WGSD Curriculum – Math 4th Grade

In Grade 4, instructional time will focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers and (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

While the content learning goals describe the mathematics students should be able to understand and do, the first eight learning goals (The Standards for Mathematical Practice) describe how students should engage with these mathematical concepts and skills as they grow in mathematical maturity and expertise. Teachers will connect the mathematical practices to mathematical content in all mathematics instruction. These learning goals merit the most time, resources, innovation, and focus necessary to qualitatively improve the instruction, assessment, and student achievement in mathematics.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP1

Learning Goal

Students will be able to make sense of problems and persevere in solving them.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Discussing and explaining problems.
- Developing plans to solve problems in multiple ways.
- Struggling with various problem solving attempts over time.
- Learning from previous solution attempts.
- Double checking his/her answers to problems.

Approaching: Student demonstrates he/she is nearing proficiency by performing processes such as:

- Explaining his/her thought processes when solving a problem.
- Representing solutions in several ways.
- Trying several approaches to solve a problem with teacher support.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Explaining his/her thought processes when solving a problem one way.
- Staying with a challenging problem for more than one attempt with prompting.

Learning Targets

- Explain the meaning of a problem and look for ways to solve it
- Use concrete objects or pictures to help conceptualize and solve problems
- Checks their thinking by asking themselves, “Does this make sense?”
- Listens to the strategies of others and tries different approaches
- Uses a different strategy to check answers
- Takes time to thoughtfully consider problems

Learning Design

- Provides time and facilitates discussion in problem solutions.
- Facilitates discourse in the classroom so that students UNDERSTAND the approaches of others.
- Provides opportunities for students to explain themselves, the meaning of a problem, etc.

WGSD Curriculum – Math 4th Grade

- Provides opportunities for students to connect concepts to “their” world.
- Provides students TIME to think and become “patient” problem solvers.
- Facilitates and encourages students to check their answers using different methods (not calculators).
- Provides problems that focus on relationships and are “generalizable”.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP2

Learning Goal	**Proficiency Scale**
Students will be able to reason abstractly and quantitatively.	Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. Meeting: Student demonstrates mastery with the learning goal as evidenced by: • Converting situations into symbols to solve problems. • Converting mathematical equations into meaningful situations. Approaching: Student demonstrates he/she is nearing proficiency by performing a process such as translating situations into symbols to solve problems. Beginning: Student demonstrates a limited understanding or skill with the learning goal by reasoning with models or pictorial representations to solve problems.

Learning Targets

- Recognize that a number represents a specific quantity
- Connect the quantity to written symbols and create a logical representation of the problem at hand
- Consider both the appropriate units involved and the meaning of quantities

Learning Design

- Provides a range of representations of math problem situations and encourages various solutions.
- Provides opportunities for students to make sense of quantities and their relationships in problem situations.
- Provides problems that require flexible use of properties of operations and objects.
- Emphasizes quantitative reasoning which entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, **not just how to compute them and/or rules**; and knowing and flexibly using different properties of operations and objects.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP3

Learning Goal

Students will be able to construct viable arguments and critique the reasoning of others.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:
- Justifying and explaining, with accurate language and vocabulary, why his/her solution is correct.
- Comparing his/her strategy to other students' strategies, asking questions, and making connections with his/her own thinking.
- Explaining the reasoning of others.

Approaching: Student demonstrates he/she is nearing proficiency by performing processes such as:
- Explaining his/her thinking and the thinking of others with accurate vocabulary.
- Explaining other students' solutions and identifying strengths and weaknesses of the strategy.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:
- Explaining his/her solution.
- Discussing other ideas, approaches, and strategies.

