Unit 3: Multiply Fractions and Mixed Numbers

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

UNIT RATIONALE

In this unit, students will extend their conceptual understanding of fractions to include multiplication. Students will explore groups of equal shares to show multiplication. Students will use a visual model to find the product of fractions and whole numbers and build their understanding. This will give students the foundation to write story problems in context and draw models to represent the problem. Throughout this unit, students will progress from finding the fractional part of a whole number to finding the fractional part of another fraction.

Students will be solving real-world problems by multiplying fractions by mixed numbers and by multiplying whole numbers by fractions. As students write word problems and solve real world problems, they will need to be precise in the language they use to indicate that the problems is solved by multiplication. Students will also use number lines, tiling, and area models to help them find the product of fractions and mixed numbers. Finally, students will extend their use of models to find the area of objects using mixed numbers. These skills will help students as they focus on multistep problems.

ESSENTIAL QUESTIONS

How do mathematicians multiply fractions?

How do mathematicians multiply mixed numbers?

STANDARDS

NEW JERSEY STUDENT LEARNING STANDARDS: CONTENT AREA

MATH.5.NF.B	Apply and extend previous understandings of multiplication and division to multiply and divide fractions
MATH.5.NF.B.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

MATH.5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
MATH.5.NF.B.4.b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
MATH.5.NF.B.5.a	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
MATH.5.NF.B.5.b	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
MATH.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

TECH.9.4.5.CI.3	Participate in a brainstorming session with individuals with diverse perspectives to expand one's thinking about a topic of curiosity (e.g., 8.2.5.ED.2, 1.5.5.CR1a).
TECH.9.4.5.CT.1	Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2).
TECH.9.4.5.CT.4	Apply critical thinking and problem-solving strategies to different types of problems such as personal, academic, community and global (e.g., 6.1.5.CivicsCM.3).

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.3-5.8.1.5.DA.1	Collect, organize, and display data in order to highlight relationships or support a claim.
CS.3-5.8.1.5.DA.4	Organize and present climate change data visually to highlight relationships or support a claim.
CS.3-5.8.2.5.ED.2	Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models.
CS.3-5.8.2.5.ED.3	Follow step by step directions to assemble a product or solve a problem, using appropriate tools to accomplish the task.

PRE-ASSESSMENTS

Module 8: Understand Multiplication of Fractions, Are You Ready, pg 180

Module 9: Understand and Apply Multiplication of Mixed Numbers, Are You Ready, pg 216

INSTRUCTIONAL PLAN

MODULE 8

Module 8: Understand Multiplication of Fractions

LESSON 8.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to explore groups of equal shares to show multiplication.
Student Learning Strategies	Draw a visual model Identify the fractional part of the whole group
Success Criteria	I can find a fractional part of a group by using a visual model to solve a problem.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 181 & 182) Check for Understanding (p. 183)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 181B) & Spark Your Learning (p. 181) **Mini-lesson**: Build Understanding (p. 182-183) **Guided Practice:** Check Understanding (p. 183) **Independent Practice**: On Your Own (p. 184) & Exit Ticket (TM p. 184) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 181C)

MATH.5.NF.B.4.a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.

LESSON 8.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to represent multiplication of whole numbers by fractions.
Student Learning Strategies	Draw a complete visual model Draw a partial visual model
Success Criteria	I can find the product of a whole number and a fraction using a visual model.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 185, 186, & 187) Check for Understanding (p. 188)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 185B) & Spark Your Learning (p. 185) **Mini-lesson**: Build Understanding (p. 186-188) **Guided Practice:** Check Understanding (p. 188) **Independent Practice**: On Your Own (p. 189-190) & Exit Ticket (TM p. 190) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 190)

MATH.5.NF.B.4.a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.

LESSON 8.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to represent multiplication with unit fractions.
Student Learning Strategies	Divide the whole Divide a visual model
Success Criteria	I can solve a problem by multiplying unit fractions using a visual model.

Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 191 & 193) Check for Understanding (p. 193)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 191B) & Spark Your Learning (p. 191) **Mini-lesson**: Build Understanding (p. 192-193) **Guided Practice:** Check Understanding (p. 193) **Independent Practice**: On Your Own (p. 194) & Exit Ticket (TM p. 194) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 191C)

MATH.5.NF.B.4.a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.

