Readington Township Public Schools
Grade 4 Honors Math

Authored by: Colleen Ogden, Michele Krayem and Kristi Dauernheim

Reviewed by: Sarah Pauch
Supervisor of Math, Science, and Technology

Approval Date:
August 20, 2024

Readington Township Public Schools
Whitehouse Station, NJ 08889
www.readington.k12.nj.us

Grade 4 Honors Mathematics

Overview

Readington Township Public Schools' K-5 mathematics curriculum provides students with a strong foundation in mathematics content while promoting and instilling the skills of problem solving, communication in mathematics, making mathematical connections, and reasoning. Throughout the delivery of the K-5 mathematics program, various tools and technology are employed, including manipulatives, calculators, software, apps, videos, websites, and computing devices (computers, tablets, smart phones, interactive whiteboards, etc.). A strong focus of the program on promoting high levels of mathematical thought through experiences which extend beyond traditional computation.

The Fourth Grade Honors course is a full-year course designed to provide advanced level mathematics instruction to select students who exhibit a demonstrated need to increase content knowledge in mathematics while accelerating the pace of instruction. The course was created with the goal of further developing strong, cogent mathematical thinking, and independent mathematical problem solving skills.

The program is directly correlated to the Fifth and Sixth New Jersey Student Learning Standards (NJSLS), and is designed to cover such topics as Operations and Algebraic Thinking, Number and Operations in Base Ten and with fractions, Measurement and Data, Geometry, and Mathematical Practices.

STUDENT OUTCOMES

(Linked to Jersey Student Learning Standards for Mathematics 2023)

Operations And Algebraic Thinking (5.OA)

A. Write and interpret numerical expressions

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2x (8+7). Recognize that 3x (18932 +921) is three times as large as 18932 +921 without having to calculate the indicated sum or product.

B. Analyze patterns and relationships

3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

Number And Operations In Base Ten (5.NBT)

A. Understand the place value system.

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1 10 of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.
    a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, 347.392 = 3x100+4x10+7x1+3x (1/10) 9x (1/100) + 2x(1/1000).
    b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

4. Use place value understanding to round decimals to any place.

B. Perform operations with multi-digit whole numbers and with decimals to hundredths.

5. With accuracy and efficiency, multiply multi-digit whole numbers using the standard algorithm.
6. Find whole-number quotients of whole numbers with up to four-digit dividends and twodigit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

NUMBER AND OPERATIONS—FRACTIONS (4.NF)

A. Extend understanding of fraction equivalence and ordering

1. Explain why a fraction a/b is equivalent to a fraction (nxa)/nxb) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

3. Understand a fraction a/b with a>1 as a sum of fractions 1/b .
    a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
    b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: ⅜=⅛+⅛+⅛; ⅜=⅛+2/8; 2 ⅛=1+1+⅛=8/8+8/8+⅛
    c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
    d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
    a. Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*
    b. Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*
    c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

C. Understand decimal notation for fractions, and compare decimal fractions.

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*
6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*

7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Number And Operations—Fractions (5.NF)

A. Use equivalent fractions as a strategy to add and subtract fractions.

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*
2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*

B. Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*
4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
    a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*
    b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
5. Interpret multiplication as scaling (resizing), by:
    a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
    b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
    a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*
    b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*
    c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

Number Systems (6.NS)

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

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. For example, create a

story context for (⅔) ÷ (¾) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (⅔)÷(¾) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b)÷ (c/d) = ad/bc). How much chocolate will each person get if 3 people share ½ lb. of chocolate equally? How many ¾ cup servings are in ⅔ of a cup of yogurt? How wide is a rectangular strip of land with length ¾ mi and area ½ square mi?

B. Compute fluently with multi-digit numbers & find common factors & multiples

2 With accuracy and efficiency, divide multi-digit numbers using the standard algorithm.

3 With accuracy and efficiency, add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

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. For example, express 36 8 + as 4(9+2).

Measurement (5.M)

A. Convert like measurement units within a given measurement system.

1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.

B. Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition

2 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

3 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and nonstandard units.

