

**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 111-120, Investigation 12

**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)

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.
5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.

4.NBT (Numbers and Operations in Base Ten)

3. Use place value understanding to round multi-digit whole numbers to any place.
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)

1. Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as  $1/2$ . Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions, e.g., by using a visual fraction model.
3. Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .
  - a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
  - b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
  - c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
  - d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
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.

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.

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

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

<p>Students will understand that...</p> <ul style="list-style-type: none"> <li>• Volume can be estimated using cubes and cubic units.</li> <li>• Fractions with different denominators can be added and subtracted.</li> <li>• We reduce a fraction by dividing it by a fraction that is equivalent to one.</li> </ul>	<ul style="list-style-type: none"> <li>• How can volume be estimated using cubes and cubic units?</li> <li>• How can fractions with different denominators be added and subtracted?</li> <li>• How do we reduce a fraction?</li> </ul>
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**Big Idea(s)**

**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**

**Extend understanding of fraction equivalence and ordering.**

**Generalize place value understanding for multi-digit whole numbers.**

<p><i>What Students will know: (what knowledge will they acquire)</i></p> <p>Math Vocabulary – approximation, area, estimate, perimeter, triangle, volume, base, denominator, divisible, equivalent fraction, fraction, numerator, reduce, term, decimal place, factor, multiplication, product, difference, improper fraction, mixed number, reduce, sum, common denominator, least common denominator (LCD), denominator, greater than, place value, round, whole numbers, digit, division, multiply, quotient, remainder, subtract, equation, half, scale, weight</p> <ul style="list-style-type: none"> <li>• Understand how to utilize a grid to estimate the area and perimeter of a given shape.</li> <li>• Understand how to use cubes to estimate the volume of a container.</li> <li>• Understand that not all fractions can be reduced, only a fraction whose numerator and denominator can be divided by the same number can be reduced.</li> <li>• Utilize prior knowledge of multiplying a 2-digit number by a 2-digit number to extend to multiplying a 3-digit number by a 2 –digit number.</li> <li>• Understand that when adding or subtracting fraction you must always reduce if possible.</li> <li>• Understand how to apply multiplication when renaming fractions</li> <li>• Understand that common denominators means that the denominators are the same number.</li> <li>• Utilize knowledge of other fraction names for 1 and knowledge of factors to find the common denominator.</li> <li>• Utilize knowledge of place value and rounding to round to the hundred millions place.</li> <li>• Demonstrate understanding of the division process and extend that knowledge to be able to divide by 2-digit numbers.</li> <li>• Utilize knowledge of creating equivalent fractions and adding/subtraction fractions to be able to add and subtract fractions with different denominators.</li> <li>• Understand how to write an equation to show a picture of a balanced equation and then solve for the variable.</li> </ul>	<p><i>What Students will be able to do: (what will they eventually be able to do as a result of their skills learned/knowledge)</i></p> <ul style="list-style-type: none"> <li>• Estimate the area of a room using the floor tiles as guidance</li> <li>• Estimate the perimeter of a garden to by the supplies for building a fence</li> <li>• Reduce and enlarge a recipe for more or less guests</li> <li>• Be able to round to easily check work for accuracy</li> <li>• Figure out how much spending money you will have once you subtract your bills form your income</li> </ul>
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**Stage 2 - Assessment Evidence (acceptable assessment evidence that students understand)**

<p><b>Performance Tasks:</b> (what authentic performance task (s) will students demonstrate understanding; by what criteria will it be judged?)</p> <ul style="list-style-type: none"> <li>• Performance Task 12</li> <li>• Activities from pages 707, and 755</li> <li>• Reinforcing the Content Standards activity on insert page SOV12a</li> <li>• Any idea from “What will students be able to do” section</li> </ul>	<p><b>Other Evidence:</b> (quizzes, tasks, academic prompts, homework, observations)</p> <ul style="list-style-type: none"> <li>• Daily homework</li> <li>• Power-up tests</li> <li>• Cumulative tests</li> <li>• Performance on daily Power-up activities</li> </ul>
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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:**

*Learning Activities:*

Saxon Table of Contents:

- Lesson 111 – Estimating Perimeter, Area, and Volume 4.OA.3; 4.NBT.5 & 6; 4.NF.1 – 2, 3a, 3c – d; 4b – c, 6
- Lesson 112 – Reducing Fractions 4.OA.3 & 5; 4.NBT.6; 4.NF.1, 3a – d, 4b – c & 6; 4.MD.1 - 2
- Lesson 113 – Multiplying a Three-Digit Number by a Two-Digit Number 4.OA.3 & 5; 4.NBT.3 & 6; 4.NF.1, 3a, c, d; 4.MD.1 - 2
- Lesson 114 – Simplifying Fraction Answers 4.OA.3; 4.NBT.6; 4.NF.1, 3a, 4.NF.3a, c, & d; 4.MD.1 - 2
- Lesson 115 – Renaming Fractions 4.OA.3 & 5; 4.NBT.3 & 6; 4.NF.1, 3c –d, 4b – c & 6
- Lesson 116 – Common Denominators 4.OA.3; 4.NBT.3, 5 – 6; 4.NF.1 – 2, 3a – d, 4b – c & 6; 4.MD.1 - 2
- Lesson 117 – Rounding Whole Numbers Through Hundred Millions 4.OA.3 ; 4.NBT.3, 5 - 6; 4.NF.1 – 2, 3a, c, d, & 4b - c & 6; 4.MD.1 - 2
- Lesson 118 – Dividing by Two-Digit Numbers 4.OA.3; 4.NBT.3 & 6; 4.NF.1 – 2, 3a – b, 6; 4.MD.1 - 2
- Lesson 119 – Adding and Subtracting Fractions with Different Denominators 4.NBT.3, 5 – 6; 4.NF.1 – 2, 3a, & 4c; 4.MD.1 - 2
- Lesson 120 – Adding and Subtracting Mixed Numbers with Different Denominators 4.OA.3 & 5; 4.NBT.6; 4.NF.1, 3a, 4b – c; 4.MD.1 - 2
- Investigation 12 – Solving Balanced Equations

\*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.\*

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

<b>Assessment Tasks that Provide Evidence for Claims including DOK</b>	<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>	

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