

Unit 1: Foundations of Algebra

Content Area: **Math**
Course(s):
Time Period: **Generic Time Period**
Length: **7 weeks**
Status: **Published**

Standards

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.DC.4	Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

Math Standards

MA.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
MA.6.EE.A.2a	Write expressions that record operations with numbers and with letters standing for numbers.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.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

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.

Transfer Goals and Career Ready Practices

Transfer Goals

The overall purpose of the unit is to introduce students to the foundations of reasoning - including justifying statements and answering "say why" questions - with mathematical expressions using variables and numbers.

Concepts

Essential Questions

- What are variables and how are they used?
- In what forms can related quantities be represented?
- What are the number properties and how are they used to justify statements of equivalence?

Understandings

- Reasoning skills are essential for working with numbers, variables, diagrams and justifying statements.
- Variables are used to express number properties.
- The number properties (commutative property, associative property, identity properties of addition and multiplication, distributive property, and inverse properties) are used to justify statements of equivalence.
- Formulas, tables and graphs represent related quantities.

Critical Knowledge and Skills

Knowledge

Students will know:

- How to use diagrams to show that two amounts are equal.
- How to justify statements as always true, sometimes true, or never true.
- That multiplication and addition are commutative and associative.
- That 1 multiplicative identity.
- That 0 is the additive identity.
- The inverse properties of addition and multiplication.
- That multiplication distributes over addition and understand the Distributive Property.

Skills

Students will be able to:

- Justify statements about mathematical expressions in which variables are used to stand for numbers.
- Learn the conventions for using numbers and variables in mathematical expressions.
- Use parentheses to clarify expressions.
- Use variables in the formulas for the area and perimeter of a rectangle.
- Use number properties of multiplication and addition through the commutative and associative properties.
- Use variables, tables, and formulas to represent quantities that vary in relation to each other.
- Use the distributive property.
- Represent the relationship between two quantities as a graph.
- Begin to learn the strategies for interpreting, representing, and solving word problems.
- Practice understanding the situation described in a word problem, using a problem situation without questions.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Homework
- Quizzes
- Exit Tickets
- Reflections
- Performance Tasks - "Putting it to Work"

School Summative Assessment Plan

- Unit Assessment

Primary Resources

Supplementary Resources

- OnRamp to Algebra - Pearson Realize
- Making Number Talks Matter by Cathy Humphreys & Ruth Parker
- Routines for Reasoning: Fostering the Mathematical Practices in All Students by Grace Kelemanik et al
- IXL

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**
 - Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
 - GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.
- **One to One Student's laptop**
 - All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

Gifted Students (N.J.A.C.6A:8-3.1)

- ☐ Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.
- ☐ Students create posters that organize and summarize information. Students can present information to their classmates.

English Language Learners (N.J.A.C.6A:15)

- ☐ When discussing different ways of solving problems, focus on keywords and phrases. ELL Students might also benefit by using concrete objects to demonstrate different concepts.
- ☐ Create place cards or simple signs for students using the vocabulary words. They can use the signs as a reference throughout the lesson.
- ☐ Work with ELL Teacher to allow for all assignments to be completed with extra time.
- ☐ Pair ELL students with a student who is fluent in English.

At-Risk Students (N.J.A.C.6A:8-4.3c)

- ☐ Encourage students to sketch and label diagrams to represent situations. Remind them to refer back to their sketches and labels as they work through problems.
- ☐ Have students create graphic organizers, modeling tables that focus on vocabulary words or break down information into smaller chunks.
- ☐ Students will use manipulatives to model abstract concepts.

Special Education Students (N.J.A.C.6A:8-3.1)

- ☐ All IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

ELA - Students will apply reasoning skills to justify statements. Students will justify statements through oral and written communication.

SCIENCE -

SOCIAL STUDIES -

WORLD LANGUAGES -

VISUAL/PERFORMING ARTS -

APPLIED TECHNOLOGY -

BUSINESS EDUCATION -

GLOBAL AWARENESS -

Learning Plan / Pacing Guide

Week 1: Week of Introduction 9-3-18

- Classroom rules
- Organization set-up: folders, Google Classroom
- Inspirational Math videos

Week 2: 9-10-18

- Lesson 1: Reasoning with Diagrams
- Lesson 2: Reasoning with Numbers
- Lesson 3: Reasoning with Variables
- Lesson 4: Conventions for Using Numbers & Variables
- Lesson 5: Conventions for Using Parentheses

Student classwork and homework practice: IXL level e.e2,.e5,e6,e7,

Week 3: 9-17-18

- Review Lessons 1-5
- Quiz 1
- Lesson 6: The Number Properties
- Lesson 7: Putting It Together - Conventions & Number Properties
- Lesson 8: Using Variables & Formulas

Classroom and homework practice IXL E.O.5 using variables to represent real world problems.

