

Understanding by Design

Designer Name(s): Young and Cowser

Date: 6/9/14

Subject Area: Math

Grade Level(s):3rd

Unit Title/Focus: Section 9 (Lessons 81-90)

Estimated Amount of Instructional Time: ~ 14 days

Stage 1 – (Desired Results)

State Content and Skill Standards: **CCSS and section overview card**

Mathematic Claim #1: Students can explain and apply mathematical concepts and carry out mathematical procedures with precision and fluency.

Domain: Operation and Algebraic Thinking

Target A. (3.OA.A) Represent and solve problems involving multiplication and division. (DOK 1)

Gr. 3 Standards: 3.OA.1, 3.OA.2, 3.OA.3, 3.OA.4,

3.OA.1: Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .

3.OA.2: Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.

3.OA.3: Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.4: Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \square \div 3$, and $6 \times 6 = ?$.

Target B. Understand properties of multiplication and the relationship between multiplication and division. (DOK 1)

Gr. 3 Standards: 3.OA.5, 3.OA.6

3.OA.5 Apply properties of operations as strategies to multiply and divide.

Examples: If $6 \times 4 = 24$ is known, then $4 \times 6 = 24$ is also known. (Commutative Property of Multiplication.) $3 \times 5 \times 2$ can be found by $3 \times 5 = 15$, then $15 \times 2 = 30$, or by $5 \times 2 = 10$, then $3 \times 10 = 30$. (Associative Property of Multiplication.) Knowing that $8 \times 5 = 40$ and $8 \times 2 = 16$, one can find 8×7 as $8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56$. (Distributive Property.)

3.OA.6 Understand division as an unknown-factor problem. For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.

Target C.(3.OA.C) Multiply and divide within 100. (DOK 2)

Gr. 3 Standards:3.OA.7

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3 know from memory all products of two one-digit numbers.

Target D.(3.OA.D) Solve problems involving the four operations, and identify and explain patterns in arithmetic. (DOK 2)

Gr. 3 Standards: 3.OA.8, 3.OA.9

3.OA.8 Solve two-step word problems using the four operations. 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.

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

Domain: Numbers and Operations in Base Ten

Target E. (3.NBT.E) - Use place value understanding and properties of operations to perform multi-digit arithmetic. (DOK 1)

Gr. 3 Standards: 3.NBT.2

3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Target I. (3.MD.C)- Geometric measurement: understand concepts of area and relate area to multiplication and to addition. (DOK 2)

Gr. 3 Standards: 3.MD.5a, 3.MD.5b,3.MD.6,3.MD.7a,3.MD.7b,3.MD.7d

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.

a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.

b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.

3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

3.MD.7 Relate area to the operations of multiplication and addition.

a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Target J. (3.MD.D)- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. (DOK 1)

Gr. 3 Standards: 3.MD.8

3.MD.8 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

<p>Enduring Understandings: <i>(what are the big ideas, what are the specific understandings desired)</i></p> <p>Students will understand that...</p> <ul style="list-style-type: none"> • To find distances, we use feet, yards, and meters as the units of measure • The area of a rectangle is the number of square units used to cover the rectangle • An array is an orderly arrangement of objects in the shape of a rectangle • Multiplication and Division are related • 	<p>Essential Questions: <i>(what questions will foster inquiry, understanding, and transfer of learning)</i></p> <ul style="list-style-type: none"> • What are some distances that I would measure using a foot as a unit of measure? A yard? A meter? • How can I find the area of a rectangle using square tiles? Without using tiles? • When I draw an array for a number sentence, how do I know how many rows to put in the array? How many objects to put in each row? • How can I check a division problem to see if the quotient is correct?
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Big Idea(s)/ Real World Application

Students will be able recognize that the area is the number of square units needed to cover the rectangle.

Students will be able to understand that an array represents a multiplication problem. (The number of rows times the number of objects in each row).

Student will be able to determine which unit of measurement to use based on the size or distance that needs to be measured.

