

Understanding by Design: School: Mountain Home School District

Designer Name(s): 4th Grade Team

Date:

Subject Area: Math

Grade Level(s): 4th

Unit Title/Focus: Lessons 81-90, Investigation 9

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.

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.
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.

4.NF (Numbers and Operations – Fractions)

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.
5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.²
⁶ Use decimal notation for fractions with denominators 10 or 100.
7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

4.MD (Measurement and Data)

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.
5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a "one-degree angle," and can be used to measure angles.
b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

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)

Students will understand that...

- Using mental math is a strategy that allows you to compute without using pencil and paper.
- We can identify the type of angle by comparing it to a right angle.
- Patterns can be used to multiply by 10, 100, and 1000.

- What is the strategy that we can use to compute without using paper and pencil?
- What comparison can we use to identify the types of angles?
- How can we use patterns to multiply 10, 100, 1000?

Big Idea(s)

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

Geometric measurement: understand concepts of angle and measure angles.

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

Math Vocabulary - straight angle, acute, angle, degree, estimate, line, obtuse, turn, tessellation, hexagon, polygon, quadrilateral, rotate, transformation, translation, triangle, sales tax, add, decimal place, rate, subtract, thousandth, decimal place, decimal point, denominator, hundredths, mixed number, numerator, tenths, multiply, product, whole number, round, digit, expression, vertical, division, remainder, improper fraction, fraction, half, lowest terms, reduce, decimal number, number sentence, percent, quarter, subtraction, sum

- Use the knowledge that a straight angle is 180 degrees, half of that is a 90 degree angle, and half of that is a 45 degree angle to estimate angle sizes.
- Understand that a tessellation is the repeated use of shapes to fill a flat surface without gaps or overlaps.
- Understand that sales tax is an extra amount that sometimes is added to the total cost of items.
- Demonstrate a complete understanding of place value in order to write fractions with a denominator of 1000 as a decimal number with three decimal places.
- Understand that when we multiply a whole number by 10 we simply add 1 zero to the end of the number, when we multiply a whole number by 100 we add 2 zeroes and so on, making multiplying by multiples of 10, 100, and 1000 easy to do mentally.
- Use knowledge of multiplying by multiples of 10, 100, and 1000 to solve 80×60 by mentally doing $8 \times 6 = 48$ and then adding the 2 zeroes back 4800.
- Understand the process of multiplying 2 two-digit numbers.
- Understand how to identify exactly what a word problems is asking before solving.
- Demonstrate how to solve word problems with remainders.
- Understand that improper fractions are greater than or equal to 1, and use this knowledge to draw pictures showing the equivalence between a mixed number and its improper fraction.
- Understand that making a reasonable estimate before multiplying will help determine if the answer is close.

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

- Measure angles in order to draw/build a bird house
- Use shapes to create a repeating picture with no gaps
- Figure out the total when the amount of the sales tax is known
- Mentally multiply by a multiple of 10
- Divide 174 students as equally as possible to sit on 4 buses
- Divide an item into small (100) pieces and demonstrate a shaded portion with a decimal and fraction representation
- Order the amount of pizza each person ate at the party from greatest to least
- Figure out how many student total if there are 21 classrooms with 25 students each
- Understand that if you eat 5 slices of pizza that was cut into 3 pieces you eat 1 whole pizza plus 2 slices

<ul style="list-style-type: none"> • Use fraction manipulatives to demonstrate knowledge of fractions (mixed numbers, adding, ordering, and reducing). • Understand how fractions, decimals, and percents are related. 	
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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"> • Performance Task 9 • Activities from pages 520-521, 527, 564-565, and 574-577 • Reinforcing the Content Standards activity on insert page SOV9 • Any idea from "What will students be able to do" section 	<p><i>Other Evidence: (quizzes, tasks, academic prompts, homework, observations)</i></p> <ul style="list-style-type: none"> • Daily homework • Power-up tests • Cumulative tests • Performance on daily Power-up activities
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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 81 – Angle Measures 4.OA.3; 4.NF.4c; 4.MD.2, 5a & b, 6 - 7</p> <p>Lesson 82 – Tessellations 4.OA.3; 4.NBT.5; 4.MD.2</p> <p>Lesson 83 – Sales Tax 4.OA.3; 4.NBT.5; 4.MD.2</p> <p>Lesson 84 – Decimal Numbers to the Thousandths 4.OA.3; 4.NBT.5; 4.NF.4c; 4.MD.2, 5a - b</p> <p>Lesson 85 – Multiplying by 10, 100, and 1000 4.OA.3; 4.NBT.1 & 5; 4.NF.4c; 4.MD.2, 5a - b</p> <p>Lesson 86 – Multiplying Multiples of 10 and 100 4.OA.3; 4.NBT.1 & 5; 4.NF.4c & 6</p> <p>Lesson 87 – Multiplying Two Two-Digit Numbers 4.OA.3; 4.NBT.5; 4.NF.6; 4.MD.2, 5a - b</p> <p>Lesson 88 – Remainders in Word Problems About Equal Groups 4.OA.3; 4.NBT.5; 4.MD.2</p> <p>Lesson 89 – Mixed Numbers and Improper Fractions 4.OA.3; 4.NBT.5; 4.NF.3b, 4.NF.3c; 4.MD.2</p> <p>Lesson 90 – Multiplying Two Two-Digit Numbers 4.OA.3; 4.NBT.5; 4.NF.3b & 4c; 4.MD.2</p> <p>Investigation 9 – Investigation Fractions with Manipulatives and Understanding How Fractions, Decimals, and Percents Are Related 4.NF.3a, 4.NF.3b, 4.NF.3c, 4.NF.3d, 4.NF.5 - 7</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

Assessment Tasks that Provide Evidence for Claims including DOK	<input type="checkbox"/> Claim #1/DOK 1, 2, 3, 4 (circle one):
	<input type="checkbox"/> Claim #2/DOK 1, 2, 3, 4 (circle one):
	<input type="checkbox"/> Claim #3/DOK 1, 2, 3, 4 (circle one):
	<input type="checkbox"/> Claim #4/DOK 1, 2, 3, 4 (circle one):
Achievement Level Descriptors	ALD #1: ALD #2: ALD #3: ALD #4: (circle one):
Materials/Resources	