Number properties IXL - Level E. N9, N.10

Week 4: 9-24-18

- Lesson 9: Distributive Property
- Lesson 10: Putting Mathematics to Work - Applying the Distributive Property
- Lesson 11: The Inverses of Addition & Multiplication
- Lesson 12: Putting It Together - Progress Check - to review definitions, conventions, and properties and how they can help with mathematical reasoning
- Mid-Unit Review

Classwork and Homework IXL practice - Level E.N2, N.7

Week 5:10-1-18

- Mid Unit Review
- Mid-Unit Assessment
- Lesson 13: Relationships Between Quantities
- Lesson 14: Using Graphs to Represent Relationships

Week 6: 10-8-18

- Lesson 15: Understanding the Problem Situations
- Review
- Quiz 2
- Lesson 16: Representing Problem Situations

Week 7: 10-15-18

- Lesson 17: Writing Formulas to Answer Questions
- Lesson 18: Putting It Together - Unit Review
- Unit Review
- Unit Assessment
- Comprehensive Assessment*

Unit 2: Positive and Negative Numbers

Content Area: **Math**
Course(s):
Time Period: **Generic Time Period**
Length: **5 weeks**
Status: **Published**

Standards

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.DC.4	Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

Math Standards

MA.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.
MA.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.
MA.6.NS.C.7	Understand ordering and absolute value of rational numbers.
MA.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.
MA.7.NS.A.1	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
MA.7.NS.A.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
MA.7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
MA.7.NS.A.1c	Understand subtraction of rational numbers as adding the additive inverse, $a - b = a + (-b)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

Mathematical Practices

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.

MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Transfer Goals and Career Ready Practices

Transfer Goals

Students will build understanding of the concepts of the extended number line with attention firmly focused on the correct use of language.

Concepts

Essential Questions

- How do the terms "plus" and "minus" differ from the terms "positive" and "negative"?
- How can the number line be used to represent addition, subtraction, and multiplication of signed numbers?
- What is absolute value?

Understandings

- The terms "positive" and "negative" are used to denote the sign of a number; the terms "plus" and "minus" are used only for operations on numbers.
- Addition is demonstrated by moving on the number line in the direction of the value of the number being added.
- Subtraction is the distance between two numbers on the number line.
- Multiplication of a negative number by a positive number can be interpreted on the number line as repeated additions of the negative number. The result is a negative number.
- The absolute value of a number is its distance from zero on a number line.

Critical Knowledge and Skills

Knowledge

Students will know:

- Positive and negative rational numbers correspond to points on the number line.
- '0' is neither negative nor positive, but it is a rational number.
- Concepts of negative and positive directions in talking about the number line.
- The commutative and associative properties hold for adding and multiplying negative and positive numbers.

Skills

Students will be able to:

- Use the concepts of negative and positive directions in talking about the number line.
- Compare rational numbers using the relations $<$, $>$, \leq , and \geq .
- Use the distributive property in relation to negative and positive numbers.
- Use the number line to represent addition and subtraction of positive and negative numbers.
- Add, subtract, multiply and divide positive and negative numbers.
- Apply the definition of absolute value to solve simple equations and inequalities.
- Solve word problems involving positive and negative numbers.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Homework
- Quizzes
- Exit Tickets
- Reflections
- Performance Tasks - "Putting it to Work"

School Summative Assessment Plan

- Unit Assessment

Primary Resources

Supplementary Resources

- OnRamp to Algebra - Pearson Realize
- Making Number Talks Matter by Cathy Humphreys & Ruth Parker
- Routines for Reasoning: Fostering the Mathematical Practices in All Students by Grace Kelemanik et al
- IXL

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**
 - Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
 - GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.
- **One to One Student's laptop**
 - All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

Gifted Students (N.J.A.C.6A:8-3.1)

- ☐ Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.
- ☐ Students create posters that organize and summarize information. Students can present information to their classmates.

English Language Learners (N.J.A.C.6A:15)

- ☐ When discussing different ways of solving problems, focus on keywords and phrases. ELL Students might also benefit by using concrete objects to demonstrate different concepts.
- ☐ Create place cards or simple signs for students using the vocabulary words. They can use the signs as a reference throughout the lesson.
- ☐ Work with ELL Teacher to allow for all assignments to be completed with extra time.
- ☐ Pair ELL students with a student who is fluent in English.

