Roscommon Area Public Schools – Curriculum Framework
Course: 6th Grade Math; CPM
Unit Number: 5 Unit Title: Multiplying Fractions and Area
Timeframe: Beginning of January to Beginning of February

Stage 1: Identify Desired Results	
Essential Question: *What thought-provoking questions will foster inquiry, meaning making and transfer?* • *An essential question is open-ended; it has no simple "right answer."* • *Is meant to be investigated, argued, looked at from different points of view* • *Encourages active "meaning making" by the learner about important ideas.* • *Raises other important questions.* • *Naturally arises*	How are spatial relationships, including shape and dimension, used to draw, construct, model and represent real situations or solve problems?
Scaffold Questions: *What questions can we ask students that break the essential question into smaller pieces of content?*	How can I visualize it? Is there another way to see it? How can I break it into smaller pieces? How can I rearrange the shape?

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Brief Summary of Unit:	In Section 5.1, you will calculate portions of fractions, or "parts of parts." You will use these ideas to develop strategies for multiplying fractions and mixed numbers. In Section 5.2, your new knowledge of multiplying fractions will help you understand decimal multiplication. You will also investigate how multiplying by a number close to, much larger than, or much smaller than 1 affects the size of the product. Section 5.3 focuses on the question *"How can we use what we know about the areas of basic shapes to find the areas of complex shapes?"* As you develop new strategies for finding the areas of shapes, you will be able to solve new problems that involve more complex areas.
Desired Understanding: *The long-term accomplishments that students should be able to do with knowledge and skill, on their own. Frames Standards as long-term performance accomplishments. Answer the questions Why? And What can you do with this?*	Section 5.1: You will learn how to multiply fractions by examining portions of fractions. Then you will connect this process to finding the products of mixed numbers. Section 5.2: In the second section, you will extend what you learned in the first section to find products of decimals. This will also help you understand how multiplication by a number greater than or less than 1 affects the product. Section 5.3: You will find the areas of different shapes such as parallelograms, triangles, and trapezoids by rearranging them into rectangles. In this chapter, you will: ● Learn how to calculate a part of another part. ● Discover how to multiply fractions, mixed numbers, and decimals. ● Find the areas of shapes, including rectangles, triangles, parallelograms, and trapezoids.

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	• Break a complex shape into smaller pieces to find area.
Common Core State Standards (CCSS) - Mathematics *List all of the standards in this unit.*	6.NS.A.1: Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?* 6.NS.B.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. 6.RP.A.3:Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with wholenumber measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

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	d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. 6.GA.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
Mathematical Practices *Which of the mathematical practices will be focused on during this unit?*	The 8 Mathematical Practices are listed below. A "kid friendly" version of each standard is also included. **1. Make sense of problems and persevere in solving them** **2. Reason abstractly and quantitatively** **3. Construct viable arguments and critique the reasoning of others** **4. Model with mathematics** **5. Use appropriate tools strategically** **6. Attend to precision** **7. Look for and make use of structure** **8.** Look for and express regularity in repeated reasoning Kid-Friendly Version of Standards **1. I never give up on a problem and I do my best to get it right** **2. I can solve problems in more than one way** **3. I can explain my math thinking and talk about it with others** **4. I see the math in everyday life and I can use math to solve everyday problems** **5. I know how to choose and use the right tools to solve a math problem** **6. I can work carefully and check my work** **7. I can use what I know to solve new problems** **8. I can solve problems by looking for rules and patterns**
Essential Standards*	

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List the Essential Standards that will be taught and assessed in this unit.	
Crossover standards* *Connection to other content areas (Option)*	
Alignment to the Vision of High Quality Instruction in Mathematics *(How do the instructional targets in this unit align to the district's vision of high quality instruction?)*	Teacher Actions: - Teacher establishes clear goals for the mathematics that students are learning, situates targets within learning progressions, and uses the targets to guide instructional decisions. - Teacher engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allows multiple entry points and varied solution strategies. - Teacher engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving. - Teacher facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments. - Teacher uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships. - Teacher builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems. - Teacher consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships. - Teacher uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning. - Teacher provides instructional scaffolding with the gradual release model of instruction to ensure students are able to construct meaning of mathematics. Student Actions: - Students solve problems without giving up. - Students think about numbers in many different ways.