4 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

b. Apply the formulas V = l x w x h and V = B x h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.

c. Recognize volume as additive. Find volumes of solid figures composed of two nonoverlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Data Literacy (5DL)

A. Understand and analyze data visualizations

1. Understand how different visualizations can highlight different aspects of data. Ask questions and interpret data visualizations to describe and analyze patterns.
2. Develop strategies to collect, organize and represent data of various types and from various sources. Communicate results digitally through a data visual (e.g. chart, storyboard, video presentation).
3. Collect and clean data to be analyzable (e.g., make sure each entry is formatted correctly, deal with missing or incomplete data).
4. Using appropriate visualizations (i.e. double line plot, double bar graph), analyze data across samples.

B. Represent and interpret data

5 Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, ⅛). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given

different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Geometry (5.G)

A. Graph points on the coordinate plane to solve real-world and mathematical problems.

1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).
2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

B. Classify two-dimensional figures into categories based on their properties.

3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
4. Classify two-dimensional figures in a hierarchy based on properties.

Geometry (6.G)

A. Solve real-world and mathematical problems involving area, surface area, and volume.

1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V=lwh and V=Bh to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
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.
4. Represent three-dimensional figures (e.g., pyramid, triangular prism, rectangular prism) using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

PERSONAL FINANCIAL LITERACY (9.1)

Civic Responsibility

9.1.5.CR.1: Compare various ways to give back and relate them to your strengths, interests, and other personal factors.

Credit Profile

9.1.5.CP.1: Identify the advantages of maintaining a positive credit history.

Economic and Government Influences

9.1.5.EG.1: Explain and give examples of what is meant by the term “tax.”

9.1.5.EG.2: Describe how tax monies are spent

9.1.5.EG.3: Explain the impact of the economic system on one’s personal financial goals.

9.1.5. EG.4: Describe how an individual’s financial decisions affect society and contribute to the overall economy.

9.1.5. EG.5: Identify sources of consumer protection and assistance.

Financial Institutions

9.1.5.FI.1: Identify various types of financial institutions and the services they offer including banks, credit unions, and credit card companies.

Financial Psychology

9.1.5.FP.1: Illustrate the impact of financial traits on financial decisions.

9.1.5.FP.2: Identify the elements of being a good steward of money.
9.1.5.FP.3: Analyze how spending choices and decision-making can result in positive or negative consequences.
9.1.5.FP.4: Explain the role of spending money and how it affects wellbeing and happiness (e.g., "happy money," experiences over things, donating to causes, anticipation, etc.).
9.1.5.FP.5: Illustrate how inaccurate information is disseminated through various external influencers including the media, advertisers/marketers, friends, educators, and family members.

Planning and Budgeting

9.1.5.PB.1: Develop a personal budget and explain how it reflects spending, saving, and charitable contributions.
9.1.5.PB.2: Describe choices consumers have with money (e.g., save, spend, donate).

Risk Management and Insurance

9.1.5.RMI.1: Identify risks that individuals and households face.
9.1.5.RMI.2: Justify reasons to have insurance.

Mathematical Practices

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.

Strategies

- Teacher presentation
- Teacher read-aloud
- Group discussion
- Small Group instruction
- Group presentations
- Interactive Smartboard Lessons
- Partner work
- Museum walks
- Math talk (students explain their thinking)
- Small Group Work
- Daily 5 Math
- Centers/ stations

Accommodations

Accommodations and Modification Addendum

Assessments

Formative	Summative
• Independent student work • Ready Classroom Lesson Quizzes • Teacher Observations • Class Participation • Class Discussions • Class Assignments • Homework Assignments • Notebooks • Anecdotal Records	• Mid-Unit Test • Unit Test

Benchmark	Alternative
• I-Ready Diagnostic • Performance Assessments	• Live Online Assessment Tools (Kahoot, Brainpop) • Student Projects • Student Presentations • Self-Assessments

Resources	
Required/Primary	**Supplemental**
• *Big Ideas Math 6* textbook (Ron Larson and Laurie Boswell; published by Big Ideas Learning) • Associated *Big Ideas Record and Practice Journal*	• Brain Pop • IXL • Reflex Math • Online Tutorials (Learnzillion, Khan Academy, Math Antics) • Online Math Games (Math is Fun, Funbrain, Cool Math Games, Math Playground) • Illustrative Mathematics (www.illustratviemathematics.org) • Explore Learning Gizmos • Estimation 180

Essential Questions And Content

Addition and Subtraction with Fractions & Decimals
- What strategies can be used to compare fractions?
- How can I add or subtract fractions and mixed numbers?
- What is the correct way to read and write decimals and fractions?
- What is the procedure for adding and subtracting decimals?
- How do I use what I know about fractions and decimals to solve problems?