LESSON 8.4

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to represent multiplication of fractions.
Student Learning Strategies	Make a visual model Make a visual model of 1 whole
Success Criteria	I can multiply fractions using a visual model.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 195) Check for Understanding (p. 197)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 195B) & Spark Your Learning (p. 195) **Mini-lesson**: Build Understanding (p. 196-196) **Guided Practice:** Check Understanding (p. 197) **Independent Practice**: On Your Own (p. 198) & Exit Ticket (TM p. 198) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources

Suggested Modifications	Plan for Differentiated Instruction (TM p. 195)

LESSON 8.5

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to use representations of area to develop procedures.
Student Learning Strategies	Draw an area model Describe an area model
Success Criteria	I can find the product of fractions using an area model.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 199, 200, & 202) Check for Understanding (p. 202)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 199B) & Spark Your Learning (p. 199) **Mini-lesson**: Build Understanding (p. 200-202) **Guided Practice:** Check Understanding (p. 202) **Independent Practice**: On Your Own (p. 203-204) & Exit Ticket (TM p. 204) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 199C)

MATH.5.NF.B.4.a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.
MA.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

LESSON 8.6

Student Learning Intentions (SLI) WALT: (We	We are learning to interpret fraction multiplication as scaling.

are learning to…)	
Student Learning Strategies	Draw a visual model Draw a detailed visual model
Success Criteria	I can explain how the size of the product compares to the size of one factor
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 205, 206, & 207) Check for Understanding (p. 207)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 205B) & Spark Your Learning (p. 205) **Mini-lesson**: Build Understanding (p. 206-207) **Guided Practice:** Check Understanding (p. 207) **Independent Practice**: On Your Own (p. 208) & Exit Ticket (TM p. 208) Teacher Resources: Into Math Teacher Edition Module 8 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 205C)

MATH.5.NF.B.5.a	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
MATH.5.NF.B.5.b	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

MODULE 9

Module 9: Understand and Apply Multiplication of Mixed Numbers

LESSON 9.2

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to multiply mixed numbers.
Student Learning Strategies	Use reasoning Draw an area model
Success Criteria	I can solve real world problems involving multiplication of mixed numbers by writing an equation to model the problem.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 221 & 223) Check for Understanding (p. 223)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 221B) & Spark Your Learning (p. 221) **Mini-lesson**: Build Understanding (p. 222-223) **Guided Practice:** Check Understanding (p. 223) **Independent Practice**: On Your Own (p. 224) & Exit Ticket (TM p. 224) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 221C)

MA.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

LESSON 9.1

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to explore area and mixed numbers.
Student Learning Strategies	Draw a visual model Use a grid to show tiles
Success Criteria	I can use an area model to multiply mixed

	numbers
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 217 & 218) Check for Understanding (p. 219)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 217B) & Spark Your Learning (p. 217) **Mini-lesson**: Build Understanding (p. 218-219) **Guided Practice:** Check Understanding (p. 219) **Independent Practice**: On Your Own (p. 220) & Exit Ticket (TM p. 220) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 217C)

MATH.5.NF.B.4.b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
MA.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

LESSON 9.3

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to practice multiplication with fractions and mixed numbers.
Student Learning Strategies	Use reasoning Draw an area model
Success Criteria	I can solve real world problems by writing a multiplication equation to model the problem.
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 225 & 226) Check for Understanding (p. 226)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 225B) & Spark Your Learning (p. 225)

	Mini-lesson: Build Understanding (p. 225-226) **Guided Practice:** Check Understanding (p. 226) **Independent Practice**: On Your Own (p. 228) & Exit Ticket (TM p. 228) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 225C)

MATH.5.NF.B.4.a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.
MA.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

LESSON 9.4

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning to apply fraction multiplication to find area.
Student Learning Strategies	Use distributive property
Success Criteria	I can solve multiplication problems with fractions and mixed numbers to find the area of rectangles
Formative Assessment (drives instructional decisions)	Turn and Talk Questions (p. 229) Check for Understanding (p. 230)
Activities and Resources	**Warm-up:** Activate Prior Knowledge (TM p. 229B) & Spark Your Learning (p. 229) **Mini-lesson**: Build Understanding (p. 229-230) **Guided Practice:** Check Understanding (p. 230) **Independent Practice**: On Your Own (p. 231-232) & Exit Ticket (TM p. 232) Teacher Resources: Into Math Teacher Edition Module 9 Online Resources
Suggested Modifications	Plan for Differentiated Instruction (TM p. 229C)

MATH.5.NF.B.4.a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.
MA.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by

using visual fraction models or equations to represent the problem.

REFLECTIONS

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

LA.RF.5.4.A	Read grade-level text with purpose and understanding.
LA.W.5.1.B	Provide logically ordered reasons that are supported by facts and details from text(s), quote directly from text when appropriate.
LA.W.5.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.
LA.W.5.2.E	Provide a conclusion related to the information of explanation presented.