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	- Students explain and justify their thinking and understand the thinking of others. - Students show, analyze and revise their work in many different ways. - Students use math tools and explain why they chose them. - Students calculate accurately and efficiently, evaluate their work, and clearly communicate their thinking. - Students use what they know to solve new problems. - Students solve problems by looking for rules and patterns and evaluate their result. - Students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.

Stage 2: Determine Acceptable Evidence

(With the exception of formative assessments, all assessments listed in this section are required elements of the district's curriculum and the data associated will be collected in the district's performance management driver system.)

Measure of Understanding (Performance Task) *(How will students demonstrate their attainment of the desired understanding?)*	**Chapter 5 Closure** What have I learned? Reflection and Synthesis The activities below offer you a chance to reflect about what you have learned during this chapter. As you work, look for concepts that you feel very comfortable with, ideas that you would like to learn more about, and topics you need more help with.

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1. WHAT HAVE I LEARNED?

Doing the problems in this section will help you to evaluate which types of problems you feel comfortable with and which ones you need more help with.

Solve each problem as completely as you can. The table at the end of this closure section provides answers to these problems. It also tells you where you can find additional help and where to find practice problems like them.

CL 5-106.
Which portion in each pair is greater? Explain how you know.

a. 0.1 and 0.01
b. 8/10 and 0.91

CL 5-107.
Simplify the following expressions without using a calculator.

a. $5(2 \cdot 3+1)-4(6)$
b. $10 \cdot 38$
c. $4.9(0.2)$

CL 5-108.
Aaron is on his school's wrestling team. He and his teammates want to paint the school's mascot on the

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wrestling mats. The T-shirts sold at Aaron's school show the mascot, a Bulldog, with a nose that is 1.2 cm long and a front paw that measures 4.5 cm across. If Aaron and his teammates plan to paint an enlarged image of the Bulldog with a nose that is 6 cm long, how long should they make the front paw?

CL 5-109.
For each of the following products, estimate the approximate answer. Explain your reasoning. Then multiply each set of numbers to see how close you were.

CL 5-110.
Find three fractions that are equivalent to each of the following fractions.

a. $\frac{4}{7}$

b. $\frac{1}{3}$

CL 5-111.
Write $\frac{23}{6}$ as a mixed number. Then make up any mixed number and show how you can write it as a fraction greater than one.

CL 5-112.
Copy each shape below on your paper, and then find its area and perimeter. Show all of your work.

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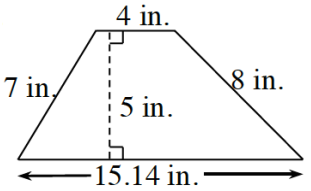
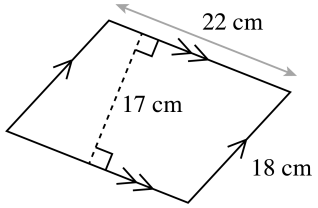
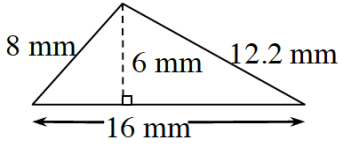
a.



b.



c.



CL 5-113.
Draw and label a set of axes on your graph paper. Plot and label the following points:

(1,3),(4,2),(0,5),and (5,1).

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Assessing the Performance Task *(How will we evaluate quality student work in the performance task? How will we determine that students can use their learning independently?)*	
Summative Assessments *(How will we know if students can demonstrate mastery of the unit's content, skills, and common core state standards?) Can overlap the performance-based evidence, thereby increasing the reliability of the overall assessment (especially if the performance task was done by a group)*	Independent Assessment
Interim Assessments	Learning Logs
Formative Assessments	Review/Previews
	Done with each closure problem.

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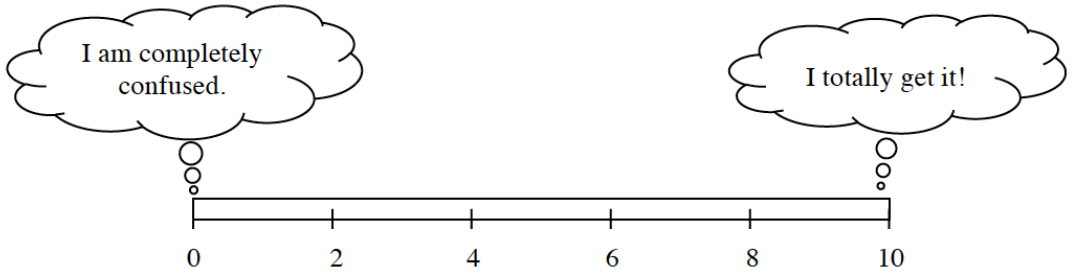
Student Self-Reflection and Self-Regulation **(Student-Centered)** *(How will we measure students' ability to think meta-cognitively?)*	 Draw a bar or number line that represents 0 to 10. - Color or shade in a portion of the bar that represents your level of understanding and comfort with completing that problem on your own. If any of your bars are less than a 5, choose *one* of those problems and complete one of the following tasks: ● Write two questions that you would like to ask about that problem. ● Brainstorm two things that you DO know about that type of problem. If all of your bars are at 5 or above, choose *one* of those problems and do one of these tasks: ● Write two questions you might ask or hints you might give to a student who was stuck on the problem. ● Make a new problem that is similar and more challenging than that problem and solve it.
State Assessment Practice *(How will we measure students'*	

