WGSD Curriculum – Math 5th Grade

In Grade 5, instructional time will focus on three critical areas: (1) developing fluency with addition and subtraction of fractions, and developing understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions); (2) extending division to 2-digit divisors, integrating decimal fractions into the place value system and developing understanding of operations with decimals to hundredths, and developing fluency with whole number and decimal operations and (3) developing understanding of volume.

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 5th Grade

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

Students will be able to reason abstractly and quantitatively.

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

Students will be able to model with mathematics.

Students will be able to use appropriate tools strategically.

Students will be able to attend to precision.

Students will be able to look for and make use of structure.

Students will be able to look for and express regularity in repeated reasoning.

Students will be able to write and interpret numerical expressions.

Students will be able to analyze patterns and relationships.

Students will be able to understand the place value system.

Students will be able perform operations with multi-digit whole numbers and with decimals to hundredths.

Students will be able to use equivalent fractions as a strategy to add and subtract fractions.

Students will be able to apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Students will be able to convert like measurement units within a given measurement system.

Students will understand the concepts of volume.

Students will be able to graph points on the coordinate plane to solve real-world and mathematical problems.

Students will be able to classify two-dimensional figures into categories based on their properties.

Students will be able to represent and interpret data.

WGSD Curriculum – Math 5th 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 they are 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 efficient 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 try different approaches
- Uses different strategies 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.
- 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 5th 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 they are 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
- Write simple expressions that record calculations with numbers
- Represent or round numbers using place value concepts

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 5th 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 they are 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 5th 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 they are 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 results in the context of the situation and reflect on whether the results make sense
- Evaluate the utility of models to determine which models are most useful and efficient to solve problems

Learning Design

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

WGSD Curriculum – Math 5th Grade
Mathematical Practices

High Priority Standards
CCSS.Math.Practice.MP5

Learning Goal	**Proficiency Scale**
Students will be able to use appropriate tools strategically.	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 they are 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.

Learning Targets

- 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, they may use unit cubes to fill a rectangular prism and a ruler to measure the dimensions
- Use graph paper to accurately create graphs and solve problems or make predictions from real world data

Learning Design

- 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.)

WGSD Curriculum – Math 5th Grade
Mathematical Practices

<table>
<tr><td colspan="2"><u>High Priority Standards</u>
CCSS.Math.Practice.MP6</td></tr>
<tr><td><u>Learning Goal</u>

Students will be able to attend to precision.</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 using appropriate symbols, vocabulary, and labeling to communicate effectively and exchange ideas.

Approaching: Student demonstrates they are 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.</td></tr>
<tr><td colspan="2"><u>Learning Targets</u>
● 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</td></tr>
<tr><td colspan="2"><u>Learning Design</u>
● Facilitates, encourages and <u>expects</u> precision in communication.
● Provides opportunities for students to explain and/or write their reasoning to others.</td></tr>
</table>

WGSD Curriculum – Math 5th 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 they are 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 as strategies to add, subtract, multiply and divide with whole numbers, fractions, and decimals
- Examine numerical patterns and relate them to a rule or a graphical representation

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 5th 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 they are 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 and look for more shortcut methods
- Use repeated reasoning to understand algorithms and make generalizations about patterns

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 5th Grade
Relationships and Algebraic Thinking

High Priority Standards

5.RA.B.3 Write, evaluate and interpret numeric expressions using the order of operations.
5.RA.B.4 Translate written expressions into algebraic expressions.
5.RA.C.5 Solve and justify multi-step problems involving variables, whole numbers, fractions and decimals.

Learning Goal	**Proficiency Scale**
Students will be able to write and interpret numerical expressions.	Innovating: In addition to score 3.0 performance, the 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: ● Writing, evaluating, and interpreting (write a story for an expression) numerical expressions using order of operations (not including exponents). ● Translating written expressions into an algebraic expression using numbers and a variable. ● Solving multi step word problems using whole numbers, fractions and decimals. Approaching: Student demonstrates they are nearing the learning goal by: ● Recognizing and recalling specific vocabulary, such as: order of operations, equation, sum, difference, product, quotient, properties, parentheses. ● Performing processes such as: ○ Writing numerical expressions having one set of parentheses. ○ Evaluating expressions using order of operations. ○ Representing multi step problems using an equation with a letter to represent an unknown quantity. Beginning: Student demonstrates a limited understanding or skill with the learning goal by evaluating numerical expressions that have either parentheses, brackets, or braces.

