Delaware Department of Education

# Grade 6 The Number System
# Sample Unit Plan

This instructional unit guide was designed by a team of Delaware educators in order to provide a sample unit guide for teachers to use. This unit guide references some textbook resources used by schools represented on the team. This guide should serve as a complement to district curriculum resources.

## Unit Overview

In this unit students apply and extend previous understandings of whole numbers to the system of rational numbers. Students are introduced to negative numbers and start to understand the relationship between fractions, decimals, and percents. They will perform mathematical operations on fractions and decimals and apply this knowledge to real world situations. Students will also use all four quadrants of the coordinate plane for the first time, and apply understanding of absolute value to find distances between points. Students develop an understanding that there are infinitely many numbers between two rational numbers on the number line.

This unit serves as a building block for Algebra. The unit consists of two parts:

- representing, locating, and comparing rational numbers on number lines and coordinate planes; and
- equivalency as well as the computation of fractions and decimals using all four operations.

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# The Design Process

The writing team followed the principles of Understanding by Design (Wiggins & McTighe, 2005) to guide the unit development. As the team unpacked the content standards for the unit, they considered the following:

**Stage 1: Desired Results**

- What long-term transfer goals are targeted?
- What meanings should students make? What essential questions will students explore?
- What knowledge and skill will students acquire?

**Stage 2: Assessment Evidence**

- What evidence must be collected and assessed, given the desired results defined in stage one?
- What is evidence of understanding (as opposed to recall)?

**Stage 3: The Learning Plan**

- What activities, experiences, and lessons will lead to achievement of the desired results and success at the assessments?
- How will the learning plan help students of Acquisition, Meaning Making, and Transfer?
- How will the unit be sequenced and differentiated to optimize achievement for all learners?

The writing team incorporated components of the Learning-Focused (LFS) model, including the learning map, and a modified version of the K-U-D.

The team also reviewed and evaluated the textbook resources they use in the classroom based on an alignment to the content standard for a given set of lessons. The intention is for a teacher to see what supplements may be needed to support instruction of those content standards. A list of open educational resources (OERs) are also listed with each lesson guide.

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# Content and Practice Standards
## Transfer Goals (Standards for Mathematical Practice)

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

## Content Standards

**6.NS.A Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

**6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples.**

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

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

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

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6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

6.NS.C.6a Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
6.NS.C.6b Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
6.NS.C.6c Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

6.NS.C.7a Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
6.NS.C.7b Write, interpret, and explain statements of order for rational numbers in real-world contexts.
6.NS.C.7c Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
6.NS.C.7d Distinguish comparisons of absolute value from statements about order.

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

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# Enduring Understandings & Essential Questions

| Enduring Understanding | Unit Essential Question(s) |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ1. How do rational numbers extend the number system?<br><br>EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems?<br><br>EQ3. How can we represent and identify rational numbers in various forms (including numerical representations, number line, tape diagram pictorial representation, etc.) and how can we apply these representations to real-world scenarios?<br><br>EQ4. How can we show equivalency among rational numbers, and decide which representation would be the most efficient for application?<br><br>EQ5: How can we locate and name points in the coordinate plane?<br><br>EQ6: How can we use absolute value to find horizontal and vertical distances on the number line, coordinate plane or in the real world? |
| **Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms. | EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real-world problems? |

***Enduring understandings and essential questions adapted from NCTM Enduring Understandings**

Source: Chval, K., Lannin, J. & Jones, D. (2013). Putting essential understanding of fractions into practice in grades 3-5. Reston, VA: The National Council of Teachers of Mathematics, Inc.

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# Acquisition

**Part I: Rational Numbers, Number Lines and Coordinate Plane**

| Conceptual Understandings (Know/Understand) | Procedural Fluency (Do) | Application (Apply) |
|---|---|---|
| Identify an integer and its opposite.<br><br>Understand that positive and negative numbers are used to describe amounts having opposite values.<br><br>Explain how 0 relates to a situation represented by integers.<br><br>Recognize opposite signs of numbers as locations on opposite sides of 0 on the number line.<br><br>Understand that absolute value is the number's distance from 0 on the number line.<br><br>Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane.<br><br>Interpret statements of inequality as statements about relative position of two numbers on a number line diagram. | Compare and order integers.<br><br>Find and position integers and other rational numbers on a horizontal or vertical number line diagram.<br><br>Find and position pairs of integers and other rational numbers on a coordinate plane.<br><br>Order rational numbers on a number line.<br><br>Find the absolute value of rational numbers.<br><br>Describe the distance between two numbers (positive or negative) on a number line.<br><br>Differentiate between comparing absolute values and ordering positive and negative numbers.<br><br>Determine the distance between points in the same first coordinate or the same second coordinate.<br><br>Given only coordinates, calculate the distances between two points with the same first coordinate or the same second coordinate using absolute value. | Use positive and negative numbers to represent quantities in real-world contexts.<br><br>Explain what rational numbers mean in real-world situations.<br><br>Interpret absolute value as magnitude for a positive or negative quantity in a real-world context.<br><br>Represent information from real-world contexts with a number line.<br><br>Use absolute value to find distances between two points with the same *x*-coordinate or the same *y*-coordinate to solve real-world problems.<br><br>Solve real-world problems by graphing points in all four quadrants of a coordinate plane.<br><br>Find the length of polygons in the coordinate plane given the same *x*-coordinates or the same *y*-coordinates to solve real-world problems.<br><br>Explain a solution in the context of the problem. |

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**Part II: Operations with Rational Numbers**

| Conceptual Understandings (Know/Understand) | Procedural Fluency (Do) | Application (Apply) |
|---|---|---|
| Distinguish between factors and multiples.<br><br>Interpret quotients as fractions.<br><br>Understand the processes of distributing and factoring. | Find the greatest common factor of two whole numbers less than or equal to 100.<br><br>Find the least common multiple of two whole numbers less than or equal to 12.<br><br>Compute quotients of fractions divided by fractions (including mixed numbers).<br><br>Apply the distributive property to numerical expressions.<br><br>Divide multi-digit numbers.<br><br>Add, subtract, multiply and divide multi-digit numbers involving decimals. | Identify the greatest common factor of a set of numbers to apply the order of operations to fractions.<br><br>Solve real-world and mathematical problems with division of fractions.<br><br>Use problem-solving strategies with any type of division (equal sharing, measurement, and unknown factor).<br><br>Interpret the meaning of the quotient in context.<br><br>Apply multi-digit division to solve real-world problems.<br><br>Solve real-world problems with decimals (for example, money and distance). |

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# Reach Back/Reach Ahead Standards

How does this unit relate to the progression of learning? What prior learning do the standards in this build upon? How does this unit connect to essential understandings of later content in this course and in future courses? The table below outlines key standards from previous and future courses that connect with this instructional unit of study.