Learning Targets
- Construct arguments using concrete referents, such as objects, pictures, and drawings
- Refine their mathematical communication skills by answering questions like "How do you know?" and "Can you show me another way?"
- Refine their mathematical communication skills by asking others questions like "How do you know?" and "How did you get that?"
- Explain their thinking to others and respond to others' thinking

Learning Design
- Provides **ALL** students opportunities to understand and use stated assumptions, definitions, and previously established results in constructing arguments.
- Provides ample time for students to make conjectures and build a logical progression of statements to explore the truth of their conjectures.
- Provides opportunities for students to construct arguments and critique arguments of peers.
- Facilitates and guides students in recognizing and using counterexamples.
- Encourages and facilitates students justifying their conclusions, communicating, and responding to the arguments of others.
- Asks useful questions to clarify and/or improve students' arguments.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards

CCSS.Math.Practice.MP4, TILS 5.C.a: Recognize that there are a variety of ways to share information, TILS 5.C.c: Effectively share information

Learning Goal

Students will be able to model with mathematics.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Recognizing math in everyday situations.
- Using a variety of models, symbolic representations, and technology tools to represent the solution to a problem.

Approaching: Student demonstrates he/she is nearing proficiency by performing processes such as:

- Recognize math in everyday situations, when prompted.
- Using models and symbols to represent a problem.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by using models to represent a problem with teacher support.

Learning Targets

- Represents problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart, list, or graph, creating equations, etc., and use all of these representations as needed
- Connect different representations and explain the connections
- Evaluate solutions in the context of the situation and reflect on whether the solutions make sense

Learning Design

- Provides problem situations that apply to everyday life.
- Provides rich tasks that focus on conceptual understanding, relationships, etc.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

<table>
<tr><td colspan="2"><u>High Priority Standards</u>
CCSS.Math.Practice.MP5</td></tr>
<tr><td><u>Learning Goal</u>

Students will be able to use appropriate tools strategically.</td><td><u>Proficiency Scale</u>
Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by combining various tools to explore and solve a problem as well as justifying his/her tool selection and problem solution.

Approaching: Student demonstrates he/she is nearing proficiency by performing processes such as selecting from a variety of provided tools the ones that can be used to solve a problem and explaining his/her reasoning for the selection.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by using the appropriate tool, when provided, to find a solution.</td></tr>
<tr><td colspan="2"><u>Learning Targets</u>
Consider the available tools (including, but not limited to estimation, graph paper, manipulatives, table, list, etc.) when solving a mathematical problem and decide when certain tools might be helpful
For example, students may use graph paper or a number line to represent and compare decimals or they may use protractors to measure angles</td></tr>
<tr><td colspan="2"><u>Learning Design</u>
Provides a variety of tools and technology for students to explore to deepen their understanding of math concepts.
Provides problem solving tasks that require students to consider a variety of tools for solving. (Tools might include pencil/paper, concrete models, manipulatives, ruler, protractor, calculator, spreadsheet, computer algebra system, statistical package, or dynamic geometry software, etc.)</td></tr>
</table>

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP6

Learning Goal	**Proficiency Scale**
Students will be able to attend to precision.	Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. Meeting: Student demonstrates mastery with the learning goal as evidenced by using appropriate symbols, vocabulary, and labeling to communicate effectively and exchange ideas. Approaching: Student demonstrates he/she is nearing proficiency by performing a process such as incorporating appropriate vocabulary and symbols in most mathematical communications. Beginning: Student demonstrates a limited understanding or skill with the learning goal by communicating his/her reasoning and solution to others, with support.

Learning Targets

- Use clear and precise language in their discussions with others and in their own reasoning
- Specify units of measure and state the meaning of the symbols used
- Report answers that appropriately address the context of a problem

Learning Design

- Facilitates, encourages and expects precision in communication.
- Provides opportunities for students to explain and/or write their reasoning to others.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP7

Learning Goal	**Proficiency Scale**
Students will be able to look for and make use of structure.	Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. Meeting: Student demonstrates mastery with the learning goal as evidenced by: • Noticing mathematical expressions as component parts. • Using mathematical generalizations to identify the most efficient solution to mathematical tasks. Approaching: Student demonstrates he/she is nearing proficiency by performing processes such as composing and decomposing number situations through observed patterns to simplify solutions. Beginning: Student demonstrates a limited understanding or skill with the learning goal by looking for structure within mathematics to help him/her solve problems efficiently.