Learning Targets

- Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols
- Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them
    - *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*
- Solve multistep word problems using whole numbers, fractions and decimals. Represent these problems as equations with a letter standing for the unknown quantity. Use estimation to assess the reasonableness of answers. *(Exclude division of fractions by fractions.)*

Learning Design

Illustrative Mathematics Units 1, 2, 4, & 5

WGSD Curriculum – Math 5th Grade
Relationships and Algebraic Thinking

High Priority Standards

5.RA.A.1 Investigate the relationship between two numeric patterns.
a. Generate two numeric patterns given two rules. b. Translate two numeric patterns into two sets of ordered pairs. c. Graph numeric patterns on the Cartesian coordinate plane. d. Identify the relationship between two numeric patterns.
5.RA.A.2 Write a rule to describe or explain a given numeric pattern.

Learning Goal

Students will be able to analyze patterns and relationships.

Proficiency Scale

Innovating: In addition to score 3.0 performance, the 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:
- Describing the relationship between two numeric patterns.
- Graphing numeric patterns on the coordinate plane.
- Expressing numerical patterns as rules, tables, and/or sets of ordered pairs.

Approaching: Student demonstrates they are nearing the learning goal by:
- Recognizing and recalling specific vocabulary, such as: relationship (algebraic relationships with function tables), input/output tables, coordinate plane, coordinate pair or ordered pairs, x-axis, y-axis, quadrant.
- Performing processes such as:
  - Generating two numerical patterns given starting points and rules.
  - Graphing ordered pairs on the coordinate plane.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by:
- Filling in the missing terms given two incomplete patterns and their rules.
- Extending two numeric patterns given the rules.
- Choosing the sequence of numbers that matches a given rule.

Learning Targets

- Investigate the relationship between two numerical patterns expressed as rules, tables, sets of ordered pairs or graphs.
  - Generate two numerical patterns given two rules and organize in tables;
  - Translate the two numerical patterns into two sets of ordered pairs then graph the two sets of ordered pairs on the same Cartesian Plane;
  - Graph numeric patterns on the Cartesian coordinate plane;
  - Identify the relationship between the two numerical patterns.(e.g., Given the rule “Starting at 0, add 3” and given the rule “Starting at 0, add 6”, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain this pattern informally.)

- Given a numerical pattern, write a rule to describe or explain the pattern.(e.g., Given the pattern 64, 32, 16, ... generate the rule. “Starting at 64, divide the previous term by 2” or “Starting at 64 multiply the previous term by ½”)

Learning Design

Illustrative Mathematics Unit 7

WGSD Curriculum – Math 5th Grade
Number Sense and Operations in Base Ten

High Priority Standards

5.NBT.A.1 Read, write and identify numbers from billions to thousandths using number names, base ten numerals and expanded form.
5.NBT.A.2 Compare two numbers from billions to thousandths using the symbols >, = or <, and justify the solution.
5.NBT.A.3 Understand that in a multi-digit number, a digit represents 1/10 times what it would represents in the place to its left.
5.NBT.A.4 Evaluate the value of powers of 10 and understand the relationship to the place value system.
5.NBT.A.5 Round numbers from billions to thousandths place.
5.NF.A.3 Compare and order fractions and/or decimals to the thousandths place using the symbols >, = or <, and justify the solution.

Learning Goal	**Proficiency Scale**
Students will be able to understand the place value system.	Innovating: In addition to score 3.0 performance, the 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: ● Reading, writing and identifying numbers from billions to thousandths using base-ten numerals, number names, and expanded form. ● Using whole number exponents to denote powers of 10. ● Explaining patterns in numbers of zeros and/or placement of a decimal point when a number is multiplied or divided by 10. ● Comparing two numbers (fractions, decimals, and whole numbers) from billions to thousandths using >, <, or =. ● Rounding numbers to any place from billions to thousandths. Approaching: Student demonstrates they are nearing the learning goal by: ● Recognizing and recalling specific vocabulary, such as: base-ten numeral, compare, decimal, decimal point, digit, expanded form, exponent, pattern, place, powers of 10, round, tenth, hundredth, thousandth, value, whole number, number names. ● Performing processes such as: ○ Recognizing a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. ○ Rounding decimals to the tenths and hundredths. ○ Calculating the value of powers of ten. Beginning: Student demonstrates a limited understanding or skill with the learning goal by: ● Reading and writing decimals to the thousandths using base-ten numerals and number names. ● Rounding whole numbers to any place.