| Reach Back | Reach Ahead |
|---|---|
| Understanding of equivalent fractions (4.NF.A.1)<br><br>Extend knowledge of multiplication and division (5.NF.B.3)<br><br>Conversions between mixed numbers and improper fractions (4.NF.B.3)<br><br>Fraction models and representations (4.NF.A.2 & 5.NF.B.6)<br><br>Multiplying and dividing with unit fractions (5.NF.B.4 & 5.NF.B.7.A)<br><br>Factors and multiples to help solve fraction operations (4.OA.B.4)<br><br>Operations with whole numbers (4.OA.A)<br><br>Operations with fractions (adding, subtracting, and multiplication) using benchmarks (5.NF.A.2)<br><br>Using a number line to plot whole numbers, fractions, and decimals (3.NF.A.2)<br><br>Understanding the place value system (4.NBT.A.1)<br><br>Use equivalent fractions as a strategy for addition and subtraction. (5.NF.A.1)<br><br>Graph points on the coordinate plane in the first quadrant (5.G.A.2) | **7th grade:**<br>Add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram (7.NS.A.1)<br>http://www.corestandards.org/Math/Content/7/NS/A/2/<br>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers (7.NS.A.2)<br><br>Solve real-world and mathematical problems involving the four operations with rational numbers (7.NS.A.3)<br><br>**8th grade:**<br>Know that there are numbers that are not rational, and approximate them by rational numbers (8.NS.A.1)<br><br>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line (8.NS.A.2)<br><br>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system and in a right triangle (8.G.B.7) |

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| | |
|---|---|
| Use estimation strategies and benchmarks to reason through problems (5.NF.A.2)<br><br>Compare decimals (4.NF.C.7)<br><br>Compare fractions (4.NF.A.2)<br><br>Perform operations with multi-digit whole numbers and with decimals to the hundredths. (5.NBT.B.5) | **High School:**<br>Extend knowledge to understand properties of sums or products of irrational numbers (RN.B.3)<br><br>Extend knowledge to apply rational, non-integer exponents (RN.A.1) |

## Common Misunderstandings

- Students may have difficulty ordering negative numbers due to thinking that the "larger" numeral is the number representing the greatest quantity.
- Students may mistake absolute value for the opposite of a number rather than the distance from zero.
- Students may confuse the *x*- and *y*-axis when plotting coordinates.
- Students may have difficulty representing and interpreting fractions and mixed numbers.
    - Students may misunderstand that a whole number has a denominator of 1.
    - Students may misinterpret how to convert a mixed number to an improper fraction and an improper fraction to a mixed number.
    - Students may think the 'bigger number' is always the denominator.
- Students may have difficulty in finding LCMs and GCFs. They may misunderstand when to apply LCM and when to apply GCF to solve a problem.
- Students may have difficulty writing and performing operations with decimals. Misunderstandings may include:
    - Students may think that 3/4 is 3.4 in decimal form.
    - Students may misplace the decimal point when representing the product or quotient of decimals.
- Students may reveal misconceptions as they perform operations with rational numbers.
    - Students may confuse reciprocals with opposites.
    - Students may think a common denominator is needed when multiplying fractions.
    - Students may apply the wrong rules to operations with fractions. For example, when adding fractions, students may add the numerators and denominators straight across, similar to multiplying fractions.
    - Students may try to use cross multiplication to multiply fractions.
    - Students may misinterpret standard measure lengths when converting into fraction or decimal form.

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# Grade 6 Smarter Balanced Blueprints

**Mathematics Summative Assessment Blueprint**
As of 02/09/15

| Target Sampling Mathematics Grade 6 | | | | | | |
|---|---|---|---|---|---|---|
| Claim | Content Category | Assessment Targets | DOK | Items | | Total Items |
| | | | | CAT | PT | |
| 1. Concepts and Procedures | Priority Cluster | E. Apply and extend previous understandings of arithmetic to algebraic expressions. | 1 | 5-6 | 0 | 16-19 |
| | | F. Reason about and solve one-variable equations and inequalities. | 1, 2 | | | |
| | | A. Understand ratio concepts and use ratio reasoning to solve problems. | 1, 2 | 3-4 | | |
| | | G. Represent and analyze quantitative relationships between dependent and independent variables. | 2 | 2 | | |
| | | B. Apply and extend previous understandings of multiplication and division to divide fractions by fractions. | 1, 2 | | | |
| | | D. Apply and extend previous understandings of numbers to the system of rational numbers. | 1, 2 | 2 | | |
| | Supporting Cluster | C. Compute fluently with multi-digit numbers and find common factors and multiples. | 1, 2 | 4-5 | | |
| | | H. Solve real-world and mathematical problems involving area, surface area, and volume. | 1, 2 | | | |
| | | I. Develop understanding of statistical variability. | 2 | | | |
| | | J. Summarize and describe distributions. | 1, 2 | | | |

| Target Sampling Mathematics Grade 6 | | | | | | |
|---|---|---|---|---|---|---|
| Claim | Content Category | Assessment Targets | DOK | Items | | Total Items |
| | | | | CAT | PT | |
| 2. Problem Solving<br>4. Modeling and Data Analysis | Problem Solving (drawn across content domains) | A. Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace. | 2, 3 | 2 | 1–2 | 8-10 |
| | | B. Select and use appropriate tools strategically.<br>C. Interpret results in the context of a situation.<br>D. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas). | 1, 2, 3 | 1 | | |
| | Modeling and Data Analysis (drawn across content domains) | A. Apply mathematics to solve problems arising in everyday life, society, and the workplace.<br>D. Interpret results in the context of a situation. | 2, 3 | 1 | 1–3 | |
| | | B. Construct, autonomously, chains of reasoning to justify mathematical models used, interpretations made, and solutions proposed for a complex problem.<br>E. Analyze the adequacy of and make improvements to an existing model or develop a mathematical model of a real phenomenon. | 2, 3, 4 | 1 | | |
| | | C. State logical assumptions being used.<br>F. Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flow charts, or formulas). | 1, 2, 3 | 1 | | |
| | | G. Identify, analyze, and synthesize relevant external resources to pose or solve problems. | 3, 4 | 0 | | |
| 3. Communicating Reasoning | Communicating Reasoning (drawn across content domains) | A. Test propositions or conjectures with specific examples.<br>D. Use the technique of breaking an argument into cases. | 2, 3 | 3 | 0-2 | 8-10 |
| | | B. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.<br>E. Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in the argument—explain what it is. | 2, 3, 4 | 3 | | |
| | | C. State logical assumptions being used.<br>F. Base arguments on concrete referents such as objects, drawings, diagrams, and actions.<br>G. At later grades, determine conditions under which an argument does and does not apply. (For example, area increases with perimeter for squares, but not for all plane figures.) | 2, 3 | 2 | | |

Available at https://portal.smarterbalanced.org/library/en/mathematics-summative-assessment-blueprint.pdf

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# Assessment Evidence

**Evidence Required (**6.NS.A)

- The student interprets quotients of fractions using visual fraction models, equations, and the relationship between multiplication and division.
- The student solves real-world and mathematical one-step problems involving division of fractions by fractions.

**Evidence Required (**6.NS.B)

- The student divides multi-digit numbers.
  A multi-digit dividend should have at least 4 digits.
  A multi-digit divisor should have at least 2 digits.
- The student adds, subtracts, multiplies, and divides multi-digit decimals.
  A multi-digit decimal can be to the thousandths.
- The student determines the greatest common factor of two whole numbers.
  The greatest common factor must be of two whole numbers less than or equal to 100.
- The student determines the least common multiple of two whole numbers.
  The least common multiple must be of two whole numbers less than or equal to 12.
- The student uses the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers with no common factor.
  When using the distributive property to express a sum of two whole numbers, the whole numbers must be 1–100.

**Claim Targets**

- Select and use appropriate tools strategically.
- Interpret results in the context of a situation.
- Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
- State logical assumptions being used.