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ability to interact with content and skills in an MSTEP-like or SAT-like format?)	

Stage 3: Learning Plan
(Summary of Key Learning Events and Instruction)

What activities, experiences and lessons will lead to achievement of the desired results and success at the assessments? *The learning events –* • *should be derived from the goals of Stage 1 and the assessments of Stage 2 to ensure alignment and effectiveness of the activities.* • *should match the level of rigor within the standard*	Students will explore mathematical reasoning and representations through collaborative teams and roles, using grit to solve challenging problems and provide reasoning for their solutions. In Chapter 5, students will develop a conceptual understanding of and strategies for multiplying fractions and decimals. They also develop strategies and rules for finding the area of non-rectangles, specifically, various quadrilaterals and triangles, and learn to find the area of complex shapes. Section 5.1 looks at multiplication of fractions, decimals, and mixed numbers. The lessons begin with geometric representations: dividing whole figures into parts, and then further dividing them, calculating "parts of parts" to find the product. Students then generalize this process to develop an algorithm for multiplying fractions. Multiplying with mixed numbers and fractions greater than one is then introduced. Students learn to use generic rectangles to organize multiplication of mixed numbers. They also convert mixed numbers to fractions greater than one and apply their algorithm. In Section 5.2, students look at multiplying decimals, making sense of the expected size of a product, and thus the placement of the decimal point.

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• *support student Acquisition, Meaning Making, and Transfer.*	Throughout Chapter 5, students have the opportunity to build number sense about the sizes of portions as well as the expected results of multiplication with portions. They compare fractions and decimals, estimate products, and explain what happens when a number is multiplied by fractions close to 1, much less than 1, or much greater than 1. Section 5.3 shifts the focus to looking at area, which was introduced in Lesson 1.1.2 with the "Toothpicks and Tiles" investigation. To begin, students are challenged to find the area of a complex shape by rearranging it into a rectangle. This strategy threads through their work in this section to find the area of other shapes. Formulas for finding the area of parallelograms, triangles, and trapezoids are developed as students find ways to recompose those shapes into rectangles. For example, students are expected to reason that since a parallelogram can always be recomposed as a rectangle with the same base and height, then its area must be the product of its base and height. Similarly, since two copies of a triangle can always be recomposed into a parallelogram with the same base and height as the original triangle, then the area of a triangle is half the area of a parallelogram. At the end of this chapter there are opportunities for both chapter closure and mid-course reflection. The intent of chapter closure is to help students summarize their learning in the chapter, while the Mid-Course Reflection activities enable students to consolidate their learning from the entire first half of the course as well as to make new connections. The Mid-Course Reflection contains two separate activities, "Scavenger Hunt" and "Memory Lane." Teachers can choose to use one or both activities. The Mid-Course Reflection activities can be used after completing the chapter closure, or both can take place simultaneously by doing a mid-course reflection activity during class and assigning problems from chapter closure for students to complete at home. Class Schedule:

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	Bell Work Roles Inquiry/Investigation (Lesson) Review/Preview work time if left Daily Wrap up/closure ALL CHAPTER 5 MATERIALS: Binder Materials (NOTES), Assessments, Learning Targets, Homework
Learning Targets *What will students be taught? What should they know? What should they be able to do?*	Learning Targets
How will the unit be sequenced and differentiated to optimize achievement for all learners? *Teaching -* • *should reflect the instructional approaches most appropriate to the goals (not what is easiest or most comfortable for the teacher).* • *should employ resources most appropriate to the*	Chapter 5 Outline **Total: 11 - 12 days plus optional time for Closure and Assessment** Section 5.1 --- **Lesson 5.1.1** **Objectives:** Representing Fraction Multiplication **Days: 1** --- **Materials:** • Lesson 5.1.1 RP (ESP), 1 per student+ **eTools & Videos:**