Learning Targets

- Look closely to discover a pattern or structure
  - *For instance, students use properties of operations to explain calculations (partial products)*
- Generate number or shape patterns that follow a given rule

Learning Design

- Provides opportunities and time for students to explore patterns and relationships to solve problems.
- Provides rich tasks and facilitates pattern seeking and understanding of relationships in numbers rather than following a set of steps and/or procedures.

WGSD Curriculum – Math 4th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP8

Learning Goal	**Proficiency Scale**
Students will be able to look for and express regularity in repeated reasoning.	Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal. Meeting: Student demonstrates mastery with the learning goal as evidenced by: • Connecting prior knowledge to an unfamiliar mathematical situation. • Noticing patterns, making generalizations, and predicting patterns. Approaching: Student demonstrates he/she is nearing proficiency by performing processes such as finding and explaining patterns. Beginning: Student demonstrates a limited understanding or skill with the learning goal by connecting prior knowledge to new situations and noticing patterns with prompting from a teacher or peer.

Learning Targets

- Notice repetitive actions in computation to make generalizations
- Use models to explain calculations and understand how algorithms work
- Use models to examine patterns and generate their own algorithms
- For example, students use visual fraction models to write equivalent fractions
- Continually evaluate their work by asking themselves, “Does this make sense?”

Learning Design

- Provides problem situations that allow students to explore regularity and repeated reasoning.
- Provides rich tasks that encourage students to use repeated reasoning to form generalizations and provides opportunities for students to communicate these generalizations.

WGSD Curriculum – Math 4th Grade
Relationships and Algebraic Thinking

High Priority Standards

4.RA.A.1 Multiply or divide to solve problems involving a multiplicative comparison.
4.RA.A.2 Solve multi-step whole number problems involving the four operations and variables and using estimation to interpret the reasonableness of the answer.
4.RA.A.3 Solve whole number division problems involving variables in which remainders need to be interpreted, and justify the solution.

Learning Goal

Students will be able to use the four operations with whole numbers to solve problems.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Using the four operations with whole numbers to solve one-step problems involving equal groups and arrays, including problems where the remainder must be interpreted.
- Finding an unknown number and represent problems using equations with a symbol representing the unknown quantity.
- Assessing the reasonableness of answers using mental computation and estimation strategies, including rounding.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: sum, difference, product, quotient, number model, equation, expression, whole number.
- Performing processes such as:
  - Using the four operations to solve one-step problems involving an unknown number.
  - Applying multiplication or division in order to solve familiar multiplicative comparison problems.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by using the four operations (add, subtract, multiply, and divide) to solve one-step problems involving equal groups and arrays.

Learning Targets

- Interpret a multiplication equation as a comparison
  - *For example, interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations*
- 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, distinguishing multiplicative comparison from additive comparison

- Solve multistep 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

Learning Design

Investigations:
Unit 1, Inv. 1.1-1.5, 2.1-2.5, 3.2-3.4
Unit 3 Inv. 1.1, 1.2, 1.4, 1.5, 2.1-2.6, 3.2-3.4, 4.1, 4.3, 4.5
Unit 8 Inv. 1.1-1.5, 2.1-2.5, 3.1-3.6
(need something for rounding)

WGSD Curriculum – Math 4th Grade
Relationships and Algebraic Thinking

High Priority Standards

4.RA.B.4 Recognize that a whole number is a multiple of each of its factors and find the multiples for a given whole number
4.RA.B.5 Determine if a whole number within 100 is composite or prime, and find all factor pairs for whole numbers within 100.

