

**Alpena Montmorency Alcona Educational Service District
6 Pacing Guide**

**Unit 3: Operations with Whole Numbers, Fractions, and Decimals
28-30 Days**

Math Background:

- Research - TE p209-L-209M
- Background - TE p209N-209JJ

Last year, students...	This year, students will...	Next year, students will...
Performed all operations with multi-digit whole numbers.	Fluently divide whole numbers.	Apply and extend previous knowledge of operations with fractions to add, subtract, multiply and divide rational numbers.
Added, subtracted, multiplied and divided decimals to the hundredths.	Fluently add, subtract, multiply, and divide decimals.	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
Applied and extended previous understandings of multiplication and division to multiply fractions and divide with a fraction and a whole number.	Multiply and divide fractions and mixed numbers.	
	Develop strategies for writing equivalent fractions, including using the LCM.	
Solved mathematical and real world problems.	Solve mathematical and real world problems involving whole numbers, decimals, and fractions.	Solve real world and mathematical problems involving the four operations with rational numbers.

Big Idea 1: Multiplication and Division of Whole Numbers and Decimals (About 7 days)

Vocabulary: dividend, divisor, quotient, remainder, ungrouping

Common Core State Standards for Mathematics [CCSS-M]

CC.6.NS.2: Fluently divide multi-digit numbers using the standard algorithm.

CC.6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Common Core Standards of Mathematical Practice [SMPs]

CC.K-12.MP.1: Make sense of problems and persevere in solving them.

CC.K-12.MP.2: Reason abstractly and quantitatively.

CC.K-12.MP.3: Construct viable arguments and critique the reasoning of others.

CC.K-12.MP.4: Model with math.

CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
3.1	<p>I can</p> <ul style="list-style-type: none"> Review meanings of place value Review multi-digit division with whole numbers. <p>Formative Assessment: Ask students to explain how they can make sure a quotient is reasonable. Students should be able to verbalize that they can round the quotient and the divisor and multiply the rounded numbers. The product should have a value close to the dividend.</p>	NS.2 NS.3 SMP 1-8	SAB p81-86 (E) HW p51-52 (E) AC 3-1 ● (NE) AC 3-1 ▲ (NE) AC 3-1 ■ (NE)	Read TE p209W
	Lesson 3.1 Notes			
3.2	<p>I can</p> <ul style="list-style-type: none"> Use appropriate strategies to estimate and adjust multipliers in division problems. Review subtraction and regrouping strategies <p>Formative Assessment: Ask students to share strategies they use for estimating multipliers in division problems. Ask them if their strategy depends on the divisor. Students may use rounding when they don't have to round far up or down and another strategy when they do.</p>	NS.2 SMP 1 SMP 2 SMP 3 SMP 6 SMP 8	SAB p87-88 (E) HW p53-54 (E) AC 3-2 ● (NE) AC 3-2 ▲ (NE) AC 3-2 ■ (NE)	

	Lesson 3.2 Notes			
3.3	<p>I can</p> <ul style="list-style-type: none"> Observe patterns in multiplication by 0.1 and 0.01. Multiply by a decimal. <p>Formative Assessment: Ask students to multiply two decimals in their head using their preferred method.</p>	NS. 2 NS.3 SMP 1 SMP 2 SMP 3 SMP 6 SMP 8	SAB p89-90 (E) HW p55-56 (E) AC 3-3 ● (NE) AC 3-3 ▲ (NE) AC 3-3 ■ (NE)	Emphasize place value (with secret code cards) and the patterns formed by multiplying by 0.1 and 0.01.
	Lesson 3.3 Notes			
3.4	<p>I can</p> <ul style="list-style-type: none"> Observe patterns in division by 0.1 and 0.01. Divide by a decimal divisor. <p>Formative Assessment: Ask students why, when they move the decimal point one rot wop places right in the divisor, they must do the same in the dividend. They may explain that a division problems is a fraction and so, to create and equivalent problem, both numbers must be multiplied by the same number (in this case, 10 or 100)</p>	NS.3 SMP 2 SMP 3 SMP 6 SMP 7 SMP 8	SAB p91-92 (E) HW p57-58 (E) AC 3-4 ● (NE) AC 3-4 ▲ (NE) AC 3-4 ■ (NE)	The goal is to get students to understand why the decimal “moves around” in division problems. See the possible response in the formative assessment section to the left.
	Lesson 3.4 Notes			