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goals (not simply march through a textbook or commercial program). • *be responsive to differences in learners' readiness, interests, and preferred ways of learning.*	**Core Problems & Homework:** CP: 5-1 and 5-3 HW: 5-4 to 5-8 **Lesson 5.1.2** **Objectives:** Describing Parts of Parts **Days: 1** **Materials:** • Lesson 5.1.2 RP (ESP), 1 per pair **eTools & Videos:** **Core Problems & Homework:** CP: 5-9 to 5-11 HW: 5-13 to 5-17 **Lesson 5.1.3** **Objectives:** Calculating Parts of Parts **Days: 1** **Materials:** • Student diagrams from homework **eTools & Videos:** **Core Problems & Homework:** CP: 5-18 to part (b) of 5-20

HW: 5-24 to 5-28

Lesson 5.1.4

Objectives: Multiplying Mixed Numbers

Days: 1

Materials:
None

eTools & Videos:
Core Problems & Homework:
CP: 5-29 to 5-33
HW: 5-34 to 5-38

Section 5.2

Lesson 5.2.1

Objectives: Making Sense of Decimal Multiplication

Days: 1

Materials:

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- None

eTools & Videos:

Core Problems & Homework:

CP: 5-39 to 5-43

HW: 5-48 to 5-52

Lesson 5.2.2

Objectives: Fraction Multiplication Number Sense

Days: 1

Materials:

- Lesson 5.2.2 RP (ESP), 1 per student

eTools & Videos:

Core Problems & Homework:

CP: 5-53 to 5-56
HW: 5-61 to 5-65

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Section 5.3

Lesson 5.3.1

Objectives: Rearranging Areas

Days: 1

Materials:

- Lesson 5.3.1 RP (ESP), 1 per pair +5 or 6
- Scissors

eTools & Videos:

- Lesson 5.3.1 Digital Activity (2 activities)

Core Problems & Homework:

CP: 5-66 to 5-69

HW: 5-71 to 5-75

Lesson 5.3.2

Objectives: Area of a Parallelogram

Days: 1

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Materials:

- Lesson 5.3.2A RP (ESP), 1 per student
- Lesson 5.3.2B RP (ESP), 1 teacher
- Lesson 5.3.2C RP (ESP), 1 per student
- Computer lab with Internet

eTools & Videos:

Area Decomposer:

- *5-76 Shape 1 Student eTool*
- *5-76 Shape 2 Student eTool*
- *5-76 Shape 3 Student eTool*
- *5-76 Shape 4 Student eTool*
- *5-76 Shape 5 Student eTool*
- *5-76 Shape 6 Student eTool*
- *5-76 Shape 7 Student eTool*
- *5-76 Shape 8 Student eTool*
- *5-78 Student eTool* (ESP)

Core Problems & Homework:

CP: 5-76 to 5-78

HW: 5-80 to 5-84

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Lesson 5.3.3

Objectives: Area of a Triangle

Days: 1

Materials:

- Lesson 5.3.3A RP (ESP), 1 per team
- Lesson 5.3.3B RP (ESP), 2 copies each pg.
- Scissors
- Computer (opt.)

eTools & Videos:

- Area of a Parallelogram (YouTube) (Vimeo) 
- Lesson 5.3.3 Digital Activity

Core Problems & Homework:

CP: 5-85 to 5-88

HW: 5-91 to 5-95

Lesson 5.3.4

Objectives: Area of a Trapezoid

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	Days: 1 Materials: ● Lesson 5.3.4A RP (ESP), 1 per team ● Lesson 5.3.4B RP (ESP), 1 each pg. ● Lesson 5.3.4C RP (ESP), 1 per student eTools & Videos: Trapezoid Decomposer: ● *Trapezoid Decomposer Method 1 Student eTool* (ESP) ● *Trapezoid Decomposer Method 2 Student eTool* (ESP) ● Area of a Triangle (YouTube) (Vimeo) Core Problems & Homework: CP: 5-96, 5-98, & 5-99 HW: 5-101 to 5-105 **Chapter Closure (Various Options)**
Key Vocabulary	**area**

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	base **dimensions** **generic rectangle** **height** **mixed numbers** **parallel** **perpendicular** **product** **quadrilateral** **ratio** **trapezoid** **triangle**
Resources *Description or link to resources*	

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