East Prairie Fifth Grade Math Pacing Guide

2016-2017

Nine Weeks: □ 1st □ 2nd **X 3rd** □ 4th

Operations and Algebraic Thinking	Numbers and Operations in Base Ten	Measurement and Data	Geometry
□ Write and interpret numerical expressions. □ Analyze patterns and relationships	□ Understand the place value system □ Perform operations with multi-digit whole numbers and with decimals to hundredths **Numbers and Operations Fractions** X Use equivalent fractions as a strategy to add and subtract fractions □ Apply and extend previous understandings of multiplication and division to multiply and divide fractions	□ Convert like measurement units within a given measurement system. □ Represent and interpret data □ Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	□ Graph points on the coordinate plane to solve real-world and mathematical problems □ Classify two-dimensional figures into categories based on their properties.

Common Core Standard: 5.NF.1 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.)*

Key Vocabulary: fraction, equivalent, addition, sum, add, subtraction, subtract, difference, unlike denominator, numerator, benchmark fraction, estimate, reasonableness, mixed numbers, common denominator, number line

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How do I add and subtract fractions and mixed numbers with unlike denominators?	**x Make sense of problems and persevere in solving them.** **x Reason abstractly and quantitatively.** □ Construct viable arguments and critique the reasoning of others. **x Model with mathematics.** □ Use appropriate tools strategically. **x Attend to precision.** □ Look for and make use of structure. □ Look for and express regularity in repeated reasoning.	**I can…..** -add and subtract fractions with unlike denominators. -add and subtract mixed numbers/improper fractions. -determine equivalent fractions.	Students use fraction models to analyze addition or subtraction problems and to understand that fractions cannot be added or subtracted unless the wholes (denominators) are the same (e.g., 1 2/5 + 3 3/10). Students trade fraction pieces to build equivalent fractions (e.g., trading 2/5 for enough tenths to make equivalent fractions). Students combine the pieces (e.g., tenths) and add the whole numbers. Students discuss the process used to find like denominators. Students repeat the activity for subtraction.	Butterfly Fractions Hands-on Fractions Weather – Science Integration Fractions The Numbers Tell LCD Domino Fractions I Have Who Has

		I will… -identify the common denominator by finding the product of both denominators. -replace fractions with an equivalent fraction. -use visual fraction models to build an understanding. -use standard algorithms to add and subtract fractions.	Students work with partners to create step-by-step visuals that show the processes for adding or subtracting fractional numbers. Steps may include: determine if the fractions have the same denominators; solve to find equivalent fractions with common denominators; perform the indicated operations with fractions and then whole numbers; simplify answers. Have students use fraction tiles to determine equivalent fractions. Students should recognize that when aligning 2/3 (2 tiles each of 1/3 a whole) is equivalent to 4/6 (4 tiles each of 1/6 a whole). Therefore, 2/3 and 4/6 are equivalent fractions. Students need to develop the understanding that when adding or subtracting fractions, the fractions must refer to the same whole. Any models used must refer to the same whole. Students may find that a circular model might not be the best model when adding or subtracting fractions. As with solving word problems with whole number operations, regularly present word problems involving addition or subtraction of fractions. The concept of adding or subtracting fractions with unlike denominators will develop through solving problems. Mental computations and estimation strategies should be used to determine the reasonableness of answers. Students need to prove or disprove whether an answer provided for a problem is reasonable. Estimation is about getting useful answers, it is not about getting the right answer. It is important for students to learn which strategy to use for estimation. Students need to think about what might be a close answer and then explain their reasoning.	Fractions in Music

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Common Core Standard: 5.NF.2 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.*

Key Vocabulary: fraction, equivalent, addition, sum, add, subtraction, subtract, difference, unlike denominator, numerator, benchmark fraction, estimate, reasonableness, mixed numbers, common denominator, number line

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How can I use my knowledge of fractions to solve real world problems?	**x Make sense of problems and persevere in solving them.** **x Reason abstractly and quantitatively.** **x Construct viable arguments and critique the reasoning of others.** **x Model with mathematics.** **x Use appropriate tools strategically.** **x Attend to precision.** **x Look for and make use of structure.** **x Look for and express regularity in repeated reasoning.**	**I can…..** -solve word problems involving addition and subtraction of fractions with unlike denominators. - demonstrate how I solved word problems, and whether they are reasonable answers, with fraction models or equations	Students create original word problems supporting their solutions with illustrations, text, and recorded narration. Students represent fraction addition problems using number lines. Students analyze addends to determine if common denominators are present. If not, students find equivalent fractions with common denominators using fraction models. Students plot addends on number lines, shading distances to the first fractions/addends and continuing to the second fractions/addends to visually represent the sums.	