**Smarter Samples:**
**2014 SBAC Math Scoring Guide (Links to an external site.): Questions 2, 4, 8, 9, 14, 17**

**Illustrative Mathematics Samples:**
**6.NS.A.1**
**Cup of Rice:** Students must first add fractions with unlike denominators, which is a skill developed in the 5th grade. Then, students need to divide fractions by fractions and interpret and compute quotients of fractions.
**Baking Cookies:** Students must first add fractions with unlike denominators, which is a skill developed in the 5th grade. Then, students need to divide fractions by fractions and interpret and compute quotients of fractions.

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**How Many Containers in One Cup/Cups in One Container?**: These two fraction division tasks use the same context and ask “How much in one group?” but require students to divide the fractions in the opposite order.
**Making Hot Cocoa, Variation 1**: This is the first of two fraction division tasks that use similar contexts to highlight the difference between the “Number of Groups Unknown” a.k.a. “How many groups?” when the quotient is a fraction.
**Making Hot Cocoa, Variation 2**: This is the second of two fraction division tasks that use similar contexts to highlight the difference between the “Number of Groups Unknown” a.k.a. “How many groups?” when the quotient is a fraction (or mixed number) greater than 1.
**Video Game Credits:** This task could be used in instructional activities designed to build the understanding of fraction division, and it could be used to develop knowledge of the common denominator approach.
**Dan's Division Strategy**: The purpose of this task is to help students explore the meaning of fraction division and to connect it to what they know about whole-number division.
**Running to School, Variation 3**: The purpose of this task is to help students extend their understanding of division of whole numbers to division of fractions.
**Traffic Jam**: It is much easier to visualize division of fraction problems with contexts where the quantities involved are continuous. It makes sense to talk about a fraction of an hour.
**How many are in ...?**: This instructional task requires that the students model each problem with some type of fractions manipulatives or drawings

**6.NS.B.2**
**How Many Staples?**: The goal of this task is to perform long division with remainder in a context. The teacher will likely need to provide multiple levels of support on this question
**Batting Average:** The goal of this task is to perform and analyze division with whole numbers in a sports context. Students can use a trial and error strategy using a table of equivalent fractions with decimal 0.350. This requires looking for fractions whose decimal expansion is 0.350
**Interpreting a Division Computation**: Students are expected to decompose a division problem.

**6.NS.B.3**
**Buying Gas**: This task involves finding the cost of 1 gallon of gas (dividing decimals) but can also tie in with unit rate.
**Jayden's Snacks:** This is a two step problem that involves adding and subtracting decimals. Students have to know that 79 cents is written as 0.79.
**Reasoning about Multiplication and Division and Place Value, Part II**

**6.NS.3**
**Movie Tickets:** The purpose of this task is for students to solve problems involving decimals in a context involving a concept that supports financial literacy, namely inflation.
**Gifts from Grandma, Variation 3:** The purpose of this task is to show three problems that are set in the same kind of context, but the first is a straightforward multiplication problem while the other two are the corresponding "How many groups?" and "How many in each group?" division problems.

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**Pennies to Heaven:** This task can be made more hands-on by asking the students to determine about how many pennies are needed to make a stack one inch high.

**Setting Goals**: The purpose of this task is for students to solve problems involving division of decimals in the real-world context of setting financial goals.

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# The Learning Plan: LFS Student Learning Maps

## Part I: Rational Numbers, Number Lines and Coordinate Plane

**Key Learning 1:**
**Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.
**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.
**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms.

**Unit Essential Questions:**

EQ1. How do rational numbers extend the number system?
EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems?
EQ3. How can we represent and identify rational numbers in various forms (including numerical representations, number line, tape diagram pictorial representation, etc.) and how can we apply these representations to real-world scenarios?
EQ4. How can we show equivalency among rational numbers, and decide which representation would be the most efficient for application?
EQ5. How can we locate and name points in the coordinate plane?
EQ6. How can we use absolute value to find horizontal and vertical distances on the number line, coordinate plane or in the real world?

| **Concept:** Classifying, Ordering, and Comparing Rational Numbers | **Concept:** Applying Rational Numbers to Number Lines and the Coordinate Plane | **Concept:** Equivalent Rational Numbers and Applications |
|---|---|---|
| **LEQ:**<br>How can we identify integers and their opposites?<br><br>How can we classify rational numbers?<br><br>How do we determine least and greatest in a contextual situation? | **LEQ:**<br>How can we use a number line to compare and order integers?<br><br>How do we determine the position of a rational number on the number line?<br>How can we find and use absolute value?<br><br>How do I solve real-world and mathematical problems using the coordinate plane?<br><br>How do I use absolute value to calculate distance between two points on the coordinate plane? | **LEQ:**<br>How can we write or represent a rational number in various ways?<br><br>How can we identify equivalent rational numbers in fraction and decimal form?<br><br>How can we use rational numbers to solve real-world problems? |
| **Vocabulary:**<br>• Integers<br>• Inequality<br>• Absolute value<br>• Negative<br>• Positive<br>• Fraction<br>• Decimal | **Vocabulary:**<br>• Absolute value<br>• Opposites<br>• Number line<br>• Negative<br>• Positive | **Vocabulary:**<br>• Equivalent<br>• Fraction<br>• Decimal |

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## Part II: Operations with Rational Numbers

**Key Learning 2:**
**Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms.

**Unit Essential Questions:**

EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real world problems?

| **Concept:** Factors and Multiples | **Concept:** Fraction Operations | **Concept:** Decimal Operations |
|---|---|---|
| **LEQ:**<br>How can we find the greatest common factor (GCF) of two whole numbers less than or equal to 100?<br><br>How can we find the least common multiple of two whole numbers less than or equal to 12<br><br>How can we use factors to demonstrate the distributive property?<br><br>How do we solve real-world problems using greatest common factor and least common multiple? | **LEQ:**<br>How can we multiply all variations of fractions including whole numbers, fractions, and mixed numbers?<br><br>What strategies help us divide a fraction by a fraction?<br><br>What strategies help us divide a whole number or a mixed number by a fraction?<br><br>What strategies help us divide a fraction by a whole number?<br><br>How do we interpret and compute quotients of fractions by using visual fraction models and equations? | **LEQ:**<br>How do we use place value to add two given decimal numbers?<br><br>How do we subtract one decimal number from another?<br><br>How do we use estimation to place the decimal in a product of any two decimal numbers?<br><br>What algorithm can be used to find any decimal quotient? |
| **Vocabulary:**<br>• Factor<br>• Divisor<br>• Multiple<br>• Quotient<br>• Product<br>• Area<br>• Greatest common factor (GCF)<br>• Least common multiple (LCM)<br>• Prime<br>• Composite<br>• Distributive property | **Vocabulary:**<br>• Sum<br>• Difference<br>• Quotient<br>• Product<br>• Improper fraction<br>• Mixed number<br>• Reciprocal<br>• Simplest form<br>• Benchmarks<br>• Number sentence<br>• Numerator<br>• Denominator<br>• Algorithm<br>• Equation | **Vocabulary:**<br>• Sum<br>• Difference<br>• Product<br>• Quotient<br>• Dividend<br>• Divisor<br>• Place value<br>• Number sentence<br>• Algorithm<br>• Estimate |