At-Risk Students (N.J.A.C.6A:8-4.3c)

- ☐ Encourage students to sketch and label diagrams to represent situations. Remind them to refer back to their sketches and labels as they work through problems.
- ☐ Have students create graphic organizers, modeling tables that focus on vocabulary words or break down information into smaller chunks.
- ☐ Students will use manipulatives to model abstract concepts.

Special Education Students (N.J.A.C.6A:8-3.1)

- ☐ All IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

ELA - Students will apply reasoning skills to justify statements. Students will justify statements through oral and written communication.

SCIENCE - Students will investigate the effects of hot air and weight on a Hot Air Balloon. Students will

solve problems relating air temperature to altitude.

SOCIAL STUDIES -

WORLD LANGUAGES -

VISUAL/PERFORMING ARTS -

APPLIED TECHNOLOGY -

BUSINESS EDUCATION -

GLOBAL AWARENESS - Students will solve problems regarding a flight from Beijing, China to San Francisco.

Learning Plan / Pacing Guide

Week 1

- Lesson 1: Extending the Number Line
- Lesson 2: Putting Numbers in Order
- Lesson 3: Adding with Negative Numbers
- Lesson 4: Subtracting with Negative Numbers
- Lesson 5: Adding & Subtracting

Classwork and Homework IXL Level I, B2, B5, C2, C3

Week 2

- Lesson 6: Putting Mathematics to Work - Balloon Model
- Lesson 7: Putting It Together - Reviewing Addition & Subtraction
- Quiz 1
- Lesson 8: Multiplying & Dividing
- Lesson 9: Order of Operations

Classwork and Homework IXL Level I C.7, E. M 11

Week 3

- Lesson 10: Mixed Operations
- Lesson 11: Number Properties
- Lesson 12: Putting It Together - Progress Check and review
- Quiz 2

- Lesson 13: Absolute Value

Week 4

- Lesson 14: Putting Mathematics to Work - It's Cold Up There
- Lesson 15: Word Problems

Week 5

- Lesson 16: Putting it Together - Unit Review
- Unit Review
- Unit Assessment

Unit 3: Showing Relationships with Graphs

Content Area: **Math**
Course(s):
Time Period: **Generic Time Period**
Length: **5 weeks**
Status: **Published**

Standards

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.DC.4	Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

Math Standards

MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.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.
MA.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.
MA.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.
MA.6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.
MA.7.RP.A.2a	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
MA.7.RP.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
MA.7.RP.A.2c	Represent proportional relationships by equations.
MA.7.RP.A.2d	Explain what a point $(\frac{a}{b}, \frac{c}{d})$ on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, \frac{c}{d})$ where $\frac{c}{d}$ is the unit rate.
MA.8.F.A.3	Interpret the equation $y = \frac{c}{d}x + \frac{e}{f}$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
MA.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the

rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

MA.8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
MA.8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
MA.8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .
MA.8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.
MA.8.EE.C.8a	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
MA.8.EE.C.8c	Solve real-world and mathematical problems leading to two linear equations in two variables.
MA.8.SP.A.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Mathematical Practices

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Transfer Goals and Career Ready Practices

Transfer Goals

Recognize and represent proportional relationships between quantities using graphs.

Concepts

Essential Questions

- What is slope, and how is it useful in both creating and reading graphs?
- What are the benefits of using graphs to model real-life situations?
- How can ratios be determined from information given in a table of values, in a set of ordered pairs, or from a graph on the coordinate plane?
- What is the solution to a system of linear equations?
- What kind of real-life problems can be solved using real-life systems?

Understandings

- Graphs that represent proportional relationships are always straight lines, and the constant of proportionality is the slope of the graph.
- A ratio can be used to define a relationship between two quantities that vary.
- Interpret the equation of a line in the form $y=mx+b$.

Critical Knowledge and Skills

Knowledge

Students will know:

- Slopes are constants of proportionality.
- k or m represents the slope of the graph and a constant increase or constant decrease.
- Different representations of k , identifying types of proportional relationships and different types of constants of proportionality
- Relationships between quantities can be represented using tables, graphs, and formulas.
- Linear rates of changes and how they relate to slope.

Skills

Students will be able to:

- Plot points given in an (x, y) table where x and y are any rational number.
- Draw a line given two points.
- Learn how to find the slope of a line, and what the slope means in different relationships between

quantities.

