PARCC MATH - SYLLABUS

2017-2018 Academic School-Year

1st Marking Period

***Students will be taking the PSAT in October, the first marking period material should include a PSAT review.*

UNIT 1: Number and Numerical Operations

- Rational and Irrational Numbers (NJSLS-8.NS.A.1, NJSLS-8.NS.A.2)

- Properties of Real Numbers (NJSLS-6.NS.C.5, NJSLS-6.NS.C.6)

- Ordering Real Numbers (NJSLS-7.NS.A.2.D, NJSLS-6.NS.C.6.A)

Assessment

- Order of Operations (NJSLS-5.OA.A.1, NJSLS-5.OA.A.2, NJSLS-5.OA.B.3)

- Operations with Different Types of Numbers (NJSLS-7.NS.A.3)

- Rules of Exponents (NJSLS-N-RN.A.1, NJSLS-N-RN.A.2)

- Numbers with Fractional and Negative Exponents (NJSLS-N-RN.A.1, NJSLS-N-RN.A.2)

Assessment

- Operations on Matrices (NJSLS-N-VM.B.5)

- Limitations on Estimations (NJSLS-N-Q.A.2)

Assessment

UNIT 2: Patterns & Algebra

- Relations and Functions (NJSLS-A-SSE.A.1, NJSLS-A-SSE.A.1.a)

- Rules for Patterns (NJSLS-8.F.A.1)

- Arithmetic and Geometric Sequences (NJSLS-F-BF.A.2)

Assessment

- Limits of Sequences and Functions (NJSLS-F-BF.A.2)

- Inductive Reasoning (NJSLS-8.F.A.2)

- Introducing Slopes (NJSLS-F.IF.B.6)

Assessment

- Slope-Intercept Form of a Line (NJSLS-8.F.B.4, NJSLS-8.F.B.5)

- Solving Systems of Two Linear Equations (NJSLS-8.EE.C.8.b)

- Solving Systems of Two Linear Inequalities (NJSLS-8.EE.C.8.c)

Assessment

- Identifying and Graphing Quadratic, Trigonometric, and Exponential Functions

    (NJSLS-F-LEA.1)

- Transformation of Functions (NJSLS-F-BF.B.3)

Assessment

2nd Marking Period

**Students will be taking the PARCC test in May, teachers should incorporate questions applicable to the PARCC test each student will take.

- Adding and Subtracting Polynomials (NJSLS-A-APR.A.1)

- Multiplying Monomials and Polynomials (NJSLS-A-APR.A.1)

- Dividing Monomials and Polynomials by Monomials (NJSLS-A-APR.B.3)

Assessment

- Evaluating Expressions (NJSLS-A-REI.A.1)

- Solving Linear Equations (NJSLS-A-REI.B.3)

- Solving Linear Inequalities (NJSLS-A-REI.A.2)

Assessment

- Solving Problems with Equations and Inequalities (NJSLS-A-REI.A.3)

- Factoring Quadratics (NJSLS-A-SSE.B.3.A)

Assessment

- Solving Quadratic Equations (NJSLS-A-SSE.B.3.B)

- Modeling and Solving Problems by Using Functions

    (NJSLS-F-LE.A.1)

Assessment

UNIT 3: Data Analysis, Probability, and Discrete Mathematics

- Surveys and Sampling: Advantages and Disadvantages of Selection Methods

    (NJSLS-S-IC.A.1, NJSLS-S-IC.A.2)

- Evaluating the Use of Data (NJSLS-S-ID.A.4)

Assessment

- Scatter Plots (NJSLS-S-ID.B.6.c)

- Variability (NJSLS-S-ID.B.5)

- Normal Distribution (NJSLS-S-ID.A.2)

- Independent and Dependent Probability (NJSLS-S-CP.A.1)

- Empirical Probability (NJSLS-S-CP.A.1)

Assessment

- Conditional Probability (NJSLS-S-CP.A.2, NJSLS-S-CP.B.6)

- Expected Value (NJSLS-S-CP.B.9)

Assessment

- Systematic Counting (NJSLS-S-CP.B.8)

- Vertex-Edge Graphs (NJSLS-G-MG.A.3)

Assessment

3rd Marking Period

**Students will be taking the PARCC test in May, teachers should incorporate questions applicable to the PARCC test each student will take.