Learning Goal

Students will gain familiarity with factors and multiples.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Finding all factor pairs for whole numbers in the range of 1–100.
- Determining whether a given whole number in the range of 1–100 is prime or composite.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: factor, multiple, factor pair, whole number, prime, composite, square number, array.
- Performing processes such as:
  - Finding factor pairs for whole numbers in the range of 1–100 that are multiples of 2 or 5.
  - Determining whether a given whole number in the range of 1–100 is a multiple of a given one-digit number.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by recognizing that a whole number is a multiple of each of its factors.

Learning Targets

- Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its 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

Learning Design

Investigations:
Unit 1 Inv 1.1-1.5, 2.1-2.3, 3.1-3.4

WGSD Curriculum – Math 4th Grade
Relationships and Algebraic Thinking

High Priority Standards

4.RA.C.6 Generate a number pattern that follows a given rule.
4.RA.C.7 Use words or mathematical symbols to express a rule for a given pattern.

Learning Goal

Students will be able to generate and analyze patterns

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Analyzing a pattern for apparent features that are not explicit in the rule itself.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: number, pattern, rule, shape, term, sequence.
- Performing a process such as generating a number or shape pattern that follows a given rule.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by extending a number or shape pattern that follows a given rule.

Learning Targets

- Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself
    - *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*

Learning Design

Investigations:
Unit 8, Inv. 3.2-3.4
Unit 9, 1.2, 2.1-2.8, 3.1-3.3 (perhaps with science unit/ponds)

WGSD Curriculum – Math 4th Grade

Number Sense and Operations in Base Ten

High Priority Standards

4.NBT.A.1 Round multi-digit whole numbers to any place.
4.NBT.A.2 Read, write and identify multi-digit whole numbers up to one million using number names, base ten numerals and expanded form.
4.NBT.A.3 Compare two multi-digit numbers using the symbols >, = or <, and justify the solution.
4.NBT.A.4 Understand that in a multi-digit whole number, a digit represents 10 times what it would represents in the place to its right.

Learning Goal

Students will be able to generalize place value understanding for multi-digit whole numbers.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Looking for and using repeated reasoning to generalize place value understanding to be able to read and write multi-digit whole numbers less than or equal to 1,000,000 using base-ten numerals, number names, and expanded form.
- Comparing multi-digit numbers up to 1,000,000 using <, >, and =.
- Rounding multi-digit whole numbers up to 1,000,000 to any place.
- Describing that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: base-ten numeral, compare, digit, expanded form, multi-digit number, number name, place, place value, round, whole number, greater than, less than, equal.
- Performing processes such as:
  - Looking for and using repeated reasoning to generalize place value understanding to be able to read and write multi-digit whole numbers less than or equal to 100,000 using base-ten numerals, number names, and expanded form.
  - Comparing multi-digit numbers up to 100,000 using <, >, and =.
  - Rounding multi-digit whole numbers up to 100,000 to any place.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Reading and writing multi-digit whole numbers less than or equal to 1,000 using base-ten numerals, number names, and expanded form.
- Comparing multi-digit numbers up to 1,000 using <, >, and =.
- Rounding multi-digit whole numbers up to 1,000 to any place.

WGSD Curriculum – Math 4th Grade

Learning Targets

- 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. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division*
- 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
- Use place value understanding to round multi-digit whole numbers to any place

Learning Design

Investigations:
Unit 5
(need something for rounding)

*up to 1,000,000

WGSD Curriculum – Math 4th Grade

Number Sense and Operations in Base Ten

High Priority Standards

4.NBT.A.5 Demonstrate fluency with addition and subtraction of whole numbers.
4.NBT.A.6 Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, and justify the solution.
4.NBT.A.7 Find whole-number quotients and remainders with up to fourdigit dividends and one-digit divisors, and justify the solution.

Learning Goal	**Proficiency Scale**

Students will be able to use place value understanding and properties of operations to perform multi-digit arithmetic.	Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.
	