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# Unit at a Glance

**Note: This is a suggested guideline for pacing of this set of standards. Add in days for remediation, extra practice or assessment as needed.**

| Day(s) | Key Ideas |
|---|---|
| | **Part I: Rational Numbers, Number Lines and Coordinate Plane** |
| **6** | Classifying and Ordering Integers<br>● I can identify integers and their opposites. (6.NS.C.5)<br>● I can use a number line to compare and order integers. (6.NS.C.6)<br>● I can find and use absolute value. (6.NS.C.7)<br>● I can identify vocabulary associated with positive and negative numbers. (6.NS.C.7c) |
| **3** | Applying Integers to the Coordinate Plane<br>● I can plot points in all four quadrants and determine the distance between points. (6.NS.C.8)<br>● I can draw polygons in the coordinate plane using given coordinates and use coordinates to find the length of a side. (6.G.A.3) |
| **1** | Assessment |
| **6** | Classifying, Ordering and Comparing Rational Numbers<br>● I can classify rational numbers. (6.NS.C.5)<br>● I can determine the position of a rational number on the number line. (6.NS.C.5, 6.NS.C.6c)<br>● I can determine least and greatest in a contextual situation. (6.NS.C.7)<br>● I can identify the opposite and absolute value of rational numbers using a number line. (6.NS.C.7, 6.NS.C.5) |
| **3** | Equivalent Rational Numbers and Applications<br>● I can write or represent a rational number in various ways. (6.NS.C.6)<br>● I can identify equivalent rational numbers in fraction and decimal form. (6.NS.C.6)<br>● I can use rational numbers to solve real-world problems. (6.NS.C.7b) |
| **1** | Assessment |

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| Part II: Operations with Rational Numbers | |
|---|---|
| **6** | Factors and Multiples<br>● I can find all of the factors (or divisors) of a number. (6.NS.B.4)<br>● I can use factors to demonstrate the distributive property. (6.NS.B.4)<br>● I can solve real-world problems using greatest common factor and least common multiple. (6.NS.B.4) |
| **10** | Fraction Operations<br>● I can multiply all variations of fractions including whole numbers, fractions, and mixed numbers. (6.NS.A.1)<br>● I can divide a fraction by a fraction. (6.NS.A.1)<br>● I can divide a whole number or a mixed number by a fraction. (6.NS.A.1)<br>● I can divide a fraction by a whole number. (6.NS.A.1)<br>● I can interpret and compute quotients of fractions by using visual fraction models and equations. (6.NS.A.1) |
| **2** | Assessment |
| **7** | Decimal Operations<br>● I can use place value to add two given decimal numbers. 6.ns.b.3<br>● I can subtract one decimal number from another. 6.ns.b.3<br>● I can add, subtract, multiply, and divide multi-digit decimals 6.ns.b.3<br>● I can use estimation to place the decimal in a product of any two decimal numbers.6.ns.b.3<br>● I can determine what algorithm I should use to find any decimal quotient.6.ns.b.3 |
| **2** | Summative Assessment |

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# Part I: Rational Numbers, Number Lines and Coordinate Plane
# Days 1-6: Classifying and Ordering Integers

**Learning Targets:**

- I can identify integers and their opposites.
- I can use a number line to compare and order integers.
- I can find and use absolute value.
- I can identify vocabulary associated with positive and negative numbers.

**Linked Content Standards:**

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

> 6.NS.C.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
> 6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
> 6.NS.C.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

> 6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
> 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
> 6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.

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6.NS.C.7d. Distinguish comparisons of absolute value from statements about order.

**Mathematical Practices:**

- MP.6 Attend to Precision
- MP.7 Look for and make use of structure

**Instructional Notes:**

- As students build understanding of positive and negative integers, reinforce concepts of distance and location on number lines.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ1. How do rational numbers extend the number system?<br><br>EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems? |

**LEQs:**

- How can we identify integers and their opposites?
- How can we use a number line to compare and order integers?
- How can we find and use absolute value?

**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| **Section(s)** | **Unit 1 Module 1 Lessons 1.1-1.3** | **Module 3: Topic A,B, C** | **Chapter 5 Lessons 1, 2, & 3** | **Bits and Pieces 1 Investigations 1, 2, 3, 4** | **Comparing Bits and Pieces: 3.1 and 3.2** |

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| | | | | | |
|---|---|---|---|---|---|
| **Strength of Alignment** | **Strongly Aligned** | **Strongly aligned** | **Strongly aligned** | **Aligned** | **Aligned** |

**Sample Lesson Activities/Resources:**
**6.NS.C.5**
**http://illuminations.nctm.org/Lesson.aspx?id=3041:** This link gives directions for a game that focuses on adding integers by using playing cards. This can be used as a launch for this lesson to engage students.

**Partner Activity:** Give students a list of words that are commonly used with positive and negative integers, such as gain/loss, up/down, above/below, and increase/decrease. Ask them to write two situations using each pair of words and an integer, such as 2 *steps up* and 4 *steps down*. Have them trade situations with a partner and write the integer for each situation. (Glencoe Math Course 1, alternate activity from online "Plan and Present" Lesson 5.1)

**Round robin:** Have students participate by standing/sitting in a circle to generate real-world situations that can be represented by negative integers (losses, below, etc.). One student generates the real-world situation, the next student identifies the integer, and the next student locates the integer on a number line. Repeat as time allows. (Glencoe Math Course 1, alternate activity from online "Plan and Present" Lesson 5.1)

(Glencoe Math Course 1, Ch5 L1, page 344, McGraw Hill, 2015)

**6.NS.C.6**
**https://www.illustrativemathematics.org/content-standards/NS/6/C/6/tasks/1665**: This link takes you to a task that extends the number line to include negative integers.

**https://www.illustrativemathematics.org/content-standards/tasks/283**: This link takes you to a task that practices placing integers on a number line and comparing integers using greater than and less than.

**https://www.illustrativemathematics.org/content-standards/NS/6/C/6/tasks/20**: This link takes you to a task that practices placing integers on a number line.

Glencoe Math Course 1, pg 370)

Think Smarter for the Smarter Balanced Assessments, McGraw Hill, 2015

**6.NS.C.7**
**https://www.illustrativemathematics.org/content-standards/6/NS/C/7/tasks/286**: This link

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takes you to a task that uses a number line to introduce absolute value to students.

**6.NS.C.6.c**
**https://www.illustrativemathematics.org/content-standards/6/NS/C/8/tasks/2221**: This link takes you to a task that has students use a coordinate graph to evaluate temperature change.

Think Smarter for the Smarter Balanced Assessments, McGraw Hill, 2015

Glencoe Math Course 1, McGraw Hill, 2015

**Smarter Interims:** (To view items, log into IMS, select DeSSA/DCAS, Smarter ELA/Math, then Assessment Viewing Application)
6th Grade IAB NS Sample Smarter Balanced Questions #2,5,10
6th Grade ICA Sample Smarter Balanced Questions #2, 3, 6, 29

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## Days 7-9: The Coordinate Plane

**Learning Targets:**

- I can plot points in all four quadrants and determine the distance between points.
- I can draw polygons in the coordinate plane using given coordinates and use coordinates to find the length of a side.

**Linked Content Standards:**

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

**Mathematical Practices:**

- MP.6 Attend to Precision
- MP.7 Look for and make use of structure

**Instructional Notes:**

- Extend student understanding of number lines to the coordinate plane.
- Activate prior understanding of plotting points in Quadrant I to all quadrants.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit. | EQ5: How can we locate and name points in the coordinate plane?<br><br>EQ6: How can we use absolute value to find horizontal and vertical distances on the number line, coordinate plane or in the real world? |

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| | |
|---|---|
| **Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | |

**LEQs:**

- How do I solve real-world and mathematical problems using the coordinate plane?
- How do I use absolute value to calculate the distance between two points on the coordinate plane?