- Recognize the $y = mx$ or $y = kx$ form.
- Understand different representations of k , identifying types of proportional relationships and different types of constants of proportionality.
- Interpret and determine the sign of m or k by incline or decline of a line.
- Use graphs to estimate the output, given a specific input, and to estimate the possible inputs, given a specific output.
- Identify slope from an equation, table, line or two points.
- Understand linear rates of change and how they relate to slope.
- Model real-world phenomena using graphs and tables.
- Solve word problems that describe situations modeled by arithmetic operations and represent the relationship between the quantities using graphs, tables and formulas.
- Distinguish between linear and nonlinear equations (only graphically).
- Generalize to $y = mx + b$ form.
- Determine the y-intercept of a line from a graph and be able to explain the y-intercept.
- Identify and interpret parallel and perpendicular lines.
- Model real-world phenomena with general $y = mx + b$ form.
- Use linear models in problem solving.
- Solve systems of equations in two variables by graphing the equations.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Homework
- Quizzes
- Exit Tickets
- Reflections
- Performance Tasks - "Putting it to Work"

School Summative Assessment Plan

- Unit Assessment

Primary Resources

Supplementary Resources

- OnRamp to Algebra - Pearson Realize
- Making Number Talks Matter by Cathy Humphreys & Ruth Parker
- Routines for Reasoning: Fostering the Mathematical Practices in All Students by Grace Kelemanik et al
- IXL

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**

- Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
- GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.

- **One to One Student's laptop**

- All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

Gifted Students (N.J.A.C.6A:8-3.1)

- ☐ Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.
- ☐ Students create posters that organize and summarize information. Students can present information to

their classmates.

English Language Learners (N.J.A.C.6A:15)

- ☐ When discussing different ways of solving problems, focus on keywords and phrases. ELL Students might also benefit by using concrete objects to demonstrate different concepts.
- ☐ Create place cards or simple signs for students using the vocabulary words. They can use the signs as a reference throughout the lesson.
- ☐ Work with ELL Teacher to allow for all assignments to be completed with extra time.
- ☐ Pair ELL students with a student who is fluent in English.

At-Risk Students (N.J.A.C.6A:8-4.3c)

- ☐ Encourage students to sketch and label diagrams to represent situations. Remind them to refer back to their sketches and labels as they work through problems.
- ☐ Have students create graphic organizers, modeling tables that focus on vocabulary words or break down information into smaller chunks.
- ☐ Students will use manipulatives to model abstract concepts.

Special Education Students (N.J.A.C.6A:8-3.1)

- ☐ All IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

ELA - Students will apply reasoning skills to justify statements. Students will justify statements through oral and written communication.

SCIENCE - Students solve multi-step problems using rate, average speed, distance and time. Solve multi-step problems involving volume, rate and time.

SOCIAL STUDIES -

VISUAL/PERFORMING ARTS -

APPLIED TECHNOLOGY -

BUSINESS EDUCATION -

GLOBAL AWARENESS -

Learning Plan / Pacing Guide

Week 1

- Lesson 1: Building the Coordinate Plane
- Lesson 2: Constant Ratios & Graphing
- Lesson 3: How Steep is the Line
- Lesson 4: Introducing Slope

Week 2

- Lesson 5: Graphing Negative Values
- Lesson 6: Relationships without a Constant Ratio
- Lesson 7: Putting Mathematics to Work - Graphs Showing Speed
- Review
- Quiz 1
- Lesson 8: Graphing Geometric Relationships

Week 3

- Lesson 9: Graphing Discrete & Continuous Data
- Lesson 10: Putting It Together - Progress Check
- Lesson 11: Linear Graphs
- Lesson 12: Focus on Slope
- Lesson 13: Parallel & Perpendicular Lines

Week 4

- Review
- Quiz 2
- Lesson 14: Putting Mathematics to Work - Water Tank Problem
- Lesson 15: Algebra of the Water Tank Problem
- Lesson 16: Solving Systems by Graphing

Week 5

- Lesson 17: Putting Mathematics to Work - Interpreting Graphs
- Lesson 18: Putting It Together - Unit Review
- Unit Review
- Unit Assessment
- Comprehensive Review

Unit 4: Expressions, Equations and Exponents

Content Area: **Math**
Course(s):
Time Period: **Generic Time Period**
Length: **8 weeks**
Status: **Published**

Standards

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.DC.4	Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

Math Standards

MA.6.EE.A.1	Write and evaluate numerical expressions involving whole-number exponents.
MA.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
MA.6.EE.A.2b	Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
MA.6.EE.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.
MA.6.EE.B.8	Write an inequality of the form $x > p$ or $x < p$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > p$ or $x < p$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MA.7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
MA.8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
MA.8.EE.A.1	Know and apply the properties of integer exponents to generate equivalent numerical

expressions.

MA.8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
MA.8.EE.A.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other.
MA.8.EE.A.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
MA.8.EE.C.7	Solve linear equations in one variable.
MA.8.EE.C.7b	Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Mathematical Practices

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Transfer Goals and Career Ready Practices

Transfer Goals

Expressions are used to represent quantities and write equations.

