Fourth Grade

Unit Name	**Unit 3:** *Reasoning about Multiplication and Division*	**Unit duration (Days)**	*3-4 weeks*

[GA K-12 Standards](#)

Previously students were multiplying and dividing numbers within 100. In this unit students will be building on this understanding by multiplying multi-digit numbers by a one-digit number or two two-digit numbers as well as dividing four-digit numbers with one-digit divisors. This unit also incorporates problem solving with money, intervals of time, and metric measurements for liquid volume, distance, and weight.

4.NR.2 Using part-whole strategies, solve problems involving addition and subtraction through the hundred-thousands place, as well as multiplication and division of multi-digit whole numbers presented in real-life, mathematical situations.
- **4.NR.2.2** Interpret, model, and solve problems involving multiplicative comparison.
- **4.NR.2.3** Solve real-life problems involving multiplication of a number with up to four digits by a 1-digit whole number or involving multiplication of 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.NR.2.4** Solve real-life division problems involving up to 4-digit dividends and 1-digit divisors (including whole number quotients with remainders) using strategies based on place-value understanding, properties of operations, and the relationships between operations.
- **4.NR.2.5** Solve multi-step problems using addition, subtraction, multiplication, and division involving whole numbers. Use mental computation and estimation strategies to justify the reasonableness of solutions.

4.MDR.6: Measure time and objects that exist in the world to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.
- **4.MDR.6.1** Use the four operations to solve problems involving elapsed time to the nearest minute, intervals of time, metric measurements of liquid volumes, lengths, distances, and masses of objects, including problems involving fractions with like denominators, and also problems that require expressing measurements given in a larger unit in terms of a smaller unit, and expressing a smaller unit in terms of a larger unit.

4.MP.1-8 Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals. *(It is important to note that MPs 1, 3 and 6 should support the learning in every lesson.)*
- **MP.1** Make sense of problems and persevere in solving them.
- **MP.2** Reason abstractly and quantitatively.
- **MP.3** Construct viable arguments and critique the reasoning of others.
- **MP.4** Model with mathematics.

- **MP.5** Use appropriate tools strategically.
- **MP.6** Attend to precision.
- **MP.7** Look for and make use of structure.
- **MP.8** Look for and express regularity in repeated reasoning.

The [Framework for Statistical Reasoning](#) and the [Mathematical Modeling Framework](#) should be taught throughout the units. The [K-12 Mathematical Practices](#) should be evidenced at some point throughout each unit depending on the tasks that are explored. It is important to note that MPs 1, 3 and 6 should support the learning in every lesson.

I Can Statements

- I can demonstrate simple multiplicative relationships using concrete materials, drawings and equations.
- I can solve mathematical problems involving multiplicative comparisons.
- I can distinguish between additive (the difference of two quantities) and multiplicative comparisons (one group being a multiple of another).
- I can multiply a number with up to four digits by a 1-digit whole number and two two-digit whole numbers using strategies based on place value and the properties of operations.
- I can illustrate and explain multiplication using dot arrays and equations with an understanding of place value and properties of operations.
- I can understand, interpret and solve real-life problem-solving situations in the context of word problems.
- I can solve real-life division problems involving up to 4-digit dividends and 1-digit divisors without remainders (whole number quotients)
- I can solve real-life division problems involving up to 4-digit dividends and 1-digit divisors with remainders (whole number quotients)
- I can explain the remainder based on the problem situation.
- I can use mental computation and estimation strategies to justify the reasonableness of solutions.
- I can divide using strategies based on place-value understanding, properties of operations, and the relationships between operations.
- I can solve multi-step problems using division involving whole numbers.
- I can solve elapsed time problems to the nearest hour, half-hour, quarter-hour, to the nearest five minutes, and to the nearest minute.
- I can draw an open number line and solve elapsed time problems by determining when something begins, ends, or how long the event lasts (duration).
- I can solve real-life problems involving elapsed time on an open number line.
- I can use the given information to help solve problems related to time and how it connects to everyday life.
- I can use different size containers to measure capacity.
- I can estimate and measure capacity using appropriate tools.
- I can estimate and measure mass using appropriate tools.