	Meeting: Student demonstrates mastery with the learning goal as evidenced by:
	• Adding and subtracting multi-digit whole numbers fluently using the standard algorithm.
	• Multiplying whole numbers including two digits by two digits based on place value and properties of operations
	• Finding whole-number quotients and remainders with up to four-digit dividends and one-digit divisors using strategies based on place value understanding, the properties of operations, and/or the relationship between multiplication and division.
	• Solving and explaining multiplication and division using equations, arrays, and/or area models.
	
	Approaching: Student demonstrates he/she is nearing the learning goal by:
	• Recognizing and recalling specific vocabulary, such as: sum, difference, product, quotient, whole number, equation, expression, remainder, array, area model.
	• Performing processes such as:
	  ○ Using place value understanding to add and subtract two- and three-digit whole numbers using a standard algorithm.
	  ○ Multiplying whole numbers up to and including four digits by one digit based on place value and properties of operations.
	  ○ Finding whole-number quotients and remainders with up to two-digit dividends and one-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.
	  ○ Representing multiplication and division problems using equations, arrays, and/or area models.
	
	Beginning: Student demonstrates a limited understanding or skill with the learning goal by:
	• Adding and subtracting one- and two-digit whole numbers using strategies based on place value.
	• Multiplying two one-digit whole numbers based on place value and properties of operations.
	• Finding whole-number quotients with no remainders with up to two-digit dividends and one-digit divisors using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division.

WGSD Curriculum – Math 4th Grade

Learning Targets

- Add and subtract multi-digit whole numbers fluently using the standard algorithm
- 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
- 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

Learning Design

Investigations:
Units 2, 4, 5 (10 minute math)
Unit 3, Inv. 1.1, 1.3-1.5, 2.1-2.6, Inv. 3, Inv. 4
Unit 8, Inv. 2, Inv. 3.1, 3.4-3.6

WGSD Curriculum – Math 4th Grade
Number Sense and Operations in Fractions

High Priority Standards

4.NF.A.1 Explain and/or illustrate why two fractions are equivalent.
4.NF.A.2 Recognize and generate equivalent fractions.
4.NF.A.3 Compare two fractions using the symbols >, = or <, and justify the solution.

Learning Goal

Students will understand fraction equivalence and ordering.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Extending understanding to compare two fractions with different numerators and different denominators using <, >, and = by creating common denominators or numerators.
- Recognizing and generating equivalent fractions using visual models.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: numerator, denominator, mixed number, improper fraction, equivalent fraction, common denominator, common numerator, whole, part.
- Performing processes such as:
  - Comparing two fractions with different numerators and different denominators using <, >, and = by comparing to a benchmark fraction such as ½.
  - Recognizing equivalent fractions using visual models.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by recognizing that fraction comparisons are valid only when the two fractions are referring to the same whole.

Learning Targets

- 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
- 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 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

Learning Design

Need more for visual fraction models, creating common denominators or numerators, recognize that comparisons are valid only when the two fractions refer to the same whole.

WGSD Curriculum – Math 4th Grade

Number Sense and Operations in Fractions

High Priority Standards

4.NF.B.4 Understand addition and subtraction of fractions as joining/composing and separating/decomposing parts referring to the same whole.
4.NF.B.5 Decompose a fraction into a sum of fractions with the same denominator and record each decomposition with an equation and justification.
4.NF.B.6 Solve problems involving adding and subtracting fractions and mixed numbers with like denominators.
4.NF.B.7 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
4.NF.B.8 Solve problems involving multiplication of a fraction by a whole number.