Concepts

Essential Questions

- How can one-step, two-step and multi-step equations be solved?
- What are the properties/operations involving exponents?
- How do we identify if terms are like terms and can be combined?
- What do the algebraic and graphical solutions to an equation or inequality represent?

Understandings

- Exponents represent the operations of multiplication and division.
- Equations are statements of equality between two expressions.
- Expressions (and equations) can be used to model (and solve) real-life problems.
- An inequality is a representation of two quantities which may not be equivalent.
- The solution to an inequality represents a range of possible solutions.
- Like terms are terms with identical variable parts.

Critical Knowledge and Skills

Knowledge

Students will know:

- The difference between solving an equation and evaluating an expression.

Skills

Students will be able to:

- Use the number properties to write equivalent expressions that represent the same quantity.
- Use algebraic terminology (e.g. variable, equation, term, coefficient, expression, constant) correctly.
- Evaluate expressions by substituting values into variables.
- Represent quantities using corresponding area models and expressions.
- Use the number of properties to combine like terms.
- Use expressions to combine quantities that have different units.
- Add and subtract expressions.
- Write the expressions for the perimeters and areas of geometric figures.
- Express numbers and variables using exponential notation.
- Multiply and divide numbers into exponential form.
- Complete operations involving parentheses with numbers in exponential form.

- Evaluate expressions with negative exponents.
- Understand and apply the Pythagorean Theorem.
- Write and interpret number using scientific notation.
- Use the Addition and Multiplication Properties of Equality to solve equations.
- Solve equations by using more than one property of equality.
- Solve equations that require simplification by using number properties and the order of operations.
- Solve simple inequalities.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Homework
- Quizzes
- Exit Tickets
- Reflections
- Performance Tasks - "Putting it to Work"

School Summative Assessment Plan

- Unit Assessment

Primary Resources

Supplementary Resources

- OnRamp to Algebra - Pearson Realize
- Making Number Talks Matter by Cathy Humphreys & Ruth Parker
- Routines for Reasoning: Fostering the Mathematical Practices in All Students by Grace Kelemanik et al
- IXL

Technology Integration and Differentiated Instruction

Technology Integration

• Google Products

- Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
- GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.

• One to One Student's laptop

- All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

Gifted Students (N.J.A.C.6A:8-3.1)

- ☐ Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.
- ☐ Students create posters that organize and summarize information. Students can present information to their classmates.

English Language Learners (N.J.A.C.6A:15)

- ☐ When discussing different ways of solving problems, focus on keywords and phrases. ELL Students might also benefit by using concrete objects to demonstrate different concepts.
- ☐ Create place cards or simple signs for students using the vocabulary words. They can use the signs as a reference throughout the lesson.
- ☐ Work with ELL Teacher to allow for all assignments to be completed with extra time.

- ☐ Pair ELL students with a student who is fluent in English.

At-Risk Students (N.J.A.C.6A:8-4.3c)

- ☐ Encourage students to sketch and label diagrams to represent situations. Remind them to refer back to their sketches and labels as they work through problems.
- ☐ Have students create graphic organizers, modeling tables that focus on vocabulary words or break down information into smaller chunks.
- ☐ Students will use manipulatives to model abstract concepts.

Special Education Students (N.J.A.C.6A:8-3.1)

- ☐ All IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

ELA - Students will apply reasoning skills to justify statements. Students will justify statements through oral and written communication. Write a real-world equation that represents a given equation/inequality. Error analysis.

SCIENCE -

SOCIAL STUDIES -

WORLD LANGUAGES -

VISUAL/PERFORMING ARTS -

APPLIED TECHNOLOGY -

BUSINESS EDUCATION -

GLOBAL AWARENESS -

Learning Plan / Pacing Guide

Week 1

- Lesson 1: Representing Quantities with Expressions
- Lesson 2: Evaluating Expressions

- Lesson 3: Exponents
- Lesson 4: Operations with Exponents
- Lesson 5: Expressions & Area Models

Classwork and Homework practice IXL: Level F. F.9, G.1, G2 - Writing expressions

IXL: Level G. E1,E2, D.2- evaluating exponents

Week 2:

- Review
- Quiz 1

Week 3:

- Lesson 6: Combining Like Terms
- Lesson 7: Putting Mathematics to Work: Combining Quantities
- Lesson 8: Adding & Subtracting Expressions

Classwork and homework practice IXL- Like Terms- Level H. Y14, Level I.R.13

Week 4:

