

Dept. of Education and
Early Development



ALASKA MATHEMATICS STANDARDS WITH LEARNING TARGETS GRADE 4

Adapted with permission from the Kentucky Department of Education, Frankfort, Kentucky 40601.

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Operations and Algebraic Thinking
Cluster	Use the four operations with whole numbers to solve problems.
Standard	4.OA.1
	Interpret a multiplication equation as a comparison e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 groups of 7 and 7 groups of 5 (commutative property). Represent verbal statements of multiplicative comparisons as multiplication equations.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Know multiplication strategies.	Interpret a multiplication equation as a comparison (e.g. $18 = 3$ times as many as 6.) Represent verbal statements of multiplicative comparisons as multiplication equations.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Operations and Algebraic Thinking
Cluster	Use the four operations with whole numbers to solve problems.
Standard	4.OA.2
	Multiply or divide to solve word problems involving multiplicative comparison (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem or missing numbers in an array). Distinguish multiplicative comparison from additive comparison.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Multiply or divide to solve word problems. Describe multiplicative comparison. Describe additive comparison.	Determine appropriate operation and solve word problems involving multiplicative comparison. Determine and use a variety of representations to model a problem involving multiplicative comparison. Distinguish between multiplicative comparison and additive comparison (repeated addition).		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Operations and Algebraic Thinking
Cluster	Use the four operations with whole numbers to solve problems.
Standard	<p>4.OA.3</p> <p>Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.</p>

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Divide whole numbers including division with remainders.	<p>Represent multi-step word problems using equations with a letter standing for the unknown quantity.</p> <p>Interpret multi-step word problems (including problems in which remainders must be interpreted) and determine the appropriate operation(s) to solve.</p> <p>Assess the reasonableness of an answer in solving a multi-step word problem using mental math and estimation strategies (including rounding).</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Operations and Algebraic Thinking
Cluster	Use the four operations with whole numbers to solve problems.
Standard	4.OA.4
	Find all factor pairs for a whole number in the range 1–100; Explain the correlation/differences between multiples and factors; determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number; determine whether a given whole number in the range 1–100 is prime or composite.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Define prime and composite numbers. Know strategies to determine whether a whole number is prime or composite. Identify all factor pairs for any given number 1-100. Recognize that a whole number is a multiple of each of its factors.	Determine if a given whole number (1-100) is a multiple of a given one-digit number.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Operations and Algebraic Thinking
Cluster	Generate and analyze patterns.
Standard	<p>4.OA.5</p> <p>Generate a number, shape pattern, table, t-chart, or input/output function that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. Be able to express the pattern in algebraic terms.</p> <p><i>For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.</i></p>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Identify a number or shape pattern.	<p>Generate a number or shape pattern that follows a given rule.</p> <p>Analyze a pattern to determine features not apparent in the rule (always odd or even, alternates between odd and even, etc.).</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Operations and Algebraic Thinking
Cluster	Generate and analyze patterns.
Standard	4.OA.6 Extend patterns that use addition, subtraction, multiplication, division or symbols, up to 10 terms, represented by models (function machines), tables, sequences, or in problem situations. (L).

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Extend number patterns (up to ten terms) that use the four basic operations.	Analyze a pattern within models (function machines, tables, sequences or in problem situations) for the rule and extend the pattern.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations in Base Ten
Cluster	Generalize place value understanding for multi-digit whole numbers.
Standard	4.NBT.1
	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. <i>For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.</i>

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.			

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations in Base Ten
Cluster	Generalize place value understanding for multi-digit whole numbers.
Standard	4.NBT.2
	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on the value of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form.	Compare two multi-digit numbers based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols to record the results of comparisons.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations in Base Ten
Cluster	Generalize place value understanding for multi-digit whole numbers.
Standard	4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place using a variety of estimation methods; be able to describe, compare, and contrast solutions.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Round multi-digit whole numbers to any place using place value.			