Learning Targets

- Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place in its right and 1/10 of what it represents in the place to its left

- Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10

- Read, write, and compare decimals to thousandths
    - Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g. 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000)

    - Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, < symbols to record the results of comparisons

    - Compare and order fractions, or decimal numbers to the thousandths place, by reasoning about their size.Record the results of comparisons with symbols >, = or <, and justify the conclusions. (e.g., by using benchmarks, number lines, manipulatives or drawings)

- Use place value understanding to round decimals to any place

Learning Design

Illustrative Mathematics Units 5 & 6

WGSD Curriculum – Math 5th Grade
Number Sense and Operations in Base Ten

High Priority Standards

5.NBT.A.6 Add and subtract multi-digit whole numbers and decimals to the thousandths place, and justify the solution.
5.NBT.A.7 Multiply multi-digit whole numbers and decimals to the hundredths place, and justify the solution.
5.NBT.A.8 Divide multi-digit whole numbers and decimals to the hundredths place using up to two-digit divisors and four-digit dividends, and justify the solution.

Learning Goal	**Proficiency Scale**
Students will be able perform operations with multi-digit whole numbers and with decimals to hundredths.	Innovating: In addition to score 3.0 performance, the 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 and decimals to the thousandths place. ● Multiplying multi-digit whole numbers and decimals to the hundredths place. ● Dividing multi-digit whole numbers and decimals to the hundredths place with up to four-digit dividends and two-digit whole number divisors. Approaching: Student demonstrates they are nearing the learning goal by: ● Recognizing and recalling specific vocabulary, such as: product, quotient, dividend, divisor, array, dimensions, sum, difference. ● Performing processes such as: ○ Multiplying three- and four-digit whole numbers. ○ Dividing whole numbers with up to three-digit dividends and two-digit divisors. ○ Identifying errors and alternate approaches to solving problems involving addition, subtraction, and multiplication of multi-digit whole numbers. ○ Assessing the reasonableness of an answer. Beginning: Student demonstrates a limited understanding or skill with the learning goal by: ● Adding and subtracting multi-digit whole numbers. ● Multiplying one- and two-digit whole numbers. ● Dividing whole numbers with up to three-digit dividends and one-digit divisors.

Learning Targets

- Add and subtract, multi-digit whole numbers and decimals, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

- Multiply multi-digit whole numbers and decimals (students should have an efficient strategy to solve problems in a clear and concise manner)
    - Use multiple representations to model real-world and mathematic problems involving multiplication of multi-digit whole numbers.
    - Critique the reasoning of others, identifying errors and alternate approaches to solving problems involving multiplication of multi-digit whole numbers.
    - Decontextualize and contextualize problems and solutions to explain his or her reasoning in multiplication of multi-digit whole numbers.
    - Identify and explain patterns and the structure of the problems with specific focus on the properties of mathematics when solving problems involving multiplication of multi-digit whole numbers.
    - Communicate reasoning precisely for problems involving multiplication of multi-digit whole numbers.

- Divide multi-digit whole numbers and decimals 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

- Explain the reasonableness of the solution and identify if a given justification is correct

Learning Design

Illustrative Mathematics Units 3 - 5, & 8

WGSD Curriculum – Math 5th Grade

Number Sense and Operations in Fractions

High Priority Standards

5.NF.B.6 Solve problems involving addition and subtraction of fractions and mixed numbers with unlike denominators, and justify the solution.
5.NF.B.4 Estimate results of sums, differences and products with fractions and decimals to the thousandths.
5.NF.A.3 Compare and order fractions and/or decimals to the thousandths place using the symbols >, = or <, and justify the solution.

Learning Goal	**Proficiency Scale**
Students will be able to use equivalent fractions as a strategy to add and subtract fractions.	Innovating: In addition to score 3.0 performance, the 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 fractions and mixed numbers with unlike denominators in word problems. ● Placing fractions and decimals correctly on a number line. ● Using number sense of fractions to estimate mentally and assess the reasonableness of answers. ● Estimating results of sums and differences with fractions and decimals to the thousandths. Approaching: Student demonstrates they are nearing the learning goal by: ● Recognizing and recalling specific vocabulary, such as: numerator, denominator, equivalent, common denominator, benchmark fractions (halves, thirds, fourths, fifths, tenths, sixths, eighths). ● Performing processes such as: ○ Adding two fractions with unlike denominators when one denominator is a factor of the other. ○ Subtracting two fractions with unlike denominators when one denominator is a factor of the other. ○ Using benchmark fractions to estimate mentally and assess the reasonableness of answers. Beginning: Student demonstrates a limited understanding or skill with the learning goal by: ● Ordering fractions from least to greatest. ● Ordering decimals from least to greatest.