Tier II Vocabulary Words- High Frequency Multiple Meaning	**Tier III Vocabulary Words-** Subject/ Content Related Words
Interpret, model, measure	Additive comparison, analog clock, dividend, divisor, elapsed time, factor, grams, kilograms, liters, milliliters, multiplicative comparison, product, remainder, quotient [K-12 Mathematics Glossary](#)

Assessments

Formative Assessment(s):
- MCS K-5 Activity & Assessment Collection
- MIP Formative Assessment p. 240 (Elapsed Time)
- 4.NR.2.2 MCS Mini Assessment #1
- 4.NR.2.2 MCS Mini Assessment #2
- 4.NR.2.3 MCS Mini Assessment
- 4.NR.2.4 MCS Mini Assessment
- 4.NR.2.5 MCS Mini Assessment #1
- 4.NR.2.5 MCS Mini Assessment #2

It is the responsibility of each schools' grade level PLC to identify appropriate instructional lessons and resources, based on data and student needs, using the suggested pacing duration. The following learning tasks have been vetted to align to the standards included in this unit. The GA Dept. of Education strongly recommends that any additional tasks, resources, and/or assessments used for instruction should be vetted using the Quality Assurance Rubric, to ensure alignment to the state standards.

Objective or Content	Learning Experiences		Differentiation Considerations
4.NR.2 Using part-whole strategies, solve problems involving addition and subtraction through the hundred-thousands place, as well as multiplication and division of multi-digit whole numbers presented in real-life, mathematical situations.	**GA DOE Learning Plans** **Multiplicative Comparisons** **4.NR.2.2** *In this plan, students will be engaged in multiplicative comparison, realizing that one group is a multiple of another group. (Suggested Time Frame: 2 -3 Days)* ● Teacher Guidance ● Student Reproducibles **Reasoning with Multiplication** **4.NR.2.3, 4.NR.2.5** *In this plan, students will extend their understanding of multiplication through the use of equations and dot arrays, with an understanding of place value and properties of operations. Students will engage in real life scenarios that will increase their understanding of multiplication while connecting the use of models and equations that support student thinking.* **Part 1**: *(Suggested Time Frame: 1 -2 Days)* ● Teacher Guidance ● Student Reproducibles **Part 2:** *(Suggested Time Frame: 2 -3 Days)* ● Teacher Guidance	**MCS Curriculum Resources** **SAVVAS enVision Topic 3 : Use Strategies and Properties to Multiply by 1- Digit Numbers** *Students develop an understanding of multiplying multi-digit numbers by 1-digit numbers using strategies based on place value and the properties of operations.* ● Lesson 3-1: Multiply by Multiples of 10, 100, and 1,000 ● Lesson 3-2: Estimate Products ● Lesson 3-3: Use Arrays and Partial Products to Multiply ● Lesson 3-4: Use Area Models and Partial Products to Multiply ● Lesson 3-5: More Use Area Models and Partial Products to Multiply ● Lesson 3-6: Mental Math Strategies for Multiplication ● Lesson 3-7: Choose a Strategy to Multiply **SAVVAS enVision Topic 4 : Use Strategies and Properties to Multiply by 2-DIgit Numbers** *Students develop an understanding of multiplying multi-digit numbers by 2-digit numbers using strategies based on place*	**GADOE Intervention Tasks** Checking Addition and Subtraction by Estimation: Choose critically from a range of mental strategies to solve addition and subtraction problems. Mental or Written?: Solve addition and subtraction problems using decomposition, leading to a written algorithm. A Standard Written Form for Addition: Solve addition and subtraction problems using decomposition, leading to a written algorithm. Cross Product: Solve multiplication and division

Last Revised: June 2023

- Student Reproducibles

Part 3: *(Suggested Time Frame: 1 -2 Days)*
- Teacher Guidance
- Student Reproducibles

Multi-Digit Multiplication Strategies
4.NR.2.3, 4.NR.2.5
This concept-based lesson is intended to help you assess how well students are able to use a variety of strategies to multiply. In particular, this learning plan aims to identify and help students who have difficulties with:Representing multiplication in multiple ways. (Suggested Time Frame: 1 -2 Days)
- Teacher Guidance
- Lesson Guide
- Student Reproducibles