3.5	<p>I can</p> <ul style="list-style-type: none"> Identify whether a situation requires multiplication or division. Understand how the size of the multiplier affects the size of the product. Place the decimal points in products and quotients. <p>Formative Assessment: Ask students to summarize how they determine where to put the decimal point in the answer to a multiplication problem and in the answer to a division problem.</p>	<p>NS.3</p> <p>SMP 1 SMP 2 SMP 3 SMP 4 SMP 6 SMP 8</p>	<p>SAB p93-98 (E) HW p59-60 (E) AC 3-5 ● (NE) AC 3-5 ▲ (NE) AC 3-5 ■ (NE) MCC 9 (NE)</p>	<p>Really bring out Math Talk in this lesson, and emphasize SMP 1.</p> <p>This lesson may take two or three days.</p>
	<p>Lesson 3.5 Notes</p>			
Quiz 1	<p>AG Quick Quiz 1</p>			
Reteach	<p>To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.</p>			

Big Idea 2: Relating, Composing, and Decomposing Decimals and Fractions (About 5 days)

Vocabulary: numerator, denominator, equivalent fraction, simplifying, unsimplifying, common factors, common denominators

Common Core State Standards for Mathematics [CCSS-M]

CC.6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

CC.6.NS.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express $36 + 8$ as $4(9 + 2)$.*

Common Core Standards of Mathematical Practice [SMPs]

CC.K-12.MP.1: Make sense of problems and persevere in solving them.

CC.K-12.MP.2: Reason abstractly and quantitatively.

CC.K-12.MP.3: Construct viable arguments and critique the reasoning of others.

CC.K-12.MP.4: Model with math.

CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
3.6	<p>I can</p> <ul style="list-style-type: none"> • Compare fractions and decimals. • Add and subtract fractions, mixed numbers, and decimals. <p>Formative Assessment: Have students tell how to add (or subtract) two fractions or decimals with the same unit.</p>	<p>NS.3</p> <p>SMP 2 SMP 3 SMP 6 SMP 8</p>	<p>SAB p99-102 (E) HW p61-62 (E) AC 3-6 ● (NE) AC 3-6 ▲ (NE) AC 3-6 ■ (NE)</p>	<p>Read TE p209BB</p> <p>The comparing section of this lesson is not a stand-alone standard, but used to help students justify the reasonability of their answer.</p>
Lesson 3.6 Notes				
3.7	<p>I can</p> <ul style="list-style-type: none"> • Write equivalent fractions and decimals • Add, subtract, and compare fractions and decimals with different unit fractions or different numbers of decimal places. <p>Formative Assessment: Have students explain how to change a fraction to an equivalent fraction. Students should be able to explain that they always multiply or divide the numerator and denominator by the same number.</p>	<p>NS.3 NS.4</p> <p>SMP 1 SMP 3 SMP 4 SMP 5 SMP 6</p>	<p>SAB p103-106 (E) HW p63-64 (E) AC 3-7 ● (NE) AC 3-7 ▲ (NE) AC 3-7 ■ (NE)</p>	
Lesson 3.7 Notes				
3.8	I can	RP.1	SAB p107-108 (E)	

	<ul style="list-style-type: none"> Find common denominators when the denominators have no common factors and are not multiples. <p>Formative Assessment: Have students explain how to find a common denominator for two fractions. They should describe all four cases: 1) the fractions have the same denominators; 2) one denominator is a multiple of the other; 3) the denominators share a common factor; 4) the denominators have no common factors except 1.</p>	NS.4 SMP 3 SMP 6	HW p65-66 (E) AC 3-8 ● (NE) AC 3-8 ▲ (NE) AC 3-8 ■ (NE)	
	Lesson 3.8 Notes			
3.9	<p>I can</p> <ul style="list-style-type: none"> Discuss different strategies for finding a common denominator. Write equations to solve real world problems involving fractions and decimals. <p>Formative Assessment: Ask students to describe the process they use to add, subtract, or compare fractions and decimals. They should be able to describe how to find a common denominator and how to group and ungroup fractions.</p>	NS. 3 NS.4 SMP 1 SMP 2 SMP 3 SMP 6	SAB p109-112 (E) HW p67-68 (E) AC 3-9 ● (NE) AC 3-9 ▲ (NE) AC 3-9 ■ (NE) MCC 10 (NE)	This lesson may take two days.
	Lesson 3.9 Notes			
Quiz 2	AG Quick Quiz 2			

Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.
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Big Idea 3: Multiplying Fractions and Dividing with Fractions and Whole Numbers (About 4 days)

Vocabulary: reciprocal

Common Core State Standards for Mathematics [CCSS-M]

CC.6.NS.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 $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) 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?.*

CC.6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

CC.6.NS.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express $36 + 8$ as $4(9 + 2)$.*

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CC.K-12.MP.4: Model with math.

CC.K-12.MP.5: Use appropriate tools strategically.

CC.K-12.MP.6: Attend to precision.

CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
3.10	<p>I can</p> <ul style="list-style-type: none"> • Multiply fractions and whole numbers. • Multiply fractions. • Multiply mixed numbers. <p>Formative Assessment: Have students explain how to multiply two fractions. They should be able to verbalize that they multiply the tops (numerators) and the bottoms (denominators). Students should also verbalize that multiplying by a number less than 1 results in a product less than the original factor.</p>	NS.1 NS.3 NS.4 SMP 1 SMP 2 SMP 3 SMP 4 SMP 6 SMP 7 SMP 8	SAB p113-116 (E) HW p69-70 (E) AC 3-10 ● (NE) AC 3-10 ▲ (NE) AC 3-10 ■ (NE)	Read TE p209EE Emphasize the drawing as representing what is happening with multiplication. Spend substantial time on SAB p116, analyzing errors. This will build students' number sense when multiplying with fractions. Note: there is a new quick practice routine on TE p298
Lesson 3.10 Notes				
3.11	<p>I can</p> <ul style="list-style-type: none"> • Divide fractions and whole numbers. <p>Formative Assessment: Ask students to explain how to divide unit fractions and whole numbers. They should be able to verbalize that dividing by a fraction or a whole number is the same as multiplying by the reciprocal of the fraction or whole number. They should also recognize that dividing by a number greater than 1 results in a product that is less than the dividend, and dividing by a number</p>	NS.1 NS.4 SMP 2 SMP 3 SMP 6 SMP 8	SAB p117-120 (E) HW p71-72 (E) AC 3-11 ● (NE) AC 3-11 ▲ (NE) AC 3-11 ■ (NE)	Emphasize and ensure that students can explain the drawings and how they represent each equation. The goal is to understand the reasoning behind dividing with fractions, and not to memorize, "yours is not to reason why, just invert and multiply"

	less than 1 results in a product that is greater than the dividend.			
	Lesson 3.11 Notes			
3.12	<p>I can</p> <ul style="list-style-type: none"> Identify problems and multiplication or division situations. Practice multiplying and dividing with fractions in a variety of problem situations. <p>Formative Assessment: Ask students to describe how to multiply and divide fractions and whole numbers.</p>	<p>NS.1</p> <p>SMP 1 SMP 3 SMP 6 SMP 8</p>	<p>SAB p121-124 (E) HW p73-74 (E) AC 3-12 ● (NE) AC 3-12 ▲ (NE) AC 3-12 ■ (NE) MCC 11 (NE)</p>	<p>This lesson may take two days.</p> <p>Work on Math Talk to develop students' awareness of what is happening in each story problem.</p>
	Lesson 3.12 Notes			
Quiz 3	AG Quick Quiz 3			
Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.			

Big Idea 4: Dividing a Fraction by a Fraction (About 6 days)

Vocabulary: inverse operations, unsimplify

Common Core State Standards for Mathematics [CCSS-M]

CC.6.NS.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 $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) 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?.*

CC.6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

CC.6.NS.4: Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express $36 + 8$ as $4(9 + 2)$.*

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CC.K-12.MP.7: Look for and make use of structure.

CC.K-12.MP.8: Look for and express regularity in repeated reasoning.