**Text Alignment:**

| **Text** | **GoMath (2014)** | **Eureka Math (2015)** | **Glencoe Math Course 1 (2015)** | **Connected Mathematics (CMP2,2006)** | **Connected Mathematics (CMP3,2014)** |
|---|---|---|---|---|---|
| **Section(s)** | Unit 1 Module 1 Lessons 1.1-1.3 | Module 3: Topic A,B, C | Chapter 5 Lessons 1, 2, & 3 | Accentuate the Negative Problem 2.5 (6.NS.C8)<br><br>Looking for Pythagoras 1.1 (6.GA.3) | Covering and Surrounding Investigation 3 (6.G.A.3)<br><br>Covering and Surrounding: Inv. 1 Variables and Patterns: Inv. 1, 2, 4 (6.NS.C8) |
| **Strength of Alignment** | **Strongly Aligned** | **Strongly aligned** | **Strongly aligned** | **Aligned** | **Aligned** |

**Sample Lesson Activities/Resources:**
**Khan Academy:**
**https://www.khanacademy.org/math/geometry-home/geometry-coordinate-plane**: Provides independent practice and instructional videos for coordinate plane, starting with quadrant one and extending to four quadrants.

**Smarter Interims:** (To view items, log into IMS, select DeSSA/DCAS, Smarter ELA/Math, then Assessment Viewing Application)
6th Grade IAB NS Sample Smarter Balanced Questions #2, 5,10
6th Grade ICA Sample Smarter Balanced Questions #2, 3, 6, 29

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## Day 10: Assessment

**Learning Target:**

- I can identify integers and their opposites.
- I can use a number line to compare and order integers.
- I can find and use absolute value.
- I can identify vocabulary associated with positive and negative numbers.
- I can plot points in all four quadrants and determine the distance between points.
- I can draw polygons in the coordinate plane using given coordinates and use coordinates to find the length of a side.

**Linked Content Standards:**

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

> 6.NS.C.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
>
> 6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
>
> 6.NS.C.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

> 6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
>
> 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
>
> 6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative

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quantity in a real-world situation.

6.NS.C.7d. Distinguish comparisons of absolute value from statements about order.

**Mathematical Practices:**

- MP.6 Attend to Precision
- MP.7 Look for and make use of structure

**Instructional Notes:**

- Ensure that the assessment includes a balance of questions that assess conceptual understanding, procedural fluency, and application.

| Enduring Understandings | Unit Essential Questions |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ1. How do rational numbers extend the number system?<br><br>EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems?<br><br>EQ5: How can we locate and name points in the coordinate plane?<br><br>EQ6: How can we use absolute value to find horizontal and vertical distances on the number line, coordinate plane or in the real world? |

**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| **Section(s)** | Module 1 Quiz | Module 3 Quiz | ThinkSmarter for the Smarter Balanced Assessment (Glencoe, 2015) Item bank Ch5 | Check-Up (Assessment) | Check-Up (Assessment) |

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| | | | | | |
|---|---|---|---|---|---|
| **Strength of Alignment** | **Aligned** | **Strongly aligned** | **Aligned** | **aligned** | **Aligned** |

**Sample Lesson Activities/Resources:**
https://educators.brainpop.com/bp-topic/coordinate-plane/
Online games, activities and lesson links

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## Days 11-16: Classifying, Ordering, and Comparing Rational Numbers

**Learning Targets:**

- I can classify rational numbers.
- I can determine the position of a rational number on the number line.
- I can determine least and greatest in a contextual situation.
- I can identify the opposite and absolute value of rational numbers using a number line.

**Linked Content Standards:**

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

> 6.NS.C.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
>
> 6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
>
> 6.NS.C.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

> 6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
>
> 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
>
> 6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.

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6.NS.C.7d. Distinguish comparisons of absolute value from statements about order.

**Mathematical Practices:**

- MP.6 Attend to precision
- MP.3 Construct viable arguments and critique the reasoning of others
- MP.2 Reason abstractly and quantitatively
- MP.1 Make sense of problems and persevere in solving them

**Instructional Notes:**

- Extend the number line to help students understand that rational numbers include whole numbers, integers, and numbers that can be written as a fraction. It may be helpful to preview the concept of irrational numbers, but emphasize that students will explore these numbers in more depth in later grades.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ1. How do rational numbers extend the number system?<br><br>EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems?<br><br>EQ3. How can we represent and identify rational numbers in various forms (including numerical representations, number line, tape diagram pictorial representation, etc.) and how can we apply these representations to real-world scenarios? |

**LEQs:**

- How can we classify rational numbers?
- How do we determine the position of a rational number on the number line?
- How do we determine least and greatest in a contextual situation?
- How do we identify the opposite and absolute value of rational numbers using a number line?

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**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| **Section(s)** | Unit 1 Module 3 | Module 3: Lessons 4-10 | Ch 5, lesson 5 | Bits and Pieces 1 Investigations 1- 4<br><br>Bits and Pieces 2: Investigation 4 | Comparing Bits and Pieces: 3.1, 3.2, and 3.4 |
| **Strength of Alignment** | **Strongly Aligned** | **Strongly Aligned** | **Somewhat aligned** | **Aligned** | **Aligned** |

**Sample Lesson Activities/Resources:**
http://www.mathplayground.com/ASB_TugTeamFractions.html Comparing Rational Numbers Activity: This will help students practice comparing rational numbers using inequality symbols.

http://www.mathplayground.com/number_climb.html Ordering Fractions Activity: Students will order rational numbers from least to greatest or greatest to least.

http://digitalcommons.trinity.edu/cgi/viewcontent.cgi?article=1196&context=educ_understandings This is a comparing and ordering rational numbers task.

https://www.khanacademy.org/math/algebra-basics/basic-alg-foundations/alg-basics-absolute-value-new/v/absolute-value-and-number-lines: This provices independent practice and instructional videos from the Khan Academy for absolute value and the number line.

**Smarter Interims:** (To view items, log into IMS, select DeSSA/DCAS, Smarter ELA/Math, then Assessment Viewing Application)
6th Grade IAB NS Sample Smarter Balanced Questions #3, 6, 14
6th Grade ICA Sample Smarter Balanced Questions #4, 7, 9, 18

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## Days 17-19: Equivalent Rational Numbers and Applications

**Learning Targets:**

- I can write or represent a rational number in various ways.
- I can identify equivalent rational numbers in fraction and decimal form.
- I can use rational numbers to solve real-world problems.

**Linked Content Standards:**

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

> 6.NS.C.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
>
> 6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
>
> 6.NS.C.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

> 6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
>
> 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
>
> 6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
>
> 6.NS.C.7d. Distinguish comparisons of absolute value from statements about order.

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**Mathematical Practices:**

- MP.7 Look for and make use of structure
- MP.4 Model with mathematics

**Instructional Notes:**

- Help students understand that whole numbers and integers are rational numbers, but not all rational numbers are integers and whole numbers. Rational numbers are numbers that can be written in fraction form.
- Students must understand that between consecutive whole numbers and integers on a number line, there are other rational numbers.
- Students should understand equivalent fractions and decimals are rational numbers.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ3. How can we represent and identify rational numbers in various forms (including numerical representations, number line, tape diagram pictorial representation, etc.) and how can we apply these representations to real-world scenarios?<br><br>EQ4. How can we show equivalency among rational numbers, and decide which representation would be the most efficient for application? |

**LEQs:**

- How can we write or represent a rational number in various ways?
- How can we identify equivalent rational numbers in fraction and decimal form?
- How can we use rational numbers to solve real-world problems?