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations in Base Ten
Cluster	Use place value understanding and properties of operations to perform multi-digit arithmetic.
Standard	4.NBT.4
	Fluently add and subtract multi-digit whole numbers using any algorithm. Verify the reasonableness of the results.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Fluently add and subtract multi-digit whole numbers less than or equal to 1,000,000 using the standard algorithm.			

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations in Base Ten
Cluster	Use place value understanding and properties of operations to perform multi-digit arithmetic.
Standard	4.NBT.5
	Multiply a whole number of up to four digits by a one-digit whole number, and multiply 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.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Multiply a whole number of up to four digits by a one-digit whole number. Multiply two two-digit numbers.	Use strategies based on place value and the properties of operations to multiply whole numbers. Illustrate and explain calculations by using written equations, rectangular arrays, and/or area models.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations in Base Ten
Cluster	Use place value understanding and properties of operations to perform multi-digit arithmetic.
Standard	4.NBT.6.
	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Find whole number quotients and remainders with up to four-digit dividends and one-digit divisors.	Use the strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using written equations, rectangular arrays, and/or area models.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations—Fractions
Cluster	Extend understanding of fraction equivalence and ordering.
Standard	4.NF.1.
	Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Recognize and identify equivalent fractions with unlike denominators.	<p>Explain why a/b is equal to $(n \times a)/(n \times b)$ by using fraction models with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. (Ex: Use fraction strips to show why $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$).</p> <p>Use visual fraction models to show why fractions are equivalent (ex: $\frac{3}{4} = \frac{6}{8}$).</p> <p>Generate equivalent fractions using visual fraction models and explain why they can be called “equivalent”.</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4						
Domain	Number and Operations—Fractions						
Cluster	Extend understanding of fraction equivalence and ordering.						
Standard	4.NF.2						
	Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$). Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions (e.g., by using a visual fraction model).						
Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Recognize fractions as being greater than, less than, or equal to other fractions.	Compare two fractions with different numerators, e.g. by comparing to a benchmark fraction such as $\frac{1}{2}$.		
Record comparison results with symbols: $<$, $>$, $=$.	Compare two fractions with different denominators, e.g. by creating common denominators, or by comparing to a benchmark fraction such as $\frac{1}{2}$.		
Use benchmark fractions such as $\frac{1}{2}$ for comparison purposes.	Justify the results of a comparison of two fractions, e.g. by using a visual fraction model.		
Make comparisons based on parts of the same whole.			

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations—Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	4.NF.3a.
	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$; a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Accumulating unit fractions ($1/b$) results in a fraction (a/b), where a is greater than 1.	Using fraction models, reason that addition of fractions is joining parts that are referring to the same whole. Using fraction models, reason that subtraction of fractions is separating parts that are referring to the same whole.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations- Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	4.NF.3b
	Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. b. Decomposing a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions (e.g., by using a visual fraction model). <i>For example: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.</i>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Add and subtract fractions with like denominators. Recognize multiple representations of one whole using fractions with the same denominator.	Using visual fraction models, decompose a fraction into the sum of fractions with the same denominator in more than one way. Record decompositions of fractions as an equation and explain the equation using visual fraction models.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations - Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	4.NF.3c
	Add and subtract mixed numbers with like denominators (e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.)

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Add and subtract mixed numbers with like denominators by using properties of operations and the relationship between addition and subtraction.	Add and subtract mixed numbers by replacing each mixed number with an equivalent fraction.		
Replace mixed numbers with equivalent fractions, using visual fraction models.			
Replace improper fractions with a mixed number, using visual fraction models.			

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations - Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	4.NF.3d
	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators (e.g., by using visual fraction models and equations to represent the problem.)