- Lesson 9: Parentheses & Exponents
- Review
- Quiz 2
- Lesson 10: Negative Exponents
- Lesson 11: Scientific Notation
- Lesson 12: Estimating Square Roots
- Lesson 13: The Pythagorean Theorem
- Lesson 14: Putting Mathematics to Work - Applying the Pythagorean Theorem

Classwork and Homework practice IXL- Negative exponents- Level K. V.3, H.D.6, H.D7

Week 5

- Lesson 15: Putting It Together - Progress Check
- Mid-Unit Review
- Mid-Unit Assessment
- Lesson 16: Writing Equivalent Expressions
- Lesson 17: Using Expressions in Geometry

Week 6

- Lesson 18: Writing Equations

- Lesson 19: Addition Property of Equality
- Lesson 20: Multiplication Property of Equality
- Lesson 21: Combining the Properties of Equality

Week 7

- Lesson 22: Solving Equations Requiring Simplification
- Review
- Quiz 3
- Lesson 23: Inequalities
- Lesson 24: Putting It Together - Unit Review

Week 8

- Unit Review
- Unit Review
- Unit Assessment

-

Unit 5: Ratio and Proportionality

Content Area: **Math**
Course(s):
Time Period: **Generic Time Period**
Length: **8 weeks**
Status: **Published**

Standards

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.DC.4	Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

Math Standards

MA.6.G.A.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.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
MA.6.RP.A.2	Understand the concept of a unit rate $\frac{a}{b}$ associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
MA.6.RP.A.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
MA.6.RP.A.3a	Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.6.RP.A.3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
MA.7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
MA.7.NS.A.1c	Understand subtraction of rational numbers as adding the additive inverse, $a - b = a + (-b)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.
MA.7.RP.A.2a	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

MA.7.RP.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
MA.7.RP.A.2c	Represent proportional relationships by equations.
MA.7.RP.A.2d	Explain what a point $(\frac{1}{r}, \frac{1}{r})$ on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, \frac{1}{r})$ where $\frac{1}{r}$ is the unit rate.
MA.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(\frac{1}{r}, \frac{1}{r})$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MA.8.EE.B.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

Mathematical Practices

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.7	Look for and make use of structure.

Transfer Goals and Career Ready Practices

Transfer Goals

The concept of ratios will be explored in algebraic, geometric and algebraic contexts.

Concepts

Essential Questions

- How are ratios, rates and unit rates applicable to real-life situations?
- What are proportions, and how can they be used to solve real-life problems?
- In what ways can proportional relationships be represented?

Understandings

- There is a difference between comparing numbers by subtraction and comparing numbers by division.
- A ratio is a comparison of two quantities using division.
- Ratios are used to make comparisons of magnitude, which are scale independent, and convert from one unit of measurement to another.
- Ratio tables can be a powerful aid in understanding ratio and proportion.
- Proportional relationships can be represented with a formula and a graph.

Critical Knowledge and Skills

Knowledge

Students will know:

- A ratio is a comparison by division.
- Percentages are standardized ratios with denominators of 100.
- Conversion factors are unit ratios.
- Directly and inversely proportional relationships can be defined as functions.

Skills

Students will be able to:

- Represent ratios and percents with concrete models, fractions, and decimals.
- Interpret and use ratios in different contexts (e.g. batting averages, miles per hour) to show the relative sizes of two quantities, using appropriate notations (a/b , a to b , $a:b$).
- Choose appropriate units of measure and use ratios to convert within and between measurement systems.
- Identify proportional relationships.
- Distinguish between rate and ratio.
- Express equivalent ratios as a proportion.
- Use proportionality to model problems.
- Reduce and enlarge images using a scale factor.
- Represent proportional relationships in tables, formulas, and graphs.
- Identify the constant of proportionality in different contexts.
- Solve problems using dimensional analysis.
- Use proportional relationships to solve real-world problems.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Homework
- Quizzes
- Exit Tickets
- Reflections
- Performance Tasks - "Putting it to Work"

School Summative Assessment Plan

- Unit Assessment

Primary Resources

Supplementary Resources

- OnRamp to Algebra - Pearson Realize
- Making Number Talks Matter by Cathy Humphreys & Ruth Parker
- Routines for Reasoning: Fostering the Mathematical Practices in All Students by Grace Kelemanik et al
- IXL

Technology Integration and Differentiated Instruction

Technology Integration

- Google Products

- Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
- GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.

● One to One Student's laptop

- All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

Gifted Students (N.J.A.C.6A:8-3.1)

- ☐ Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.
- ☐ Students create posters that organize and summarize information. Students can present information to their classmates.