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**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| **Section(s)** | Unit 1 Module 3 Lessons 3.1-3.3 | Module 3:Topic A,B, C: | Ch 5, Lessons 4 & 5 | Bits and Pieces 1: Investigations 1 - 4<br>Bits and Pieces 2: Investigations 1 - 4 | Comparing Bits and Pieces: 3.3 and 3.5 |
| **Strength of Alignment** | **Strongly aligned** | **Strongly aligned** | **Aligned** | **aligned** | **Aligned** |

**Sample Lesson Activities/Resources:**

**Fractions on a Number Line:**

https://www.illustrativemathematics.org/content-standards/6/NS/C/7/tasks/284

This activity allows students to place rational numbers on a number line and gets them to see that there are numbers between integers and whole numbers.

**Venn diagram for classifying rational numbers:**

https://www.bing.com/images/search?view=detailV2&ccid=UkoJVPIo&id=9F53E8870D15A006CD871A86F6toEA84D06B9075B0&q=venn+diagram+for+rational+number&simid=608039685416094756&selectedIndex=32&ajaxhist=0

This Venn Diagram is a good illustration for classifying whole numbers, integers, and rational numbers. It allows students to see that whole numbers and integers are also rational numbers, but rational numbers are not integers or whole numbers.

**KhanAcademy Instructional Videos:**

https://www.khanacademy.org/math/algebra/rational-and-irrational-numbers/alg-1-irrational-numbers/v/introduction-to-rational-and-irrational-numbers

This video shows the meaning of rational numbers and has an overview of irrational numbers. Please decide if students should view the irrational number section of the video.

https://www.khanacademy.org/math/pre-algebra/pre-algebra-arith-prop/pre-algebra-rational-irrational-numbers/a/classifying-numbers-review

This link looks at classifying numbers, which would include whole numbers, integers and rational numbers, including irrational numbers.

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## Day 20: Assessment

**Learning Target:**

- I can classify rational numbers.
- I can determine the position of a rational number on the number line.
- I can determine least and greatest in a contextual situation.
- I can identify the opposite and absolute value of rational numbers using a number line.
- I can write or represent a rational number in various ways.
- I can identify equivalent rational numbers in fraction and decimal form.
- I can use rational numbers to solve real-world problems.

**Linked Content Standards:**

**6.NS.C Apply and extend previous understandings of numbers to the system of rational numbers.**

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

> 6.NS.C.6a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
> 6.NS.C.6b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
> 6.NS.C.6c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

> 6.NS.C.7a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
> 6.NS.C.7b. Write, interpret, and explain statements of order for rational numbers in real-world contexts.
> 6.NS.C.7c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity

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in a real-world situation.

6.NS.C.7d. Distinguish comparisons of absolute value from statements about order.

**Instructional Notes:**

- Ensure that the assessment includes a balance of questions that assess conceptual understanding, procedural fluency, and application.

| **Linked Essential Understanding(s):** | **Linked Unit EQ(s):** |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ1. How do rational numbers extend the number system?<br><br>EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems?<br><br>EQ3. How can we represent and identify rational numbers in various forms (including numerical representations, number line, tape diagram pictorial representation, etc.) and how can we apply these representations to real-world scenarios?<br><br>EQ4. How can we show equivalency among rational numbers, and decide which representation would be the most efficient for application?<br><br>EQ5: How can we locate and name points in the coordinate plane?<br><br>EQ6: How can we use absolute value to find horizontal and vertical distances on the number line, coordinate plane or in the real world? |

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**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| Section(s) | Module 3 Quiz | Module 3 Quiz | Think Smarter for the Smarter Balanced Assessment (Glencoe, 2015) Item bank Ch 5 | Check Up<br><br>Assign ACE questions not used for homework | Comparing Bits and Pieces: 3.1-3.5 ACE problems and Check-Up |
| Strength of Alignment | Aligned | Aligned | Aligned | Aligned | Aligned |

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## Part II: Operations with Rational Numbers
## Days 21-26: Factors and Multiples

**Learning Target:**

- I can find all of the factors (or divisors) of a whole number from 1 to 100.
- I can generate multiples of whole numbers from 1 to 12.
- I can find the GCF of two whole numbers less than or equal to 100.
- I can find the LCM of two whole numbers less than or equal to 12.
- I can use factors to demonstrate the distributive property.
- I can solve real-world problems using greatest common factor and least common multiple.

**Linked Content Standards:**
**6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples.**

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

**Mathematical Practices:**

- MP.1 Make sense of problem and persevere in solving them
- MP.7 Look for and make use of structure
- MP.8 Look for and express regularity in repeated reasoning

**Instructional Notes:**

- Have students apply their understanding of factors and multiples to generate equivalent numerical expressions using the distributive property. Have students use area models and manipulatives to confirm that the distributive property produces equivalent expressions.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms. | EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real world problems? |

**LEQs:**

- How can we find the greatest common factor (GCF) of two whole numbers less than or equal to 100?
- How can we find the least common multiple of two whole numbers less than or equal to 12?
- How can we use factors to demonstrate the distributive property?

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- How do we solve real-world problems using greatest common factor and least common multiple?

**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| Section(s) | Unit 1 Module 2 | Module 2: Topic D | Ch 6 Lessons 1 & 6 | Prime Time: Investigations 2 & 3 | Prime Time: 2.1-2.3 and 4.2 |
| Strength of Alignment | Aligned | Strongly aligned | Somewhat aligned | Aligned | Strongly aligned |

**Sample Lesson Activities/Resources:**

**Eureka (or EngageNY): Module 2, Topic D. Lesson 18**

During this lesson, students move in groups to various stations where a topic is presented on chart paper. At each station, students read the directions, choose a problem, and then work collaboratively to solve the problem. There are four different topics: Factors and GCF, Multiples and LCM, Using Prime Factors to Determine GCF, and Applying Factors to the Distributive Property. Review all three documents for Lesson 18. The exit ticket for Lesson 18 has a student reflection of the activity that may be useful information for the teacher.

**Student Activity--Lesson 18:**
https://www.luminpdf.com/viewer/82vAhqqQuoJ4gmpuT/share?sk=d18ec296-4f14-4509-83cc-6d366fb7dfdc
**Student Exit Ticket--Lesson 18:**
https://www.luminpdf.com/viewer/Ef2xuEPy7q6fuqXJj/share?sk=08e04c91-c24a-4150-a41b-eb7b55dc9b7a
**Teacher Notes--Lesson 18:**
https://www.luminpdf.com/viewer/oJZMX69QQXyJMEsHf/share?sk=a9c6fb77-4cdb-4f0d-bc22-65153622b35d

**Illustrative Mathematics Tasks**
https://www.illustrativemathematics.org/content-standards/6/NS/B/4/tasks/257
This task would be most useful to assess the students' depth of understanding in generalizing repeated calculations (MP.8) and applying the distributive property to show that two numbers with a common factor can be expressed as a multiple of a sum of two whole numbers with no common factor.

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**Factors and Common Factors**
https://www.illustrativemathematics.org/content-standards/6/NS/B/4/tasks/255
This problem uses the same numbers and asks essentially the same mathematical questions as "6.NS Bake Sale," (below) but that task requires students to apply the concepts of factors and common factors in a context. This could be used for scaffolding the concept.