UNIT 4: Geometry and Measurement

- Angles Formed by Parallel Lines and a Transversal (NJSLS-8.G.A.5, NJSLS-G-CO.C.9)

- Triangle Inequality Theorem (NJSLS-8.G.A.5)

- Segment Joining Midpoints of Two Side of a Triangle (NJSLS-G-MG.A.1)

Assessment

- Strategies to Determine Perimeter, Area,Surface Area, and Volume

    (NJSLS-G-MG.A.1, NJSLS-G-MG.A.2)

Free Response Question - Strategies & Practice

PARCC Review Packet - Strategies & Practice

UNIT 5: Basic Mathematical Skills

Basic Operations with Whole Numbers

- Addition and Subtraction of Whole Numbers (NJSLS-4.OA.A.1)

- Multiplication and Division of Whole Numbers (NJSLS-4.NBT.B.5, NJSLS-4.NBT.B.6)

- Word Problems with Whole Numbers (NJSLS-4.OA.A.3)

- Review of Whole Numbers (NJSLS-4.OA.A.1, NJSLS-4.NBT.B.5, NJSLS-4.NBT.B.6)

Assessment

4th *Marking Period*

**Students will be taking the PARCC test in May, teachers should incorporate questions applicable to the PARCC test each student will take. When PARCC test is complete students should be preparing to take the Accuplacer test.

Basic Operations with Fractions

- Proportions (NJSLS-7.RP.A.1, NJSLS-7.RP.A.2.A)

- Addition and Subtraction with Fractions (NJSLS-5.NF.A.1)

Assessment

- Multiplication and Division with Fractions (NJSLS-6.NS.A.1)

- Review of Fractions (NJSLS-7.RP.A.1, NJSLS-7.RP.A.2.A, NJSLS-6.NS.A.1)

Assessment

Basic Operations with Mixed Numbers

- Addition and Subtraction of Mixed Numbers (NJSLS-6.NS.B.2)

- Multiplication and Division of Mixed Numbers (NJSLS-6.NS.B.2)

Assessment

- Word Problems with Mixed Numbers (NJSLS-6.NS.B.2)

- Review of Mixed Numbers (NJSLS-6.NS.B.2)

Assessment

Basic Operations with Decimals

- Place Value and Rounding Decimals (NJSLS-7.NS.A.1)

- Ordering and Adding Decimals (NJSLS-7.NS.A.1)

- Subtraction of Decimals (NJSLS-7.NS.A.1.C)

Assessment

- Multiplication and Division of Decimals

  (NJSLS-6.NS.B.2, NJSLS-6.NS.B.3, NJSLS-7.NS.A.2.D)

- Word Problems with Decimals (NJSLS-6.NS.B.2, NJSLS-6.NS.B.3)

- Review of Decimals (NJSLS-6.NS.B.2, NJSLS-6.NS.B.3, NJSLS-7.NS.A.2.D)

Assessment

Percents

- Various Computations Involving Percents (NJSLS-7.RP.A.3)

Assessment

- WordProblems with Percents (NJSLS-N-Q.A.1, NJSLS-N-Q.A.2)

- Equivalent Measure (NJSLS-N-Q.A.2, NJSLS-N-Q.A.3)

Assessment

**End of Course: Have students review for their end of course tests for their main math course.

- Students are required to participate in both small and large group discussions and activities, as directed.
- Students are required to complete a project each marking period, including those which require the use of technology.
- Students are required to take notes in Cornell Notes format and maintain those notes in a neat and organized notebook.
- In the second portion of this course, students are required to complete all class work without the assistance of a calculator, in order to strengthen their basic computation skills.