<p>What Students will know: <i>(what knowledge will they acquire)</i></p> <p>Math Vocabulary- area, array, Celsius scale, certain, commutative property of multiplication, customary unit, 50/50 chance, foot, impossible, larger-smaller-difference problem, likely, meter</p> <ul style="list-style-type: none"> • A number multiplied by itself is a square number • The intervals on the Celsius side of the thermometer increase by 1 • The number of days in a month can be remembered using the knuckle trick • Each year has 365 ¼ days • Area is the length of an polygon multiplied by the width of an polygon • Basic Multiplication Facts • Which unit of measurement to use based on the size or distance that needs to be measured • Placement of the factors are interchangeable and will not affect the product • An array represents a multiplication problem • Division is a larger number being separated into equal smaller groups 	<p>What Students will be able to do: <i>(what will they eventually be able to do as a result of their skills learned/knowledge)</i></p> <p>(Saxon Lesson Objectives)</p> <p>Students will be able to</p> <ul style="list-style-type: none"> • Find the Square Roots of Perfect Squares • Find the Length of the Side of a Square Given the Area • Add Money Amounts • Read and Show the Temperature on a Celsius Scale • Identify the Number of Days in Each Month • Identify the Number of Days in a Year • Multiply by 0 and 5 • Identify Commutative Property of Multiplication • Measure and Identify Feet, Yards, and Meters • Identify and Solve Larger Smaller Difference Problem • Make and Draw an Array • Estimate and Find Area of a Rectangle • Find the Sum of 3 Addends • Divide by 2 and 5
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Stage 2 - Assessment Evidence (acceptable assessment evidence that students understand)	
<p>Performance Tasks: <i>(what authentic performance task (s) will students demonstrate understanding; by what criteria will it be judged?)</i></p> <ul style="list-style-type: none"> • Create an Array • Work Backwards to Solve a Word Problem 	<p>Other Evidence: <i>(quizzes, tasks, academic prompts, homework, observations)</i></p> <ul style="list-style-type: none"> • Cumulative Written Assessments 85-1, 85-2, 90-1, 90-2

<ul style="list-style-type: none"> Determine Likelihood of an Event and Fairness of a Game 	<ul style="list-style-type: none"> Oral Assessment 9 Teacher Observations Guided Practice Homework Practice Fact Practice
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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 Section 9

- Lesson 81- Finding Square Roots of Perfect Squares and Finding the Length of the Side of a Square given the Area – Does Not Align to Common Core
- Lesson 82- Adding Money (Decimals)
- Lesson 83- Reading and Showing Temperature on Celsius Scale
- Lesson 84- Identifying Number of Days in a Month and Number of Days in a Year
- Lesson 85-1- Multiplying by 0 and 5, Identifying the Commutative Property of Multiplication
- Lesson 85-2- Estimating and Measuring Distances (Feet, Yards, and Meters)- Grade 2 Review ****
- Lesson 86- Identifying and Solving "Larger- Smaller- Difference" Problems
- Lesson 87- Making and Drawing Arrays
- Literature Connection: Betcha! By Stuart J. Murphy**
- Lesson 88- Estimating and Finding the Area of a Rectangle
- Lesson 89- Sum of 3 Addends- Grade 2 Review
- Lesson 90-1- Working Backward to Solve a Problem, Dividing by 2 and 5
- Lesson 90-2- Determining the Likelihood of an Event and Determining the Fairness of a Game

Journal Writing:

- Write the first ten perfect squares. What patterns do you see in these numbers? (Lesson 81)
- Would you play outside when it is 2 degrees Celsius or 30 degrees Celsius? Explain why. (Lesson 83)
- Choose something you would like to measure. Explain which units of measure (inches, centimeters, feet, yards, or meters) would be best to use to measure the object. Estimate the length. (Lesson 85-2)
- Pretend you went to the zoo. Write a larger-smaller-difference problem about the animals at the zoo. (Lesson 86)
- If we had 24 desks in our classroom, show the best way to arrange them in an array. Explain why you think this arrangement is best for our classroom. (Lesson 87)
- Write about a time you played a game that you thought wasn't fair. Why did you think the game wasn't fair? (Lesson 90-2)

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	

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