Multiplication and Division with Fractions
- Can I multiply and divide fractions just like whole numbers?
- How can I use multiplication or division of fractions to solve real-world problems?

Multiplication and Division with Whole Numbers and Decimals
- How is multiplying with decimals related to multiplying whole numbers?
- How is division with decimals related to dividing whole numbers?

Operations and Word Problems
- How can I use what I know about estimation and mathematical operations to solve real-world problems?

Algebra, Patterns and Coordinate Graphs
- How can expressions be written, read, and used in the real world?
- What is a coordinate plane, and how is one used?

Measurement and Geometry
- What are the different types of measurement units, and when do I use them?
- How do I measure two and three-dimensional shapes?

Pacing and Interdisciplinary Connections

Whole Number Operations and Applications: Volume, Multiplication, and Division

Lessons 0-5 (27 days)
- Understand Volume
- Find Volume Using Unit Cubes
- Find Volume Using Formulas
- Multiply Whole Numbers
- Divide Whole Numbers

Interdisciplinary Connections:
- **L.LV.5.2.** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.
  5.NBT B. Find whole-number quotients of whole numbers with up to four-digit dividends and two digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between

multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Activity: Introduce new mathematics vocabulary for division by reading aloud Remainder of One by: Elinor J. Pinczes

Decimals and Fractions: Place Value, Addition, and Subtraction

Lessons 6-14 (40 days)

- Understand Place Value
- Understand Powers of 10
- Read and Write Decimals
- Compare and Round Decimals
- Add Decimals
- Subract Decimals
- Add Fractions
- Subtract Fractions
- Add and Subtract in Word Problems
- Understand Equivalent Fractions
- Compare Fractions
- Add and Subtract Mixed Numbers
- Add and Subract Fractions in Line Plots
- Understand Fraction Multiplication
- Multiply Fractions by Whole Numbers
- Fractions as Tenths and Hundredths
- Relate Decimals and Fractions

Interdisciplinary Connections:

- **5.NF.A.1** Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.

  LS2.B Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases and water from the environment and release waste matter (gas, liquid, or solid) back into the environment.

  Activity: Students will be testing their lung volume capacity using fractions and mixed numbers. Students can find their total lung volume by adding their three tries or by finding the difference between their highest lung capacity and lowest lung capacity.
- **5.NF.A.2.** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

  SL.PE.5.1.C Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.

  Activity: Math Journal and share. Students will create a math story problem that requires the use of adding or subtracting fractions to solve. Students will share their stories and solve their classmates' word problems.

Decimals and Fracitons: Multiplicaiton and Division

Lessons 15-24 (45 days)

- Multiply a Decimal by a Whole Number
- Multiply Decimals
- Divide Decimals
- Fractions as Division
- Understnd Multiplicaiton by a Fraction

- Multiply Fractions to Find Area
- Understand Multiplicaitons as Scaling
- Multipy Fractions in Word Problems
- Understand Division with Unit Fractions
- Divide Unit Fractions in Word Problems

Interdisciplinary Connections:

- **5.NBT.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
  5-LS1-1 Support an argument that plants get the materials they need for growth chiefly from air and water.
  Activity: Students will create an experiment where students place celery stalks (some with leaves and some without) in vials (some with and some without water) to demonstrate that plants only need air and water for growth. Students will need to use addition and subtraction to determine the amount of water was used by the celery and how much evaporated.

Measurement, Data, and Geometry: Converting Units, Using Data, and Classifying Figures
Lessons 25-29 (25 days)

- Convert Measurement Units
- Solve Word Problems Involving Conversions
- Make Line Plots and Interpret Data
- Understand Categories of Two-Dimensional Figures
- Classify Two-Dimensional Figures

Interdisciplinary Connections:

- **SL.UM.5.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
  5.DL.B.5 Make a line plot to display a data set of measurements in fractions of a unit (½, ¼, ⅛).
  Activity: Students will add a line plot to a piece of nonfiction writing and write a paragraph to be displayed with the line plot explaining what information can be discerned from the line plot.
- **5-ESS1-2**. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
  5.DL.B.5 Represent and interpret data. 2. Make a line plot to display a data set of measurements in fractions of a unit.
  Activity: Create a line plot showing the daily changes of the lengths of shadows throughout the day.
- **5.DL.B.5** Make a line plot to display a set of measurements in fractions of a unit (½, ¼, ⅛).
  5-PS1-3 Make observations and measurements to identify materials based on their properties.
  Activity: Students will get various materials (salt, diatomaceous earth, gravel, etc.) and will measure it to determine the best method of separation. Students will then create a line plot using the data from the measurements.
- **A.L.6** Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.
  5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.
  Activity: Students will discuss in small groups determining the hierarchy of various three and four-sided shapes. In their discussions, students will need to use key vocabulary to explain their reasoning to their group about the hierarchy.