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Add and subtract fractions with like denominators.	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, by using visual fraction models and equations to represent the problem.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations—Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	<p>4.NF.4a.</p> <p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number;</p> <p>a. Understand a fraction a/b as a multiple of $1/b$. <i>For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</i></p>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Represent a fraction a/b as a multiple of $1/b$ (unit fractions). For example, represent $5/4$ as an accumulation of five $1/4$'s.	Apply multiplication of whole numbers to multiplication of a fraction by a whole number using visual fraction models. (For example, just as students know that four 3's can be represented by 4×3 , students know that five $1/4$'s is $5 \times 1/4$ which is $5/4$.)		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations - Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	4.NF.4b
	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. <i>b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. For example: use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general $n \times (a/b) = (n \times a)/b$.)</i>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
From the Introduction: Extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply by a whole number.	<p>Explain that a multiple of a/b is a multiple of $1/b$ (unit fraction) using a visual fraction model.</p> <p>Multiply a fraction by a whole number by using the idea that a/b is a multiple of $1/b$. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$ recognizing this product as $(6/5)$.</p>		

Alaska Mathematics Standards

Grade 4

Grade Level/Course	4
Domain	Numbers and Operations - Fractions
Cluster	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
Standard	4.NF.4c
	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. c. Solve word problems involving multiplication of a fraction by a whole number (e.g., by using visual fraction models and equations to represent the problem). Check for the reasonableness of the answer. <i>For example, if each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</i>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Multiply a fraction by a whole number. Use fraction models and equations to represent the problem.	Solve word problems involving multiplication of a fraction by a whole number.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations—Fractions
Cluster	Understand decimal notation for fractions, and compare decimal fractions.
Standard	4.NF.5.
	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Rename and recognize a fraction with a denominator of 10 as a fraction with a denominator of 100. Recognize that two fractions with unlike denominators can be equivalent.	Use knowledge of renaming tenths to hundredths to add two fractions with denominators 10 and 100.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations—Fractions
Cluster	Understand decimal notation for fractions, and compare decimal fractions.
Standard	4.NF.6.
	Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
<p>Explain the values of digits in the decimal places.</p> <p>Read and write decimals through hundredths.</p> <p>Rename fractions with 10 and 100 in the denominator as decimals.</p> <p>Recognize multiple representations of fractions with denominators 10 or 100.</p>	<p>Represent fractions with denominators 10 or 100 with multiple representations and decimal notation.</p> <p>Explain how decimals and fractions relate.</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Number and Operations—Fractions
Cluster	Understand decimal notation for fractions, and compare decimal fractions.
Standard	4.NF.7.
	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions (e.g., by using a visual model).

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Recognize that comparisons are valid only when the two decimals refer to the same whole.	<p>Compare two decimals to hundredths by reasoning about their size.</p> <p>Record the results of comparisons with the symbols $>$, $=$, or $<$.</p> <p>Justify the conclusions using visual models and other methods.</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit, and involving time.
Standard	<p>4.MD.1.</p> <p>Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4-ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36).</p>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Know relative size of measurement units (km, m; kg, g; lb, oz; L, mL; hr, min, sec).	<p>Compare the different units within the same system of measurement (e.g. 1 ft = 12 in; 1 lb = 16 oz).</p> <p>Convert larger units of measurement within the same system to smaller units and record conversions in a 2-column table.</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4						
Domain	Measurement and Data						
Cluster	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit, and involving time.						
Standard	4.MD.2.						
	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.						
Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Add, subtract, multiply, and divide fractions and decimals. Express measurements given in a larger unit in terms of a smaller unit.	Solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money. Solve word problems involving measurement that include simple fractions or decimals. Solve word problems that require expressing measurements given in a larger unit in terms of a smaller unit.		

	Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.		
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Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit, and involving time.
Standard	4.MD.3
	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. <i>For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.</i>

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Know that the formula for the perimeter of a rectangle is $2L + 2W$ or $L+L+W+W$. Know that the formula for the area of a rectangle is $L \times W$.	Apply the formula for perimeter of a rectangle to solve real world and mathematical problems. Apply the formula for area of a rectangle to solve real world and mathematical problems. Solve area and perimeter problems in which there is an unknown factor (n).		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit, and involving time.
Standard	4.MD.4.
	Solve real-world problems involving elapsed time between U.S. time zones (including Alaska Standard time). (L).