**Bake Sale (Factor Items in Context)**
https://www.illustrativemathematics.org/content-standards/6/NS/B/4/tasks/258
This problem uses the same numbers and asks essentially the same mathematical questions as "6.NS Factors and Common Factors," but requires students to apply the concepts of factors and common factors in a context. A version of this task could be adapted into a teaching task to help motivate the need for the concept of a common factor.

**Multiples and Common Multiples**
https://www.illustrativemathematics.org/content-standards/6/NS/B/4/tasks/256
This problem uses the same numbers and asks similar mathematical questions as "6.NS The Florist Shop," but that task requires students to apply the concepts of multiples and common multiples in a context.

**The Florist Shop (Multiples Items in Context)**
https://www.illustrativemathematics.org/content-standards/6/NS/B/4/tasks/259
This task provides a context for some of the questions asked in "6.NS Multiples and Common Multiples." A scaffolded version of this task could be adapted into a teaching task that could help motivate the need for the concept of a common multiple.

**Khan Academy:**
https://www.khanacademy.org/math/pre-algebra/pre-algebra-factors-multiples/pre-algebra-greatest-common-divisor/v/greatest-common-divisor
This is an instructional video to find the GCF.

https://www.khanacademy.org/math/algebra2/rational-expressions-equations-and-functions/adding-and-subtracting-rational-expressions/v/least-common-multiple-exercise
This is an instructional video for LCM.

**Smarter Interims:** (To view items, log into IMS, select DeSSA/DCAS, Smarter ELA/Math, then Assessment Viewing Application)
6th Grade IAB NS Sample Smarter Balanced Questions #12
6th Grade ICA Sample Smarter Balanced Questions #8

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## Days 27-36: Operations with Fractions

**Learning Target:**

- I can multiply all variations of fractions including whole numbers, fractions, and mixed numbers.
- I can divide a fraction by a fraction.
- I can divide a whole number or a mixed number by a fraction.
- I can divide a fraction by a whole number.
- I can interpret and compute quotients of fractions by using visual fraction models and equations.

**6.NS.A Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

**Mathematical Practices:**

- MP.7 Look for and make use of structure
- MP.4 Model with mathematics
- MP.6 Attend to precision

**Instructional Notes:**

- Pay close attention to the modeling with tape diagrams and partitive model when dividing with fractions.
- Students must read real-world problems and determine the correct operation to solve correctly.
- Make sure students use the algorithm correctly when dividing with fractions. Students must understand the meaning of the answer when solving the problems mathematically or with a model.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms. | EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real world problems? |

**LEQs:**

- How can we multiply all variations of fractions including whole numbers, fractions, and mixed numbers?
- What strategies help us divide a fraction by a fraction?
- What strategies help us divide a whole number or a mixed number by a fraction?

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- What strategies help us divide a fraction by a whole number?
- How do we interpret and compute quotients of fractions by using visual fraction models and equations?

**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| **Section(s)** | **Unit 2 Module 4** | **Module 2: Topic A** | **Ch4** | **Bits and Pieces 2: Investigation 4** | **Let's Be Rational: Investigations 2, 3, and 4** |
| **Strength of Alignment** | **Strongly aligned** | **Strongly aligned** | **Strongly aligned** | **Strongly Aligned** | **Strongly aligned** |

**Sample Lesson Activities/Resources:**
**LearnZillion Dividing Fractions Unit**
https://learnzillion.com/resources/64216-dividing-fractions
This unit is structured to connect multiplication to division and to allow several opportunities for modeling. Conceptual, procedural, and application situations are all included throughout this unit.

**Video Game Credits:**
https://www.illustrativemathematics.org/content-standards/NS/6/A/1/tasks/267
This task could be used in instructional activities designed to build the understanding of fraction division, and it could be used to develop knowledge of the common denominator approach.

**Cup of Rice:** https://www.illustrativemathematics.org/content-standards/NS/6/A/1/tasks/463
This task addresses the confusion between the remainder and the fractional part of a mixed number answer. Students will be required to explain their reasoning by using a diagram.

**Baking Cookies:** https://www.illustrativemathematics.org/content-standards/NS/6/A/1/tasks/50
Students must first add fractions with unlike denominators, which is a skill developed in the 5th grade. Then, students need to divide fractions by fractions and interpret and compute quotients of fractions.

**How many ___ are in ...?:**. https://www.illustrativemathematics.org/content-standards/NS/6/A/1/tasks/692
Students are asked to solve each problem using pictures and a number sentence involving division. It is a scaffolded activity that allows students to practice division at various difficulty levels.

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**IXL Division Word Problems:** https://www.ixl.com/math/grade-6/divide-fractions-and-mixed-numbers-word-problems
This is an interactive website that allows students to answer division problem scenarios electronically.

**Rabbit Costumes Performance Task:** http://www.insidemathematics.org/assets/common-core-math-tasks/rabbit%20costumes.pdf
The task challenges studenst to demonstrate understanding of multiplication and division of fractions. A student must be able to interpret and solve word problems involving multiplication and division of fractions. A student must be able to connect the results of calculations to the context and constraints of the real-world problem.

**Khan Academy:**
https://www.khanacademy.org/math/arithmetic/fraction-arithmetic
This site provides independent practice and instructional videos.

**Smarter Interims:** (To view items, log into IMS, select DeSSA/DCAS, Smarter ELA/Math, then Assessment Viewing Application)
6th Grade IAB NS Sample Smarter Balanced Questions #7, 8, 11, 15
6th Grade ICA Sample Smarter Balanced Questions #13

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## Days 37-38: Assessment

**Learning Targets:**

- I can find all of the factors (or divisors) of a whole number from 1 to 100.
- I can generate multiples of whole numbers from 1 to 12.
- I can find the GCF of two whole numbers less than or equal to 100.
- I can find the LCM of two whole numbers less than or equal to 12.
- I can use factors to demonstrate the distributive property.
- I can solve real-world problems using greatest common factor and least common multiple.
- I can multiply all variations of fractions including whole numbers, fractions, and mixed numbers.
- I can divide a fraction by a fraction.
- I can divide a whole number or a mixed number by a fraction.
- I can divide a fraction by a whole number.
- I can interpret and compute quotients of fractions by using visual fraction models and equations.

**Linked Content Standards:**

**6.NS.A Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

**6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples.**

6.NS.B.2 Fluently divide multi-digit numbers using the standard algorithm.
6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

**Instructional Notes:**

- Ensure that the assessment includes a balance of questions that assess conceptual understanding, procedural fluency, and application.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms. | EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real world problems? |

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**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| Section(s) | Module 4 Quiz | Module 3 | Think Smarter for the Smarter Balanced Assessment (Glencoe, 2015) Item bank Ch 4 | Checkpoint quiz | Check-Up (Assessment), ACE problems |
| Strength of Alignment | Aligned | Strongly aligned | Strongly aligned | Strongly aligned | Strongly aligned |

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## Days 39 - 45: Operations with Decimals

**Learning Targets:**

- I can use place value to add two given decimal numbers.
- I can subtract one decimal number from another.
- I can add, subtract, multiply, and divide multi-digit decimals
- I can use estimation to place the decimal in a product of any two decimal numbers.
- I can determine what algorithm I should use to find any decimal quotient.