Algebraic Thinking and Coordinate Plane: Expressions, Graphing Points, Patterns and Relationships
Lessons 30-33 (20 days)

- Evaluate, Write, and Interpret Expressions

- Understand Coordinate Plane
- Represent Problems in the Coordinate Plane
- Analyze Patterns and Relationships

Interdisciplinary Connections:

- **5-ESS1-1**. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
  5.G.A 2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
  Activity: Students will plot a constellation on a coordinate plane. They will have a partner find the coordinates of each point of the constellation.
- **5.G.A.2** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
  5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
  Activity: Students will design an experiment to see how the Earth heats soil and water differently. Students will set up containers of water and soil (one in shade and one not). Students will take the temperature at various times of the day. Then, students will graph the results in a coordinate plane and discuss the similarities and differences.
- **SL.PE.5.1** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
  5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
  Activity: Students will complete a problem by adding parentheses, brackets, or braces to ensure the answer is accurate. Students will then prepare to present their thinking to their partners, adding to their ideas after others have presented theirs.
- **SL.PE.5.1.D** Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
  5.OA.B.3 Analyze patterns and relationships. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
  Activity: During the Try-it Activity, students will share their ideas and draw conclusions based on their classmates' shares. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, students will generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence.

Personal Financial Literacy 9.1 (10 days)

Civic Responsibility

- You can give back in areas that matter to you.

Credit Profile

- There are benefits to having a positive credit history.

Economic and Government Influences

- Taxes are collected on a variety of goods and services at the local, state, and federal levels.
- There is a broader economic system that influences your financial goals.
- There are agencies, laws, and resources to protect individuals as consumers.

Financial Institutions

- People can choose to save money in many places such as home in a piggy bank, bank, or credit union.

Financial Psychology

- An individual's financial traits and habits affect his/her finances.
- Spending choices and their intended and unintended consequences impact financial outcomes and personal well-being.
- Not all financial information is accurate or truthful.

Planning and Budgeting

- There are specific steps associated with creating a budget.
- Saving money can impact an individual's ability to address emergencies and accomplish their short-and long-term goals.

Risk Management and Insurance

- Individuals can choose to accept inevitable risk or take steps to protect themselves by avoiding or reducing risk.

Career, Computer Science, and Key Skills

Number And Operations In Base Ten

- **Career Ready Practices**
  Utilize critical thinking to make sense of problems and persevere in solving them.
  5.NBT.B7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
  Activity: Students will create real world scenarios which would require adding/subtracting decimals to the hundreths. Students will solve classmates' problems providing a model and explanation of their thinking.

- **9.2 Career Awareness, Exploration, and Preparation**
  9.2.5.CAP.8: Identify risks that individuals and households face.
  5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
  Activity: Using teacher-created word problems involving typical household finances, students will solve the problems and discuss the risks that households face.

- **9.4 Life Literacies and Key Skills**
  9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
  9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.
  5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
  Activity: Using the teacher-created word problems involving typical household finances, students will discuss what tools/technology could be used to help solve household financial problems.

- **Computer Science**
  8.1.5.AP.2: Create programs that use clearly named variables to store and modify data.
  5NBT.A.4 Use place value understanding to round decimals to any place.
  Activity: Students will create a program to modify data to demonstrate how to round decimals.

Measurement

- **Career Ready Practices**
  Work productively in teams while using cultural global competence.
  5.M.B.4 Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.
  Activity: Students will work together to find the volume of various prisms.

- **9.2 Career Awareness, Exploration, and Preparation**
  9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited for personal likes.
  5.M.A.1: Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.
  Activity: Using teacher-created word problems involving careers that utilize converting measurements,

students will discuss careers and solve the problems.

Data Literacy

- **9.4 Life Literacies and Key Skills**

  9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process.
  9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
  9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data.
  9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.
  5.DL.B.5. Represent and interpret data. 2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
  Activity: Collect data from classmates and create a graph using Google Sheets or other digital graphing tools.