		- solve benchmark fractions and number sense of fractions to estimate mentally and check for reasonableness. **I will…..** -write a number equation to solve word problems involving fractions with like and unlike denominators. -use visual fraction models to represent the problem. - use my knowledge of benchmark fractions to estimate mentally and check for reasonableness. - use number sense of fractions to estimate mentally and check for reasonableness.	When given subtraction fraction equations with correct and incorrect differences, students judge the reasonableness of the given differences. Students draw pictures to solve problems and verify the responses. Show students the "butterfly" method for adding and subtracting fractions. This will also establish finding common denominators and can lead to an introduction to mixed numbers and improper fractions. 8/9 + 2/3 = 9x3=27 which can serve as a common denominator, now cross multiply, 8x3 is 24 and 2x9 is 18. So, 24+18/27 = 42/27	

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Common Core Standard: 5.NF.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *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?*

Key Vocabulary: fraction, numerator, denominator, operations, multiplication, multiply, division, divide, mixed numbers, product, quotient, partition, equal parts, equivalent, factor, improper fraction, proper fraction, whole numbers, unit fraction, area, side lengths, fractional side lengths, scaling (resizing), comparing, $^{a}/_{b}$ = a ÷ b, equation, fraction models, inverse, reciprocal, binomial

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How do you interpret a fraction as a division problem?	**x Make sense of problems and persevere in solving them.** **x Reason abstractly and quantitatively.** **x Construct viable arguments and critique the reasoning of others.** **x Model with mathematics.** **x Use appropriate tools strategically.** **x Attend to precision.**	**I can…..** -understand a fraction as division of the numerator by the denominator. - solve word problems that include dividing whole numbers when	Students use paper models to investigate expressions (e.g., 5 ÷ 10). Students discuss that wholes can be divided into equal parts (e.g., 5 circles cut into ten equal pieces). Students observe that pieces are equivalent (e.g., 1/2 = 5/10). Students draw pictures, make models, or act out to solve word problems involving division of whole numbers leading to answers in the form of fractions or whole	Real World Fractions Estimating Rational Numbers M&M Madness

	x Look for and make use of structure. **x Look for and express regularity in repeated reasoning.**	the quotient is a fraction or mixed number using models or equations. **I will…..** -use a fraction to create a division problem. -solve word problems using division by interpreting the quotient as a mixed number. -use visual fraction models or equations to represent the problem.	numbers (e.g., Eight girls shared six cookies. How much cookie did each girl get? 6/8). Students determine solutions and share in small groups. Connect the meaning of multiplication and division of fractions with whole-number multiplication and division. Consider area models of multiplication and both sharing and measuring models for division. Ask questions such as, What does 2 × 3 mean? and What does 12 ÷ 3 mean? Then, follow with questions for multiplication with fractions, such as, What does 3/4 ×1/3 mean? What does 3/4 × 7 mean? (7 sets of 3/4) and What does 7 × 3/4 mean? (3/4 of a set of 7) The meaning of 4 ÷ 1/2 (how many 1/2 are in 4) and 1/2 ÷ 4 (how many groups of 4 are in 1/2) Encourage students to use models or drawings to multiply or divide with fractions. Begin with students modeling multiplication and division with whole numbers. Have them explain how they used the model or drawing to arrive at the solution. Models to consider when multiplying or dividing fractions include, but are not limited to: area models using rectangles or squares, fraction strips/bars and sets of counters.	

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Common Core Standard: 5.MD.1 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.