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Identify the different time zones in relation to Alaska.		Calculate time change between different time zones.	

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Represent and interpret data.
Standard	4.MD.5.
	Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Add and subtract fractions.	Analyze and interpret a line plot to solve problems involving addition and subtraction of fractions.		Create a line plot to display a data set of measurements given in fractions of a unit.

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Represent and interpret data.
Standard	4.MD.6.
	Explain the classification of data from real-world problems shown in graphical representations including the use of terms range and mode with a given set of data. (L).

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Understand range and mode.	Classify the data found in a graphic representation of real-world situations. Analyze a set of data in a graphic representation to determine the range and mode.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Geometric measurement: understand concepts of angle and measure angles.
Standard	<p>4.MD.7a-b</p> <p>Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand the following concepts of angle measurement:</p> <p>a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles;</p> <p>b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.</p>

Standards of Mathematical Practice

Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.
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Learning Targets

Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
<p>Define angle.</p> <p>Recognize a circle as a geometric figure that has 360 degrees.</p> <p>Recognize and identify an angle as a geometric shape formed from 2 rays with a common endpoint.</p>	<p>Compare angles to circles with the angles point at the center of the circle to determine the measure of the angle.</p> <p>Calculate angle measurement using the 360 degrees of a circle.</p>		

Recognize that an angle is a fraction of a 360 degree circle.			
Explain the angle measurement in terms of degrees.			

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Geometric measurement: understand concepts of angle and measure angles.
Standard	4.MD.8.
	Measure and draw angles in whole-number degrees using a protractor. Estimate and sketch angles of specified measure.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Recognize that angles are measured in degrees ($^{\circ}$). Read a protractor.	Determine which scale on the protractor to use, based on the direction the angle is open. Determine the kind of angle based on the specified measure to decide reasonableness of the sketch.	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Measurement and Data
Cluster	Geometric measurement: understand concepts of angle and measure angles.
Standard	4.MD.9. Recognize angle measure as additive. When an angle is divided into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems (e.g., by using an equation with a symbol for the unknown angle measure).

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Recognize that an angle can be divided into smaller angles.	<p>Solve addition and subtraction equations to find unknown angle measurements on a diagram.</p> <p>Find an angle measure by adding the measurements of the smaller angles that make up the larger angle.</p> <p>Find an angle measure by subtracting the measurements of the smaller angle from the larger angle.</p>		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Geometry
Cluster	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Standard	4.G.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular, parallel, and intersecting line segments. Identify these in two-dimensional (plane) figures.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.	Analyze two-dimensional figures to identify points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Geometry
Cluster	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Standard	4.G.2. Classify two-dimensional (plane) figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
Identify parallel or perpendicular lines in two dimensional figures. Recognize acute, obtuse, and right angles. Identify right triangles.	Classify two-dimensional figures based on parallel or perpendicular lines and size of angles. Classify triangles as right triangles or non-right.		

Alaska Mathematics Standards Grade 4

Grade Level/Course	4
Domain	Geometry
Cluster	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.
Standard	4.G.3
	Recognize a line of symmetry for a two-dimensional (plane) figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

Standards of Mathematical Practice							
Make sense of problems and persevere to solve them.	Reason abstractly and quantitatively.	Construct viable arguments and critique the reasoning of others.	Model with mathematics.	Use appropriate tools strategically.	Attend to precision.	Look for and make use of structure.	Look for and express regularity in repeated reasoning.

Learning Targets			
Knowledge	Reasoning	Skill	Products
Facts and concepts we want students to know.	Use what they know to reason or solve problems.	Use knowledge and reasoning to act skillfully.	Use knowledge, reasoning, and skills to create a concrete product.
<p>Recognize lines of symmetry for a two-dimensional figure.</p> <p>Recognize a line of symmetry as a line across a figure that when folded along creates matching parts.</p> <p>Draw lines of symmetry for two-dimensional figures.</p> <p>Identify line-symmetric figures.</p>			