Lesson	Focus	CCSS-M and SMPs	Additional Resources Supplemental/Reteaching Materials Essential (E) Non-essential (NE)	Hints
3.13	<p>I can</p> <ul style="list-style-type: none"> • Relate division to finding an unknown factor in a multiplication problem. • Divide fractions by dividing numerators and denominators. <p>Formative Assessment: Ask students to explain how a multiplication problem with an unknown factor is related to a division problem. Students should show understanding that multiplication and division are inverse operations for all whole numbers, decimals and fractions.</p>	<p>NS.1</p> <p>SMP 1 SMP 2 SMP 3 SMP 4 SMP 6 SMP 7</p>	<p>SAB p125-128 (E) HW p75-76 (E) AC 3-13 ● (NE) AC 3-13 ▲ (NE) AC 3-13 ■ (NE)</p>	<p>Read TE p209GG</p> <p>The Activity Cards are excellent resources for this lesson.</p>
<p>Lesson 3.13 Notes</p>				
3.14	<p>I can</p> <ul style="list-style-type: none"> • Understand the idea of dividing by unsimplifying • Connect dividing by unsimplifying to multiplying by the reciprocal. • Use division methods to solve problems. <p>Formative Assessment: Ask students to summarize the two methods of dividing by a fraction. Have them give an example to demonstrate: 1) dividing numerators and dividing denominators; and 2) multiplying by the reciprocal.</p>	<p>NS.1</p> <p>SMP 2 SMP 3 SMP 6 SMP 8</p>	<p>SAB p127-128 (E) HW p77-78 (E) AC 3-14 ● (NE) AC 3-14 ▲ (NE) AC 3-14 ■ (NE)</p>	<p>To reach all students, ensure that you are teaching and explaining both methods equally.</p>

	Lesson 3.14 Notes			
3.15	<p>I can</p> <ul style="list-style-type: none"> Practice dividing with fractions. <p>Formative Assessment: Ask students to describe two methods for dividing by a fraction, and ask them in which situations they use each method.</p>	<p>NS.1</p> <p>SMP 1 SMP 3 SMP 6 SMP 8</p>	<p>SAB p 129-130 HW p79-80 (E) AC 3-15 ● (NE) AC 3-15 ▲ (NE) AC 3-15 ■ (NE)</p>	
	Lesson 3.15 Notes			
3.16	<p>I can</p> <ul style="list-style-type: none"> Understand that numbers change in predictable ways when multiplied and divided by fractions less than 1 and fractions greater than 1. <p>Formative Assessment: On the board, write four fraction situations shown in the TE p 346. Have students state a generalization for each situation, and provide an example that supports each generalization.</p>	<p>NS.1</p> <p>SMP 1 SMP 2 SMP 3 SMP 6 SMP 8</p>	<p>SAB p131-134 (E) HW p 81-82 (E) AC 3-16 ● (NE) AC 3-16 ▲ (NE) AC 3-16 ■ (NE)</p>	Emphasize SMP 8
	Lesson 3.16 Notes			
3.17	<p>I can</p> <ul style="list-style-type: none"> Understand and apply decimal and fraction operations. 	<p>NS.1</p> <p>SMP 1 SMP 3</p>	<p>SAB p135-136 (E) HW p83-84 (E) AC 3-17 ● (NE) AC 3-17 ▲ (NE)</p>	

	Formative Assessment: Ask students to complete the operations listed in the TE p352		AC 3-17 ■ (NE) MCC 12 (NE)	
	Lesson 3.17 Notes			
Quiz 4	AG Quick Quiz 4			
Reteach	To reteach, use the resources listed above (Essentials and Non-Essentials) as well as the Response to Intervention Resource Books.			
3.18	Math Practices Lesson	NS.1 NS.3 SMP 1-8	SAB p137-138 (E) HW p85-86 (E) AC 3-18 ● (NE) AC 3-18 ▲ (NE) AC 3-18 ■ (NE)	
	Lesson 3.18 Notes			

Unit 3: Enrichment/Intervention Loop (About 3-5 days)

Unit Test Objectives

- 3A Divide with whole numbers.
- 3B Multiply and divide with decimals.
- 3C Find equivalent fractions, including by using the LCM.
- 3D Compare, add, and subtract decimals, fractions, and mixed numbers.
- 3E Multiply and divide fractions and mixed numbers.
- 3F Solve real world problems.

Day 1: Final Formative Assessment - SAB p139-140

Day 2-4: Reteaching Activities- TE p362-363

Day 5: Assessment - Unit 3 Test AG