Key Vocabulary: conversion, convert, metric measurement, customary measurement, [from previous grades: relative size, liquid volume, mass, length, kilometer (km), meter (m), centimeter (cm), kilogram (kg), gram (g), liter (L), milliliter (mL), inch (in), foot (ft), yard (yd), mile (mi), ounce, (oz), pound (lb), cup (c), pint (pt), quart (qt), gallon (gal), hour, minute, second

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How can I use multiplication and division to convert measurements within a system to solve multi-step real world problems?	□ Make sense of problems and persevere in solving them. **x Reason abstractly and quantitatively.** □ Construct viable arguments and critique the reasoning of others. **x Model with mathematics.** **x Use appropriate tools strategically**. □ Attend to precision. □ Look for and make use of structure. □ Look for and express regularity in repeated reasoning.	**I can…..** -convert (multiply and divide) within a given measurement system. -use conversions in solving multi-step, real world problems. -determine elapsed time	Using conversion tables labeled with standard or metric units with numbers placed in random grids, students complete the tables using measurement tools and needed calculations. Students use the conversion tables above to write multi-step real world problems. Students dramatize problems with props and realia while remaining student's record solutions. Use steps to show the conversion between metric measurements. King Henry Died _____ Drinking	Measurement Foldable

		I will….. -use conversions in solving multi-step problems. -use conversions to solve real world problems. -use the base-ten system when converting within the metric system.	Chocolate Milk used as an acronym to help students remember the units for metric measurements. (kilo-, hecto-, deca-, _____ deci-, centi-, milli-) Students create a book of conversions and the formula used supported by illustrations, text, and recorded narration. Students should gain ease in converting units of measures in equivalent forms within the same system. To convert from one unit to another unit, the **relationship** between the units must be known. In order for students to have a better understanding of the relationships between units, they need to use measuring tools in class. The number of units must relate to the size of the unit. For example, students have discovered that there are 12 inches in 1 foot and 3 feet in 1 yard. This understanding is needed to convert inches to yards. Using 12-inch rulers and yardsticks, students can see that three of the 12-inch rulers are equivalent to one yardstick (3 × 12 inches = 36 inches; 36 inches = 1 yard). Using this knowledge, students can decide whether to multiply or divide when making conversions. Once students have an understanding of the relationships between units and how to do conversions, they are ready to solve multi-step problems that require conversions within the same system. Allow students to discuss methods used in solving the problems. Begin with problems that allow for renaming the units to represent the solution before using problems that require renaming to find the solution.	

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Common Core Standard: 5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

Key Vocabulary: line plot, length, mass, liquid volume, fraction of a unit (1/2, 1/4, 1/8), add, subtract, multiply, mean

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How can I create a line plot to display measurement data in fractions?	□ Make sense of problems and persevere in solving them. □ Reason abstractly and quantitatively. □ Construct viable arguments and critique the reasoning of others. **x Model with mathematics.** □ Use appropriate tools strategically. □ Attend to precision. **x Look for and make use of structure.** □ Look for and express regularity in repeated reasoning.	**I can…..** -make a line plot to show data in fractions of a unit, and solve word problems with the line plot using +, -, x, ÷ of fractions **I will…..** -create line plots to the nearest 1/2, 1/4, 1/8.	Conduct a survey to compile data. Use a line plot to show results of a survey. Students create a line plot displaying a set of measurements in fractions of a unit supporting it with illustrations and text. Students use cookie recipes to plot amount of salt required by recipes on line plots. Using displayed data from recipes, students calculate the total amount of salt needed for all recipes or the average amount of salt used by the recipes. Students record the equations used to solve the problems in math journals.	Am I A Square? A Land of Climate Diversity **Integrates Science 5.E.1 Frogs in Flight

			Students complete investigations using dry measures and line plots. Using cards with given fractional units of cups (e.g., 1/4, 1/8, 1/2), students fill individual measuring containers with specified amounts of rice. Students display containers and plot data on class line plots. Students calculate to determine the total amount of rice and the average amount in containers if rice was redistributed equally into containers. Students check calculations for accuracy, pouring rice into original containers and pouring average amounts into individual containers. Using a line plot to solve problems involving operations with unit fractions now includes multiplication and division. Revisit using a number line to solve multiplication and division problems with whole numbers. In addition to knowing how to use a number line to solve problems, students also need to know which operation to use to solve problems. Use the tables for common addition and subtraction, and multiplication and division situations as a guide to the types of problems students need to solve without specifying the type of problem. Allow students to share methods used to solve the problems. Also have students create problems to show their understanding of the meaning of each operation.	