- **Computer Science**

  8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
  5.MD.B. Represent and interpret data. 2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots.
  Activity: Collect data from classmates and create a graph using Google Sheets or other digital graphing tools.

Number And Operations—Fractions

- **Career Ready Practices**

  Act as a responsible and contributing community member and employee
  5.NF.B.5 Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b =(n×a)/(n×b) to the effect of multiplying a/b by 1.
  Activity: Students will explain how multiplying by a fraction less than one creates a smaller product and provide examples.

- **9.2 Career Awareness, Exploration, and Preparation**

  9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited for personal likes.
  5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
  Activity: Using teacher-created word problems involving careers that utilize fractions, students will discuss the careers and solve the problems.

- **9.4 Life Literacies and Key Skills**

  9.4.5.C.3: Describe how digital tools and technology may be used to solve problems.
  9.4.5.DC.6: Compare and contrast how digital tools have changed social interactions.
  9.4.5.IML.1: Evaluate digital sources for accuracy, perspective, credibility and relevance
  9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.
  5.NF..A.2: Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*
  Activity: Students will discuss how digital tools and technology can aid in solving fraction word problems.

- **Computer Science**
  8.1.5.AP.1 Compare and refine multiple algorithms for the same tasks and determine which is the most appropriate.
  5.NF..A.2: Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*
  Activity: Using various computer algorithms, students will solve word problems determining which algorithm is the most appropriate.

Geometry

- **Career Ready Practices**
  Act as a responsible and contributing community member and employee
  5.G.B. Classify two-dimensional figures into categories based on their properties. 3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
  Activity: Students will write a description of a 2-dimensional figure using its attributes. Classmates will guess what figure is being described.

- **9.2 Career Awareness, Exploration, and Preparation**
  9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.
  5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of a situation.
  Activity: The teacher will create word problems that include various careers that use graphing. The teacher will lead a discussion defining each career.

- **9.4 Life Literacies and Key Skills**
  9.4.5.CT.4: Apply critical thinking and problem solving strategies to different types of problems such as personal, academic, community, and global.
  9.4.5.IML.5: Distinguish how media are used by individuals, groups, and organizations for varying purposes.
  9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.
  9.4.5.DC.4: Model safe, legal, and ethical behavior when using online or offline technology.
  5.G.B. Classify two-dimensional figures into categories based on their properties. 3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
  Activity: Students will create a game describing a 2-dimensional figure using its attributes. Students will discuss how to use a variety of digital platforms to create the game.

- **Computer Science**
  8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.
  5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of a situation.
  Activity: Students will roll a ball to determine how many seconds it takes the ball to roll 1 yard. Students will create function tables in a spreadsheet on the computer. Students will use the data to create coordinate grids.

Operations And Algebraic Thinking

- **Career Ready Practices**
  Act as a responsible and contributing community member and employee
  5.OAA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculator “add 8 and 7, then multiply by 2” as 2 X (8+7). Recognize that 3 X (18932 + 921) is three times as large as 18932 +921, without having to calculate the indicated sum or product.

Activity: Students will discuss various problems (given by the teacher) to explain what they know about the problems without having to solve them.

- **9.2 Career Awareness, Exploration, and Preparation**
  9.2.5.CAP.9: Justify reasons to have insurance.
  5.OAA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculator "add 8 and 7, then multiply by 2" as 2 X (8+7). Recognize that 3 X (18932 + 921) is three times as large as 18932 +921, without having to calculate the indicated sum or product.
  Activity: Students will work collaboratively to solve problems (given by the teacher) involving insurance (health, car, etc.). Students will discuss reasons to have insurance while determining "how many times" more they would pay if they did not have insurance.

- **9.4 Life Literacies and Key Skills**
  9.4.5.CT.4: Apply critical thinking and problem solving strategies to different types of problems such as personal, academic, community, and global.
  9.4.5.TL.1: Compare the common uses of at least two different digital tools and identify the advantages and disadvantages of using each.
  5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
  Activity: Students will work collaboratively to solve problems (given by the teacher) by adding parentheses, brackets, and/or braces to ensure the problem is equivalent to the given answer.

- **Computer Science**
  8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data.
  5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.
  Activity: Students will use a Google Spreadsheet to fulfill an in-out table (by creating rules for the spreadsheet to follow) using given rules and then graph them on a coordinate plane.