English Language Learners (N.J.A.C.6A:15)

- ☐ When discussing different ways of solving problems, focus on keywords and phrases. ELL Students might also benefit by using concrete objects to demonstrate different concepts.
- ☐ Create place cards or simple signs for students using the vocabulary words. They can use the signs as a reference throughout the lesson.
- ☐ Work with ELL Teacher to allow for all assignments to be completed with extra time.
- ☐ Pair ELL students with a student who is fluent in English.

At-Risk Students (N.J.A.C.6A:8-4.3c)

- ☐ Encourage students to sketch and label diagrams to represent situations. Remind them to refer back to their sketches and labels as they work through problems.
- ☐ Have students create graphic organizers, modeling tables that focus on vocabulary words or break down

information into smaller chunks.

- ☐ Students will use manipulatives to model abstract concepts.

Special Education Students (N.J.A.C.6A:8-3.1)

- ☐ All IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

ELA - Students will apply reasoning skills to justify statements. Students will justify statements through oral and written communication.

SCIENCE -

SOCIAL STUDIES -

WORLD LANGUAGES -

VISUAL/PERFORMING ARTS -

APPLIED TECHNOLOGY - Solve problems involving the measurements of a car's dashboard logistics.

BUSINESS EDUCATION - Use ratios to calculate unit price and solve problems.

GLOBAL AWARENESS -

Learning Plan / Pacing Guide

Week 1: 1-7-19

- Lesson 1: Comparing Quantities
- Lesson 2: Representing Ratios
- Lesson 3: Unit Ratios and Equal Ratios
- Lesson 4: Ratio Tables
- Lesson 5: Putting Mathematics to Work - Solving Proportion Problems with Ratio Tables

Week 2: 1-14-19

- Review
- Quiz 1
- Midterm Review
- Midterm Review

Week 3: 1-21-19

- Midterm Review
- Midterm Exams

Week 4: 1-28-19

- Midterm Exams
- Lesson 6: More About Solving Proportion Problems
- Lesson 7: Introducing Rates
- Lesson 8: Putting It Together - Reviewing Ratio & Arithmetic
- Lesson 9: Enlarging & Reducing
- Lesson 10: Scale Factor & Ratio
- Mid-Unit Review

Week 5: 2-4-19

- Mid-Unit Review
- Mid-Unit Assessment
- Lesson 11: Unit Price
- Lesson 12: Unit Conversion
- Lesson 13: Unit Analysis
- Lesson 14: Representing Proportional Relationships
- Lesson 15: Identifying Proportional Relationships

•

Week 6: 2-11-19

- Lesson 16: Graphing Proportional Relationships
- Lesson 17: Formulas & Proportional Relationships
- Review
- Quiz 3

Week 7: 2-18-19

- Lesson 18: Introducing Functions
- Lesson 19: Inversely Proportional Relationships
- Lesson 20: Putting Mathematics to Work - Proportionality
- Lesson 21: Putting Mathematics to Work - Geometry, Ratio, and Proportionality
- Lesson 22: Putting Mathematics to Work - Mountain Trip

Week 8: 2-25-19

- Lesson 23: Putting It Together - Unit in Review
- Unit in Review

- Unit Assessment
- Comprehensive Assessment

Unit 6: Operations with Fractions

Content Area: **Math**
Course(s):
Time Period: **Generic Time Period**
Length: **5 weeks**
Status: **Published**

Standards

TECH.9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
TECH.9.4.12.DC.4	Explain the privacy concerns related to the collection of data (e.g., cookies) and generation of data through automated processes that may not be evident to users (e.g., 8.1.12.NI.3).
TECH.9.4.12.IML.1	Compare search browsers and recognize features that allow for filtering of information.

Math Standards

MA.4.NF.B.3	Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.
MA.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.
MA.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.
MA.5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
MA.5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
MA.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

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Transfer Goals and Career Ready Practices

Transfer Goals

The main purpose is for students to explore the properties of operations with fractions and to apply their understanding of the concepts to real world problems

Concepts

Essential Questions

- How are fractions added, subtracted, multiplied and divided?
- How can you solve equations with fractions using inverse operations?

Understandings

- Number lines and area models can be used to add and subtract fractions with like and unlike denominators.
- Adding and subtracting fractions with unlike denominators by using equivalent fractions or by using the least common multiple to write common denominators.
- Repeated addition, number lines, and area models can be used to show the multiplication of a whole number by a fraction.
- Multiplication of fractions can be represented algebraically.
- The inverse relationship between addition and subtraction can be used to solve equations.
- Dividing by a/b is the same as multiplying by b/a .
- Commutative Property of Multiplication and the Distributive Property can be applied to fractions.