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Common Core Standard: 5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

a. 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.
b. 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.

Key Vocabulary: measurement, attribute, volume, solid figure, right rectangular prism, unit, unit cube, gap, overlap, cubic units, cubic cm (cm^3), cubic (in^3), cubic foot (ft^3), nonstandard cubic units, multiplication, addition, edge lengths, height, area of base, 3-dimensional figures, decompose, exponent, area, a=l x w, v=l x w x h, v=b x h

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How can I use unit cubes to model the volume of a solid?	□ Make sense of problems and persevere in solving them. **x Reason abstractly and quantitatively.** □ Construct viable arguments and critique the reasoning of others. **x Model with mathematics.** **x Use appropriate tools strategically.** **x Attend to precision.** **x Look for and make use of structure.** □ Look for and express regularity in repeated reasoning.	**I can…..** -recognize volume as an attribute of solid figures. -understand cubic units measurement. **I will…..** -define volume. -identify measurement used with volume.	Students measure varieties of unit cubes including 1-centimeter, 1-inch, and 1-foot cubes with rulers. Students measure lengths, widths, and heights and multiply the values of all three dimensions to determine volumes of cubes. Students discuss the use of the unit cubes in determining volume of solid figures. Students make open rectangular prisms from nets that measure 6 inches by 3 inches by 2 inches. Students use 'l-inch cubes to fill containers. Students remove and count the number of cubes used to determine the volume. Students identify volume in terms of cubic inches.	Volume Nets

			Provide students with opportunities to find the volume of rectangular prisms by counting unit cubes, in metric and standard units of measure, before the formula is presented. Multiple opportunities are needed for students to develop the formula for the volume of a rectangular prism with activities similar to the one described below. Give students one block (a 1- or 2- cubic centimeter or cubic-inch cube), a ruler with the appropriate measure based on the type of cube, and a small rectangular box. Ask students to determine the number of cubes needed to fill the box. Have students share their strategies with the class using words, drawings or numbers. Allow them to confirm the volume of the box by filling the box with cubes of the same size.	

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Common Core Standard: 5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

Key Vocabulary: measurement, attribute, volume, solid figure, right rectangular prism, unit, unit cube, gap, overlap, cubic units, cubic cm (cm^3), cubic (in^3), cubic foot (ft^3), nonstandard cubic units, multiplication, addition, edge lengths, height, area of base, 3-dimensional figures, decompose, exponent, area, a=l x w, v=l x w x h, v=b x h

Essential Question	Suggested Mathematical Practices	Student Outcomes	Suggested Activities	Materials Needed Websites
How can I use unit cubes to measure the volume of a solid?	☐ Make sense of problems and persevere in solving them. **x Reason abstractly and quantitatively.** ☐ Construct viable arguments and critique the reasoning of others. **x Model with mathematics.** **x Use appropriate tools strategically.** **x Attend to precision.** **x Look for and make use of structure.** ☐ Look for and express regularity in repeated reasoning.	**I can…..** -explain measuring volumes using cubic cm, cubic in, and cubic ft. **I will…..** - use concrete manipulatives to measure volume in cubic inches, centimeters and feet.	Students use 1-centimeter counting cubes or cubes from a base-ten block set to calculate the volume of a variety of small rectangular containers. Students use t-inch cubes to calculate the volume of a variety of medium-sized rectangular containers. Students label measures in cubic units (e.g., cubic cm, cubic in., cubic ft). By stacking geometric solids with cubic units in layers, students can begin understanding the concept of how *addition plays a part in finding volume*. This will lead to an understanding of the formula for the volume of a right rectangular prism, b x h, where b is the area of the base. A right rectangular prism has three pairs of parallel faces that are all rectangles.	Cubes

			Have students build a prism in layers. Then, have students determine the number of cubes in the bottom layer and share their strategies. Students should use multiplication based on their knowledge of arrays and its use in multiplying two whole numbers. Ask what strategies can be used to determine the volume of the prism based on the number of cubes in the bottom layer. Expect responses such as ―adding the same number of cubes in each layer as were on the bottom layer or multiply the number of cubes in one layer times the number of layers.	