Learning Goal

Students will be able to build fractions from unit fractions.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Identifying and generating equivalent forms of a fraction including mixed numbers with like denominators.
- Solving one-step problems involving multiplication of a fraction by a whole number.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: decompose, denominator, numerator, equivalent, express, mixed number, part, whole, improper fraction, common denominator.
- Performing processes such as:
  - Understanding that a fraction a/b is a multiple of 1/b by extending previous understanding of multiplication on whole numbers.
  - Solving one-step problems involving addition and subtraction of fractions referring to the same whole with like denominators.
  - Using visual fraction models and/or equations to represent the problem.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Understanding that a fraction a/b with a > 1 is the sum of its unit fractional parts by extending previous understandings of addition on whole numbers.
- Identifying fractions using visual models.

Learning Targets

- Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$
  - Understand addition and subtraction of fractions as joining and separating parts referring to the same whole
  - Decompose 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

        - *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8*
    - 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
    - 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
- Apply and extend previous understandings of multiplication to multiply a fraction by a whole number
    - Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4)*
    - 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 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
    - 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
        - *For example, if each person at a party will eat 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?*

Learning Design

Unit 6 Inv 1.1-1.4, 1.5-1.6 Inv. 2.5, 3.7
needs more support

Need more for multiplication to multiply a fraction by a whole number, understand a fraction a/b as a multiple of 1/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.

WGSD Curriculum – Math 4th Grade

Number Sense and Operations in Fractions

High Priority Standards

4.NF.C.9 Use decimal notation for fractions with denominators of 10 or 100.
4.NF.C.10 Understand that fractions and decimals are equivalent representations of the same quantity.
4.NF.C.11 Read, write and identify decimals to the hundredths place using number names, base ten numerals and expanded form.
4.NF.C.12 Compare two decimals to the hundredths place using the symbols >, = or <, and justify your solution.

Learning Goal

Students will be able to understand decimal notation for fractions and compare decimal fractions.
limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, 100

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Adding two fractions with respective denominators 10 and 100 by first converting to two fractions with like denominators.
- Comparing two decimals to the hundredths using >, <, =, or on a number line.
- Comparing decimals by reasoning about their size.
- Using fractions and decimals interchangeably to represent the same quantity.
- Reading, writing and identifying decimals to the hundredths place using number names, base ten numerals and expanded form.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: compare, comparison, decimal, fraction, tenth, hundredth, notation.
- Performing processes such as expressing a fraction with denominator 10 as an equivalent fraction with denominator 100 and expressing those fractions as decimals.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Identifying a fraction as a number.
- Identifying a fraction on a number line when the increments are equal to the denominator.

Learning Targets

- 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 3/10 as 30/100, and add 3/10 + 4/100 = 34/100*
- Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram*
- 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

Learning Design

Unit 6, 3.1-3.3, 3.5

WGSD Curriculum – Math 4th Grade
Geometry and Measurement

High Priority Standards

4.GM.C.6 Know relative sizes of measurement units within one system of units. a. Convert measurements in a larger unit in terms of a smaller unit.
4.GM.C.7 Use the four operations to solve problems involving distances, intervals of time, liquid volume, weight of objects and money.
4.GM.C.8 Apply the area and perimeter formulas for rectangles to solve problems.

Learning Goal

Students will be able to solve problems involving measurement and conversion of measurements.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Using the four operations to solve 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.
- Representing measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
- Applying the perimeter and area formulas to rectangles in word problems.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: centimeter, meter, kilometer, gram, kilogram, liter, milliliter, ounce, pound, decimal, fraction, volume, distance, mass, liquid, hour, minute, second, time money, interval, measurement.
- Performing processes such as:
  - Expressing measurements in a larger unit in terms of a smaller unit within a single system of measurement.
  - Recording measurement equivalents in a two-column table.
  - Applying the perimeter formula to rectangles in mathematical problems.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Knowing relative sizes of measurement units within one system of units, including km, m, cm; kg, g; lb, oz; l, ml; and hr, min, sec.

Learning Targets

- 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), ...