Division by Fair Sharing
4.NR.2.4, 4.NR.2.5
In this plan, students develop an understanding of division with 1-digit divisors and 4-digit dividends using models, the relationship between multiplication and properties of operations. (Suggested Time Frame: 1 -2 Days)
- Teacher Guidance
- Student Reproducibles

Exploring Division Through Arrays
4.NR.2.4, 4.NR.2.5
In this plan, students develop an understanding of division with 1-digit divisors and 4-digit dividends using models, the relationship between multiplication and properties of operations. (Suggested Time Frame: 1 -2 Days)
- Teacher Guidance
- Student Reproducibles

Division Strategies
4.NR.2.4, 4.NR.2.5
In this learning plan, students develop an understanding of division with 1-digit divisors and 4-digit dividends using diagrams, the relationship between multiplication and properties of operations. (Suggested Time Frame: 2 - 3 Days)

value and the properties of operations.
- Lesson 4-1: Multiply Multiples by 10
- Lesson 4-2: Use Models to Multiply 2-Digit Numbers by Multiples of 10
- Lesson 4-3: Estimate: Use Rounding or Compatible Numbers
- Lesson 4-4: Arrays and Partial Products
- Lesson 4-5: Area Models and Partial Products
- Lesson 4-6: Use Partial Products to Multiply by 2-Digit Numbers

SAVVAS enVision Topic 5 : Use Strategies and Properties to Divide by 1-DIgit Numbers
Students develop an understanding of finding whole-number quotients and remainders with up to four-digit dividends and 1-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.
- Lesson 5-1: Mental Math: Find Quotients
- Lesson 5-2: Mental Math: Estimate Quotients
- Lesson 5-3: Mental Math: Estimate Quotients for Greater Dividends
- Lesson 5-4: Interpret Remainders
- Lesson 5-5: Use Partial Quotients to Divide
- Lesson 5-6: Use Partial Quotients to Divide: Greater Dividends
- Lesson 5-7: Use Sharing to Divide
- Lesson 5-8: Continue Sharing to Divide
- Lesson 5-9: Choose a Strategy to Divide

SAVVAS enVision Topic 6 : Use Operations with Whole Numbers to Solve Problems
Students focus on solving word problems using skills developed involving multi-digit whole-number addition, subtraction, multiplication, and division. As students solve word problems, theydraw on previously learned meanings of the four operations, and they come to understand how multiplication can be used for comparison.
- Lesson 6-1: Solve Comparison Problems
- Lesson 6-2: Continue to Solve Comparison Problems

problems by using place value.

Little Bites at Big Multiplications and Divisions: Solve multiplication and division problems by splitting factors.

 Cut and Paste: Solve multiplication and division problems by using proportional adjustment.

| | ● Teacher Guidance
● Student Reproducibles | ● Lesson 6-3: Model Multi-Step Problems
● Lesson 6-4: More Model Multi-Step Word Problems
● Lesson 6-5: Solve Multi-Step Problems

SAVVAS enVision Topic 10 : Extend Multiplication Concepts in Fractions
Students will use addition, subtraction, multiplication, or division to solve problems involving time.
    ● Lesson 10-4: Solve Time Problems

MIP Module 1 - Understanding and Solving Problems with Multiplicative Comparison
Students have explored multiplication as repeated addition, thinking of 3 baskets with 4 apples in each basket as 3 groups of 4 or 4 + 4 + 4. This type of thinking is additive thinking. But multiplication is more than repeated addition. It can also represent comparisons in which one set or quantity is described in terms of another using multiplicative thinking. If a tree is 4 feet tall and another tree is 3 times as tall, the two factors and their product represent a comparison (3 times as tall as 4 feet is 12 feet tall)

    ● Sorting Problems p. 16 -17
    ● Baking with Grandma p. 18 - 19
    ● What is Unknown, p. 19 - 22
    ● Jack and the Beanstalk p. 22-23
    ● Line Segment Model p. 23
    ● Pass the Basketball problem p. 23- 24
    ● How Many Snowballs p. 24
    ● Focus on the Question p. 24 -25
    ● Show and Compare p. 25