Learning Targets

- Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators
    - *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

- Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers
    - *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2*.

- Compare and order fractions and/or decimals to the thousandths place.

Learning Design

Illustrative Mathematics Unit 6

WGSD Curriculum – Math 5th Grade
Number Sense and Operations in Fractions

High Priority Standards

5.NF.A.1 Understand that parts of a whole can be expressed as fractions and/or decimals.
5.NF.A.2 Convert decimals to fractions and fractions to decimals.
5.NF.B.5 Justify the reasonableness of a product when multiplying with fractions. a. Estimate the size of the product based on the size of the two factors. b. Explain why multiplying a given number by a fraction greater than 1 results in a product larger than the given number. c. Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number. d. Explain why multiplying the numerator and denominator by the same number is equivalent to multiplying the fraction by 1.
5.NF.B.7 Extend the concept of multiplication to multiply a fraction or whole number by a fraction. a. Recognize the relationship between multiplying fractions and finding the areas of rectangles with fractional side lengths. b. Calculate and interpret the product of a fraction by a whole number and a whole number by a fraction. c. Calculate and interpret the product of two fractions less than one.
5.NF.B.8 Extend the concept of division to divide unit fractions and whole numbers by using visual fraction models and equations. a. Calculate and interpret the quotient of a unit fraction by a non-zero whole number. b. Calculate and interpret the quotient of a whole number by a unit fraction.

Learning Goal

Students will be able to apply and extend previous understandings of multiplication and division to multiply and divide fractions.

Proficiency Scale

Innovating: In addition to score 3.0 performance, the 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:

- Solving mathematical problems and word problems that involve multiplying fractions.
- Solving mathematical problems and word problems that involve dividing a unit fraction by a whole number.
- Solving mathematical problems and word problems that involve dividing a whole number by a unit fraction.
- Describing the effect that a fraction has on another fraction when multiplied.
- Using or creating visual models when multiplying two fractions.

Approaching: Student demonstrates they are nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: improper fraction, mixed numbers, numerator, denominator.
- Performing processes such as:
    - Multiplying a whole number by a fraction.
    - Knowing the effect that a fraction greater than or less than 1 has on a whole number when multiplied.
    - Explaining why multiplying the numerator and denominator by the same number is equivalent to multiplying the fraction by 1.
    - Understanding that division of whole numbers can result in fractions.
    - Converting fractions to decimals, including mixed numbers and improper fractions.

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

- Knowing the effect that whole number multiplication has on fractions.
- Using or creating visual models when multiplying a whole number by a fraction.
- Interpreting and performing division of a whole number by 1/2 or 1/3.
- Identifying parts of a whole using fractions and/or decimals.
- Converting decimals to fractions, including decimals greater than one.

Learning Targets

- Interpret a fraction as division of the numerator by the denominator. Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

- Justify the reasonableness of a product when multiplying with fractions.
  - Estimate the size of the product based on the size of the two factors;
  - Explain why multiplying a given number by a number greater than 1 (e.g., improper fractions, mixed numbers or whole numbers) results in a product larger than the given number;
  - Explain why multiplying a given number by a fraction between zero and 1 results in a product smaller than the given number;
  - Explain why multiplying the numerator and denominator by the same number has the same effect as multiplying the fraction by 1.

- Apply and extend previous understanding of multiplication to multiply a fraction or whole number by a fraction.
  - Recognize the relationship between multiplying fractions and finding the areas of rectangles with fractional side lengths;
  - Calculate and interpret multiplication of a fraction or a whole number by a fraction. (e.g., 1/5 x 5/12 is one fifth of five objects called twelfths; 2 ½ x 4/5 is two groups of four fifths and another half-group of four fifths)
  - Calculate and interpret the product of two fractions which are both between zero and one.

- Extend the concept of division to divide unit fractions and whole numbers by using visual fraction models and equations.
  - Calculate and interpret division of a unit fraction by a non-zero whole number and compute the quotient; *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins? Create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3*.
  - Calculate and interpret division of a whole number by a unit fraction and compute the quotient. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4*.