- 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
- Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *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*

Learning Design

Investigations:
Unit 2, Inv. 1.2-1.5, 2.4-2.5
Unit 4 Inv. 1.1-1.5, 2.3, 3.2, 4.5
Unit 5, Inv.1.4-1.6, 2.1-2.3
Unit 6, Inv. 3.1, 3.4
Unit 8, Inv. 2.1, 3.1, 3.5
Unit 9, Inv. 3.1-3.3
Do with science ponds?

WGSD Curriculum – Math 4th Grade
Geometry and Measurement

High Priority Standards

4.GM.B.4 Identify and estimate angles and their measure.
4.GM.B.5 Draw and measure angles in whole-number degrees using a protractor.

Learning Goal

Students will understand concepts of angle and measure angles.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Constructing angles in whole-number degrees using a protractor.
- Using understanding of angle concepts to decompose a larger angle with two or more smaller angles that have the same sum as the original.
- Determining an unknown angle measure in a diagram.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: protractor, angle, degree, ray, endpoint.
- Performing processes such as:
  - Recognizing whole-number degrees on a protractor.
  - Measuring angles in whole-number degrees using a protractor.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by measuring angles in whole-number degrees using a protractor, with help, or inconsistently.

Learning Targets

- Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
  - 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 1/360 of a circle is called a "one-degree angle," and can be used to measure angles
  - An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees
- Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure
- Recognize angle measure as additive. When an angle is decomposed 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

Learning Design

Investigations: Unit 4; Inv 3

WGSD Curriculum – Math 4th Grade
Geometry and Measurement

High Priority Standards

4.GM.A.1 Draw and identify points, lines, line segments, rays, angles, perpendicular lines and parallel lines.
4.GM.A.2 Classify two-dimensional shapes by their sides and/or angles.
4.GM.A.3 Construct lines of symmetry for a two-dimensional figure.

Learning Goal

Students will be able to draw and identify lines and angles and classify shapes by properties of their lines and angles.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Drawing all lines of symmetry for two-dimensional figures.
- Classifying two-dimensional figures based on parallel or perpendicular lines or angles of specified lines.
- Recognizing right triangles as a category of triangles.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: point, line, line segment, ray, angle, right, acute, obtuse, perpendicular, parallel, figure, symmetry, line of symmetry.
- Performing processes such as:
    - Identifying points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines in two-dimensional figures .
    - Identifying all lines of symmetry in unfamiliar two-dimensional figures.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Drawing points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines.
- Recognizing a line of symmetry for a familiar two-dimensional figure.
- Identifying right triangles.

Learning Targets

- Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures
- Classify two-dimensional 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
- Recognize a line of symmetry for a two-dimensional 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

Learning Design

Investigations: Unit 4, Inv. 2.1, 2.3-2.5, 4.1, 4.3

WGSD Curriculum – Math 4th Grade
Data and Statistics

High Priority Standards

4.DS.A.1 Create a frequency table and/or line plot to display measurement data.
4.DS.A.2 Solve problems involving addition and subtraction by using information presented in a data display.
4.DS.A.3 Analyze the data in a frequency table, line plot, bar graph or picture graph.

Learning Goal

Students will be able to represent and interpret data.

Proficiency Scale

Innovating: Student demonstrates an in-depth inference or advanced application, or innovates with the learning goal.

Meeting: Student demonstrates mastery with the learning goal as evidenced by:

- Creating a line plot to represent a data set using fractions 1/2, 1/4, and 1/8.
- Interpreting data from a line plot to solve problems involving addition and subtraction of fractions with like denominators.
- Creating a frequency table to display measurement data.
- Analyzing the data in a frequency table, line plot, bar graph or picture graph.

Approaching: Student demonstrates he/she is nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: data, fraction, line plot, measurement, unit.
- Performing a process such as using data from a given line plot using fractions 1/2, 1/4, and 1/8 to solve one-step problems.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:

- Identifying data from a given line plot using whole numbers.

Learning Targets

- Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 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*

Learning Design

WGSD Curriculum – Math 4th Grade

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