number in the 10's place only and then add a zero to your answer ex. to solve  $34 \times 20$  do  $34 \times 2 = 68$  then add a zero 680.
- Understand what a centimeter and millimeter look like.
- Understand that there are 10 millimeters in a centimeter and that metric measures usually are written as decimal numbers instead of fractions ex.  $25 \text{ mm} = 2.5 \text{ cm}$ .

#### *What Students will be able to do: (what will they eventually be able to do as a result of their skills learned/knowledge)*

- If you got  $\frac{2}{5}$  of the cake what fraction did your brother get?
- Draw a picture using only triangles, quadrilaterals, pentagons, hexagons, and octagons
- Measure various objects using millimeters and centimeters
- Find  $\frac{1}{5}$  of 50,  $\frac{1}{4}$  of 32, or  $\frac{1}{3}$  of 27 etc.
- Collect data on students favorite drink choice using a survey
- Solve large number problems using knowledge of multiples ex  $900 \times 700 = 630,000$
- Divide 90 crayons into 6 boxes leave any extras on the table
- If I had 3 clowns sitting on 3 chairs at 3 desks how many clowns would I have total

<ul style="list-style-type: none"> <li>Understand when finding the fraction of the total number of a group you will divide by the denominator.</li> <li>Understand the importance of collecting accurate and relevant data when taking a survey.</li> </ul>	
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**Stage 2 - Assessment Evidence (acceptable assessment evidence that students understand)**

<p><i>Performance Tasks: (what authentic performance task (s) will students demonstrate understanding; by what criteria will it be judged?)</i></p> <ul style="list-style-type: none"> <li>Performance Task 7</li> <li>Activities from pages 426, 442, and 453</li> <li>Reinforcing the Content Standards activity on insert page SOV7</li> <li>Any idea from "What will students be able to do section"</li> </ul>	<p><i>Other Evidence: (quizzes, tasks, academic prompts, homework, observations)</i></p> <ul style="list-style-type: none"> <li>Daily homework</li> <li>Power-up tests</li> <li>Cumulative tests</li> </ul> <p>Performance on daily Power-up activities</p>
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**Stage 3 - Learning Plan (sequence of teaching and learning activities that will produce desired understandings, engagement and development) Use WHERETO elements to help you:**

<p><i>Learning Activities:</i></p> <p>Saxon Table of Contents:</p> <p>Lesson 61 – Remaining Fractions and Two-Step Equations 4.OA.1, 3 &amp; 4; 4.NBT.3 &amp; 5; 4.NF.6; 4.MD.1 &amp; 2; 4.G.1 &amp; 2</p> <p>Lesson 62 – Multiplying Three or More Factors and Exponents 4.OA.1 – 4; 4.NBT.3 – 5; 4.MD.2 &amp; 3; 4.G.1</p> <p>Lesson 63 – Polygons 4.OA.1, 3 &amp; 4; 4.NBT.5; 4.NF.6; 4.MD.1 – 2; 4.G.1</p> <p>Lesson 64 – Division with Two-Digit Answers 4.OA.2 – 4; 4.NBT.4 – 6; 4.NF.6; 4.MD.1 - 2</p> <p>Lesson 65 - Division with Two-Digit Answers 4.OA.3; 4.NBT.5 – 6; 4.MD.1 – 2; 4.G.1 - 2</p> <p>Lesson 66 – Similar and Congruent Figures 4.OA.2 – 3; 4.NBT.3 – 6; 4.MD.1 – 2; 4.G.2</p> <p>Lesson 67 – Multiplying by Multiples of 10 4.OA.2 &amp; 4; 4.NBT.1, 4 – 6; 4.NF.6; 4.MD.1 - 2</p> <p>Lesson 68 – Division with Two-Digit Answers and a Remainder 4.OA.2 – 3; 4.NBT.3, 5 – 6; 4.MD.1 - 3</p> <p>Lesson 69 – Measuring with Metric Units focus on Millimeters 4.OA.2 – 4; 4.NBT.3 – 6; 4.NF.6; 4.MD.1 - 3</p> <p>Lesson 70 – Word Problems About a Fraction of a Group 4.OA.2 &amp; 4; 4.NBT.4 – 6; 4.NF.4b &amp; c, 6; 4.MD.1 &amp; 2; 4.G.1 - 2</p> <p>Investigation 7 – Collecting Data with Surveys *Not a 4<sup>th</sup> Grade Standard*</p> <p>*It was discussed that the "fact" section of the daily Power-Ups be done on Tuesday/Thursday and the "mental math" section be done on Monday, Wednesday, and Friday. Teacher may also want to cut back on "Written Practice", possibly only 15 problems each day or having 1 assignment every 2 lessons. This will free up some time for higher level discussion of concepts and Performance Tasks.*</p>
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W=help the students know WHERE the unit is going and WHAT is expected/Help teacher to know where the students are coming from (prior knowledge, interests)

H=HOOK all students and hold their interest

E=EQUIP students, help them EXPERIENCE the key ideas and EXPLORE the issue

R=Provide opportunities to RETHINK and REVISE their understanding/work

E (2)=Allow students to EVALUATE their work

T=Be TAILORED (personalized) to different needs, interests, and abilities of learners

O=Be ORGANIZED to maximize initial and sustained engagement as well as effective learning

<p><b>Assessment Tasks that Provide Evidence for Claims including DOK</b></p>	<input type="checkbox"/> <b>Claim #1/DOK 1, 2, 3, 4 (circle one):</b>
	<input type="checkbox"/> <b>Claim #2/DOK 1, 2, 3, 4 (circle one):</b>
	<input type="checkbox"/> <b>Claim #3/DOK 1, 2, 3, 4 (circle one):</b>
	<input type="checkbox"/> <b>Claim #4/DOK 1, 2, 3, 4 (circle one):</b>

<b>Achievement Level Descriptors</b>	<b>ALD #1: ALD #2: ALD #3: ALD #4: (circle one):</b>
<b>Materials/Resources</b>	