Critical Knowledge and Skills

Knowledge

Students will know:

- How to order fractions and place them on a number line.
- How to represent fractions and translate between these representations.
- Any fraction can be written as an equivalent fraction, and know why equivalent fractions represent the same point on the number line
- How to accurately perform manual, multistep calculations involving addition, subtraction, multiplication, and division of rational numbers when expressed as fractions; in particular, know that when adding two fractions a/b and c/d the easiest common denominator to use is bd .

Skills

Students will be able to:

- Add and subtract fractions with common denominators.
- Add fractions to that have different denominators.
- Multiply a fraction by a whole number, and to write equivalent equations using division.
- Multiply fractions and find products using area models
- Subtract fractions with different denominators.
- Apply the concepts of adding and subtracting fractions to solve a problem.
- Divide with fractions.
- Apply the number properties to operations with fractions.
- Solve problems using operations with fractions.

Assessment and Resources

School Formative Assessment Plan (Other Evidence)

- Homework
- Quizzes
- Exit Tickets
- Reflections
- Performance Tasks - "Putting it to Work"

School Summative Assessment Plan

- Unit Assessment

Primary Resources

Supplementary Resources

- OnRamp to Algebra - Pearson Realize
- Making Number Talks Matter by Cathy Humphreys & Ruth Parker
- Routines for Reasoning: Fostering the Mathematical Practices in All Students by Grace Kelemanik et al
- IXL

Technology Integration and Differentiated Instruction

Technology Integration

- **Google Products**
 - Google Classroom - Used for daily interactions with the students covering a vast majority of different educational resources (Daily Notes, Exit Tickets, Classroom Polls, Quick Checks, Additional Resources/ Support, Homework, etc.)
 - GAFE (Google Apps For Education) - Using various programs connected with Google to collaborate within the district, co-teachers, grade level partner teacher, and with students to stay connected with the content that is covered within the topic. Used to collect data in real time and see results upon completion of the assignments to allow for 21st century learning.
- **One to One Student's laptop**
 - All students within the West Deptford School District are given a computer, allowing for 21st century learning to occur within every lesson/topic.

Differentiated Instruction

Gifted Students (N.J.A.C.6A:8-3.1)

- ☐ Within each lesson, the Gifted Students are given choice on topic and subject matter allowing them to explore interests appropriate to their abilities, areas of interest and other courses.
- ☐ Students create posters that organize and summarize information. Students can present information to their classmates.

English Language Learners (N.J.A.C.6A:15)

- ☐ When discussing different ways of solving problems, focus on keywords and phrases. ELL Students might also benefit by using concrete objects to demonstrate different concepts.
- ☐ Create place cards or simple signs for students using the vocabulary words. They can use the signs as a reference throughout the lesson.
- ☐ Work with ELL Teacher to allow for all assignments to be completed with extra time.
- ☐ Pair ELL students with a student who is fluent in English.

At-Risk Students (N.J.A.C.6A:8-4.3c)

- ☐ Encourage students to sketch and label diagrams to represent situations. Remind them to refer back to their sketches and labels as they work through problems.
- ☐ Have students create graphic organizers, modeling tables that focus on vocabulary words or break down information into smaller chunks.
- ☐ Students will use manipulatives to model abstract concepts.

Special Education Students (N.J.A.C.6A:8-3.1)

- ☐ All IEP modifications will be honored (ie. hard copies of notes, directions restated, etc.)

Interdisciplinary Connections

ELA - Students will apply reasoning skills to justify statements. Students will justify statements through oral and written communication. Students will write their own real world problem about distance.

SCIENCE - Students will determine the shortest distance from a waterfall to a rock. Students will apply units of measurement.

SOCIAL STUDIES -

WORLD LANGUAGES -

VISUAL/PERFORMING ARTS -

APPLIED TECHNOLOGY -

BUSINESS EDUCATION -

GLOBAL AWARENESS -

Learning Plan / Pacing Guide

Week 1

- Lesson 1: Adding & Subtracting Fractions
- Lesson 2: Adding with Different Denominators
- Lesson 3: Multiplying by a Whole Number
- Lesson 4: Multiplying Fractions
- Lesson 5: Progress Check

Week 2

- Review
- Quiz 1
- Lesson 6: Finding Differences
- Lesson 7: Addition and Subtraction as Inverse operations
- Lesson 8: Putting Mathematics to Work - Shortest Distance

Week 3

- Lesson 9: Dividing Fractions
- Lesson 10: Mixed Operations

Week 4

- Lesson 11: Putting It Together - Progress Check
- Review
- Quiz 2
- Lesson 12: Putting Mathematics to Work - Shortest Time
- Lesson 13: Putting It Together - Unit Review

Week 5

- Unit Review
- Unit Assessment
- Comprehensive Review