**Linked Content Standards:**
**6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples.**
6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

**Mathematical Practices:**

- MP.6 Attend to precision
- MP.7 Look for and make use of structure
- MP.8 Look for and express regularity in repeated reasoning

**Instructional Notes:**

- Emphasize representing decimal problems in multiple ways, including using number line diagrams.
- Make explicit connections between decimals and fraction representations.

| Linked Essential Understanding(s): | Linked Unit EQ(s): |
|---|---|
| **Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms. | EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real world problems? |

**LEQs:**

- How do we use place value to add two given decimal numbers?
- How do we subtract one decimal number from another?
- How do we use estimation to place the decimal in a product of any two decimal numbers?
- What algorithm can be used to find any decimal quotient?

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**Text Alignment:**

| Text | GoMath (2014) | Eureka Math (2015) | Glencoe Math Course 1 (2015) | Connected Mathematics (CMP2,2006) | Connected Mathematics (CMP3,2014) |
|---|---|---|---|---|---|
| Section(s) | Unit 2 Module 4 | Module 2: Topic B, C | Ch3 | Bits and Pieces 3: Investigations 1, 2, & 3 | Decimal Ops: Investigations 1, 2, and 3 |
| Strength of Alignment | Strongly aligned | Strongly aligned | Strongly aligned | Strongly aligned | Strongly aligned |

**Note: Prentice Hall Pre-Algebra (2004) Chapter 3Sections 1, 2, 5, & 6 are aligned**

**Sample Lesson Activities/Resources:**
**Illustrative Mathematics:**
https://www.illustrativemathematics.org/6.NS
This site has several individual problems separated by standard.

**Khan Academy video:**
https://www.khanacademy.org/math/arithmetic/arith-decimals#arith-review-add-decimals

**Buying Gas**:
https://www.illustrativemathematics.org/content-standards/6/NS/B/3/tasks/274
This task assists students in recognizing contexts that require division as a necessary conceptual prerequisite to modeling problems that they will be asked to in the future. This task also relates to work with ratios and rates, so students should be building connections between these types of division problems and finding unit rates.

**Jayden's Snacks**
https://www.illustrativemathematics.org/content-standards/6/NS/B/3/tasks/273
This task focuses on operations with decimals.

**Smarter Interims:** (To view items, log into IMS, select DeSSA/DCAS, Smarter ELA/Math, then Assessment Viewing Application)
6th Grade IAB NS Sample Smarter Balanced Questions #1, 4, 13

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## Days 46-47: Assessment

**Learning Target:**

- I can identify integers and their opposites.
- I can use a number line to compare and order integers.
- I can find and use absolute value.
- I can identify vocabulary associated with positive and negative numbers.
- I can plot points in all four quadrants and determine the distance between points.
- I can draw polygons in the coordinate plane using given coordinates and use coordinates to find the length of a side.
- 
- I can classify rational numbers.
- I can determine the position of a rational number on the number line.
- I can determine least and greatest in a contextual situation.
- I can identify the opposite and absolute value of rational numbers using a number line.
- I can write or represent a rational number in various ways.
- I can identify equivalent rational numbers in fraction and decimal form.
- I can use rational numbers to solve real-world problems.
- I can find all of the factors (or divisors) of a whole number from 1 to 100.
- I can generate multiples of whole numbers from 1 to 12.
- I can find the GCF of two whole numbers less than or equal to 100.
- I can find the LCM of two whole numbers less than or equal to 12.
- I can use factors to demonstrate the distributive property.
- I can solve real-world problems using greatest common factor and least common multiple.
- I can multiply all variations of fractions including whole numbers, fractions, and mixed numbers.
- I can divide a fraction by a fraction.
- I can divide a whole number or a mixed number by a fraction.
- I can divide a fraction by a whole number.
- I can interpret and compute quotients of fractions by using visual fraction models and equations.
- I can use place value to add two given decimal numbers.
- I can subtract one decimal number from another.
- I can add, subtract, multiply, and divide multi-digit decimals
- I can use estimation to place the decimal in a product of any two decimal numbers.
- I can determine what algorithm I should use to find any decimal quotient.

**Linked Content Standards:**

**6.NS.A Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.

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**6.NS.B Compute fluently with multi-digit numbers and find common factors and multiples.**

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

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

6.NS.B.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

**Instructional Notes:**

- Ensure that the assessment includes a balance of questions that assess conceptual understanding, procedural fluency, and application.

| Enduring Understanding | Unit Essential Question(s) |
|---|---|
| **Understanding 1a:** Extending from whole numbers to rational numbers creates a more powerful and complicated number system. The rational numbers allow us to solve real-world problems that are not possible to solve with just whole numbers or integers.<br><br>**Understanding 1b:** Rational numbers have multiple interpretations (e.g. part-whole, a quotient, an operation) and making sense of them depends on identifying the unit.<br><br>**Understanding 1c:** Any rational number can be represented in infinitely many equivalent symbolic forms. | EQ1. How do rational numbers extend the number system?<br><br>EQ2. How can we use rational numbers (including integers and whole numbers) to solve real world problems?<br><br>EQ3. How can we represent and identify rational numbers in various forms (including numerical representations, number line, tape diagram pictorial representation, etc.) and how can we apply these representations to real-world scenarios?<br><br>EQ4. How can we show equivalency among rational numbers, and decide which representation would be the most efficient for application?<br><br>EQ5: How can we locate and name points in the coordinate plane?<br><br>EQ6: How can we use absolute value to find horizontal and vertical distances on the number line, coordinate plane or in the real world? |

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| | |
|---|---|
| **Understanding 2:** Computation with rational numbers is an extension of computation with whole numbers but introduces some new ideas, processes, and algorithms. | EQ7. How can we apply and extend our previous understanding of number operations to rational numbers and use them to solve real-world problems? |

**Text Alignment:**

| **Text** | **GoMath (2014)** | **Eureka Math (2015)** | **Glencoe Math Course 1 (2015)** | **Connected Mathematics (CMP2,2006)** | **Connected Mathematics (CMP3,2014)** |
|---|---|---|---|---|---|
| **Section(s)** | The tests in Go Math are broken down into one that includes integers, rational numbers and factors/multiples and another that includes fraction and decimal operations. | There are two unit tests for this module. Unit Test 1 covers: LCM/GCF, operations with decimals and division of fractions. Unit Test 2 covers: writing integers, opposites, integers on number line, rational numbers on number line, comparing, ordering, absolute value and coordinate plane. | | For days 39-45 only: (Checkpoint Quiz or ACE 1-12, 22-24, 28, 29, 41-44, 47, 48)<br><br>For entire unit: see the assessments book for CMP2, each unit has "unit test questions" and "additional questions". Select questions that are representative of the content covered in class. | There is not a single summative assessment in CMP3 to cover this unit.<br><br>These topics are drawn from the following units: Comparing Bits and Pieces, Let's Be Rational, Decimal Ops?? Prime Time, and Covering and Surrounding. |
| **Strength of Alignment** | **Somewhat aligned** | **Aligned** | | **Aligned** | **Somewhat aligned** |

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**Helpful Tools and Informational References:**

| | |
|---|---|
| Smarter Balanced Sample Question Library | Graph Paper |
| Coordinate Plane<br><br>Coordinate Plane Grid | Custom Number Lines |
| Benchmark Fraction to Decimal | Delaware DOE Link for Mathematics Lesson Plans (not standard specific) |
| Learning Progressions (from Delaware DOE) | Connected Math Project (Univ. of Michigan) |
| Delaware DOE Math Homepage | Smarter Balanced Assessment System (Delaware DOE) |

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