- Understand that parts of a whole can be expressed as fractions and/or decimals. Denominators are limited to 1, 2, 4, 5, 10, 20, 25, 50 or 100 when working with fractions and decimals. Denominators 3, 6, 8 and 12 may be used when decimals are not involved.

- Convert decimals to fractions and fractions to decimals. Denominators are limited to 1, 2, 4, 5, 10, 20, 25, 50 or 100. Fractions include those that are greater than 1 (i.e. mixed numbers and improper fractions)

Learning Design

Illustrative Mathematics Units 2, 3, & 8

WGSD Curriculum – Math 5th Grade
Geometry and Measurement

High Priority Standards

5.GM.D.8 Convert measurements of capacity, length and weight within a given measurement system.
5.GM.D.9 Solve multi-step problems that require measurement conversions.

Learning Goal

Students will be able to convert like measurement units within a given measurement system.

Proficiency Scale

Innovating: In addition to score 3.0 performance, the 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 measurements within a system using whole numbers, fractions, and decimals.
- Solving multi-step problems that require measurement conversions.

Approaching: Student demonstrates they are nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: metric, U.S. customary, conversion, inch, foot, yard, mile, millimeter, centimeter, meter, kilometer, gram, milligram, ounce, pound, ton, liter, milliliter, cup, pint, quart, gallon, unit.
- Performing processes such as:
    - Converting a whole number measurements within a system resulting in a whole number.

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

- Converting whole numbers measurements using a conversion chart.

Learning Targets

- Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems
- Units should include in., ft., yd., miles, km, m, cm, mm; kg, g, mg, oz., lb., ton; L, mL, cup, pt., qt. and gal.

Learning Design

Illustrative Mathematics Unit 6

WGSD Curriculum – Math 5th Grade

Geometry and Measurement

High Priority Standards

5.GM.B.4 Understand the concept of volume and recognize that volume is measured in cubic units. a. Describe a cube with edge length 1 unit as a "unit cube" and is said to have "one cubic unit" of volume and can be used to measure volume. b. Understand that the volume of a right rectangular prism can be found by stacking multiple layers of the base.
5.GM.B.5 Apply the formulas V = l × w × h and V = B × h for volume of right rectangular prisms with whole-number edge lengths.

Learning Goal

Students will understand the concepts of volume.

Proficiency Scale

Innovating: In addition to score 3.0 performance, the 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 formulas V = l x w x h and V = B x h to find the volume of rectangular prisms.
- Labeling volume of objects with correct cubic units.
- Determining if volume, area or perimeter should be found in a given situation.

Approaching: Student demonstrates they are nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: volume, three-dimensional, cubic units, formula, measure, right rectangular prism, solid.
- Performing a process such as using the concept that the volume of a rectangular prism packed with unit cubes is related to the edge lengths.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by using unit cubes to find the volume of rectangular prisms with whole number edge lengths.

Learning Targets

- Recognize volume as an attribute of solid figures and understand concepts of volume measurement
  - A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
  - A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.
- Distinguish the difference between volume and area. Determine if volume, area or perimeter should be found in a given situation.
- Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units
- Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume
  - Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base.
  - Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

Learning Design

Illustrative Mathematics Units 1, 4, & 8

WGSD Curriculum – Math 5th Grade
Geometry and Measurement

High Priority Standards

5.GM.C.6 Define a first quadrant Cartesian coordinate system. a. Represent the axes as scaled perpendicular number lines that both intersect at 0, the origin. b. Identify any point on the Cartesian coordinate plane by its ordered pair coordinates. c. Define the first number in an ordered pair as the horizontal distance from the origin. d. Define the second number in an ordered pair as the vertical distance from the origin.
5.GM.C.7 Plot and interpret points in the first quadrant of the Cartesian coordinate plane.

Learning Goal

Students will be able to graph points on the coordinate plane to solve real-world and mathematical problems.

Proficiency Scale

Innovating: In addition to score 3.0 performance, the 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:

- Graphing ordered pairs on the coordinate plane in the first quadrant.
- Interpreting points as horizontal or vertical distance from the origin.
- Interpreting points in the first quadrant of the coordinate plane to mathematical and real-world situations.

Approaching: Student demonstrates they are nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: coordinate plane, coordinate pair or ordered pairs, origin, x-axis, y-axis, quadrants.
- Performing a process such as identifying what the x and y coordinates represent.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by identifying the ordered pair of a given point in the first quadrant of the coordinate plane.