MIP Module 5 - Using Place Value to Perform Multi Digit Multiplication
In third grade, students were introduced to the concepts of multiplication and division. They created models to show the operations, explored their properties, and worked to master the basic multiplication and division facts. In fourth grade, students extend their understanding of multiplication by working with larger numbers. | |

- Mental Maneuvers p. 91-92
- Developing the Area Model p. 92-93
- Extending the Area Model p. 93-95
- Exploring Multiplication with a 3-digit factor p. 98 - 99
- Using Expanded Form to Multiply p. 99 - 101
- Partial Product in a Different Format p. 101 -102
- Exploring 3-Digit Factors p. 102 - 103
- Modeling 2-Digit by 2-Digit Multiplication p. 103 - 106
- Using Partial Product to Multiply p. 106 - 108.
- Pass the Problem p. 109
- Digit Challenge p. 110
- Perfect Placement p.110
- Comparing Problems for 2-digit by 2-Digit Multiplication p. 110 - 111
- Roll a Product 111 - 112
- What's the Problem? P. 112

MIP Module 6: Using Place Value to Perform Multi Digit Division:

In third grade, students were introduced to the operation of division and explored basic division facts. In fourth grade, students extend their understanding of division beyond these basic facts to include multi digit dividends. The emphasis is on developing strategies that are based on an understanding of place value, properties, and the relationship between multiplication and division. These strategies provide the foundation for the standard algorithm for division, although the standard algorithm is not expected until sixth grade. The goal is for students to understand the division process through contexts and investigations

- Exploring Division with Remainders p. 118 - 119
- Using a Rectangle Model to Divide p. 120 - 122
- Using Partial Quotient p. 122-125
- Partial Quotients with Remainders p. 125 - 127
- Interpreting Remainders p. 127 -128
- Remainder of One: p.129
- Focus on the Questions: p.130-131
- Largest Quotient Wins: p.131
- Division Discussion: p.131
- Leftovers Game: p.132

		● Remainder Challenge: p.132	
4.MDR.6 Measure time and objects that exist in the world to solve real-life, mathematical problems and analyze graphical displays of data to answer relevant questions.	**Elapsed Time** **4.MDR.6.1** *In this plan students explore the concept of time and measure elapsed time. Students will engage in experiences that require some form of measurement of time in which they can explain when an event begins, ends, or the duration of time from the beginning to end. (Suggested Time Frame: 1 -2 Days)* ● Teacher Guidance ● Student Reproducibles **Liquid Volume and Mass** **4.MDR.6.1** *In this plan, students will explore the estimation and measurement of liquid volume (capacity) and mass with real-world tools. (Suggested Time Frame: 1 -2 Days)* ● Teacher Guidance ● Student Reproducibles	**SAVVAS enVision Topic 3,4, 5 & 6 : Use Operations with Whole Numbers to Solve Problems** *Students will use previously learned concepts and skills to represent and solve problems.* ● Lesson 3 - 8: Problem Solve: Model With Math ● Lesson 4 - 7: Problem Solving: Make Sense and Persevere ● Lesson 5 - 10: Problem Solving: Model With Math ● Lesson 6 - 6: Problem Solving: Make Sense and Persevere **MIP Module 11 Time:** ● Elapsed Time p. 235-237 ● Finding A Missing End Time p. 237-239 ● Finding a Missing Start Time p. 239-240	

Content Resources

GA DOE Links: ● GA DOE Unit 3 Reasoning about Multiplication and Division ● GA DOE Grade Comprehensive Grade Level Overview ● GA DOE Grade Level Guide for Effective Mathematics Instruction ● K-5 Georgia Mathematics Strategies Toolkit ● Mathematics to Support English Language Learners ● Georgia Numeracy Project ● K-12 Mathematical Modeling Framework ● K-12 Statistical Reasoning Framework ● K-12 Mathematical Practices	**Additional Resources:** ● Estimation Activities/Estimation 180 ● Which One Doesn't Belong? ● Same or Different? ● Splat! ● Splash Learn - Elapsed Time ● Iknowit -Elapsed Time ● Splash Learn - 2x2 Multiplication ● Khan Academy - Multi-Digit Multiplication ● Khan Academy - Multi-Digit Division ● Khan Academy - Comparing with Multiplication (Video)

Last Revised: June 2023