Learning Targets

- Define a Cartesian coordinate system.
  - The x- and y- axes are perpendicular number lines that intersect at 0 (the origin);
  - Any point on the Cartesian coordinate plane can be represented by its coordinates;
  - The first number in an ordered pair is the x-coordinate and represents the horizontal distance from the origin;
  - The second number in an ordered pair is the y-coordinate and represents the vertical distance from the origin.
- Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation

Learning Design

Illustrative Mathematics Unit 7

WGSD Curriculum – Math 5th Grade
Geometry and Measurement

High Priority Standards

5.GM.A.1 Understand that attributes belonging to a category of figures also belong to all subcategories.
5.GM.A.2 Classify figures in a hierarchy based on properties.
5.GM.A.3 Analyze and describe the properties of prisms and pyramids.

Learning Goal

Students will be able to classify two- and three-dimensional geometric shapes.

Proficiency Scale

Innovating: In addition to score 3.0 performance, the 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:

- Selecting all the categories that describe a two-dimensional or three-dimensional shape.
- Analyze and describe the properties of prisms and pyramids.

Approaching: Student demonstrates they are nearing the learning goal by:

- Recognizing and recalling specific vocabulary, such as: right angle, congruent, parallel, perpendicular, property.
- Performing a process such as classifying two-dimensional figures into categories by their attributes or properties.

Beginning: Student demonstrates a limited understanding or skill with the learning goal by identifying attributes of two- and three-dimensional figures.

Learning Targets

- Understand that attributes belonging to a category of two-dimensional or three-dimensional geometric shapes also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
- Classify figures in a hierarchy based on properties
- Analyze properties of prisms and pyramids, describing them by the number of edges, faces or vertices as well as the types of bases.
- Categories are limited to: circles, polygons (limited to all triangles, all quadrilaterals, pentagons, hexagons or octagons), prisms, cylinders, cones, spheres and pyramids.

Learning Design

Illustrative Mathematics Units 7 & 8

WGSD Curriculum – Math 5th Grade
Data and Statistics

High Priority Standards

5.DS.A.1 Create a line graph to represent a data set, and analyze the data to answer questions and solve problems.
5.DS.A.2 Create a line plot to represent a given or generated data set, and analyze the data to answer questions and solve problems, recognizing the outliers and generating the median.

Learning Goal	**Proficiency Scale**
Students will be able to represent and interpret data.	Innovating: In addition to score 3.0 performance, the 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 line graph and a line plot to identify trends in the data. ● Creating a line graph to represent data using appropriate scales and title. ● Creating a line plot to represent data using appropriate scale and title. ● Making predictions based on the data in a line graph or line plot. Approaching: Student demonstrates they are nearing the learning goal by: ● Recognizing and recalling specific vocabulary, such as: data, line plot, unit. ● Performing processes such as: ○ Identifying the mode and range of the data in a line graph. ○ Identifying the mode, range, median, and outlier(s) of the data in a line plot. Beginning: Student demonstrates a limited understanding or skill with the learning goal by choosing the correct data set given a line graph or line plot.

Learning Targets

- Create a line graph to represent a data set, and analyze the data to answer questions and solve problems.
  - Choose appropriate axis labels, reasonable scales for the x and y axis, and an appropriate title.
  - Create a line graph to represent given data by placing points correctly.
  - Choose the correct graph representing a given data set.
  - Choose the correct data set given a line graph.
  - Identify the least occurring, most occurring (i.e. mode), range of the data, trends in the data.
  - Answer questions about trends on the graph (i.e. increasing/decreasing) by using data.
  - Make predictions using the data and/or the graph.

- Create a line plot to represent a given or generated data set, and analyze the data to answer questions and solve problems, recognizing the outliers and generating the median.
  - Choose an appropriate title for the line plot.
  - Create a line plot to represent given data by placing points (x) correctly.
  - Choose the correct line plot representing a given data set.
  - Choose the correct data set given a line plot.
  - Identify the least/most occurring (mode), range, median, outlier(s), and trends in the data.
    - Data sets in which the median should be found may include an odd number of data points or an even number of data points.
  - Answer questions by using data from the line plot.

- Data may include fractions with denominators of 2, 3, 4, 5, 6, 8, 10, 12 or 100.

Learning Design

Illustrative Mathematics Unit 6

WGSD Curriculum – Math 5th Grade

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