Resources

Text Book: *Explorations in CORE MATH for common core, Holt McDougal*
Supplemental Materials: ALEKS (intervention program for individual students)

Assessment Information
Department of Mathematics - PARCC Prep. (2014-2015)

Marking Period 1	**Marking Per iod 2**	**Marking Period 3**	**Marking Period 4**
50% : **Assessment** *Given approximately once per week.*	50% : **Assessment** *Given approximately once per week.*	50% : **Assessment** *Given approximately once per week.*	50% : **Assessment** *Given approximately once per week.*
30% : **Projects** *Given at least once per marking period.*	30% : **Projects** *Given at least once per marking period.*	30% : **Projects** *Given at least once per marking period.*	30% : **Projects** *Given at least once per marking period.*
20% : **Class Participation**	20% : **Class Participation**	20% : **Class Participation**	20% : **Class Participation**

Black Horse Pike Regional School District Curriculum Template

ENGAGING STUDENTS ● FOSTERING ACHIEVEMENT ● CULTIVATING 21ST CENTURY GLOBAL SKILLS

Course Name: PARCC Math
Course Number: 039300

Unit 1: Numbers and Numerical Operations
PART I: UNIT RATIONALE
WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: Numbers and Numerical Operation **Grade Level(s):** 11	Unit Summary: In this unit students will learn about Real Numbers. They will learn about the properties of Real Numbers and use these properties to organize Real Numbers and perform all the basic operations of mathematics. Students will also learn about the rules for exponents, focusing on fractional and negative exponents. Students will also examine estimation and its limitations.
Essential Question(s): - What is a Rational Number? - What are the properties of real numbers? - How do you order real numbers? - How do you perform mathematical operations with different types of numbers? - What are the exponent rules? - What is the difference in meaning between fractional and negative exponents? - How do you perform operations on a matrix? - What are some of the limitations to estimation?	**Enduring Understanding(s):** Students will be able to: - Identify the various types of numbers with in the real numbers. - Identify and use the various properties of real numbers. - Organize real numbers on a number line. - Evaluate expressions using the order of operations - Perform the basic operations with a variety of number types. - Use exponent rules to simplify expressions. - Perform addition, subtraction, and scalar multiplication on matrices. - Use ratio and proportion to find percent of variation.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.
After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target and NJSLS

NJSLS-5.OA.A.1
Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
NJSLS-5.OA.A.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 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.
NJSLS-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. 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.
NJSLS-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.
NJSLS-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.
NJSLS-6.NS.C.6.a
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.
NJSLS-7.NS.A.2.d
Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
NJSLS-7.NS.A.3
Solve real-world and mathematical problems involving the four operations with rational numbers.
NJSLS-8.NS.A.1
Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
NJSLS-8.NS.A.2
Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
NJSLS-N-RN.A.1
Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.
NJSLS-N-RN.A.2
Rewrite expressions involving radicals and rational exponents using the properties of exponents.
NJSLS-N-VM.B.5.a
Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.
NJSLS-N-VM.A.2
Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.

Inter-Disciplinary Connections:

When possible lessons will have real-world application and free response questions.

Students will engage with the following text:

Explorations in CORE MATH for Common Core (Holt McDougal Mathematics)

Students will write:

Where applicable, lessons begin with students answering essential questions.
Students will also write as they summarize, restate and re-explain concepts during warm-up, exit ticket activities and reviews.
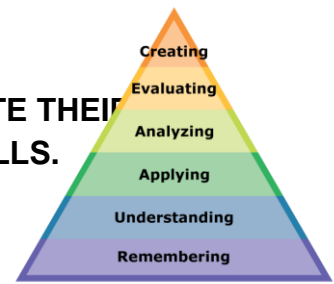
PART III: TRANSFER OF KNOWLEDGE AND SKILLS
DESCRIBE THE LEARNING EXPERIENCE.
How will students uncover content and build skills?

Students will uncover and build skills through various classroom learning activities. Cornell Notes and Guided Notes will be used to facilitate study skills. A blend of group activities, whole class discussion, modeling examples, applying real-life applications are strategies used in order to promote critical thinking, problem solving and the performance skills of all learners. Smart Board Technologies and ALEKS are used for individual students' needs and for developmental progress.

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR
UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Use manipulative material to build patterns or represent symbols.
Provide Graphic organizers to use in solving problems.
Provide guided notes/handouts.
Provide visual glossaries, blank number lines for use with positive and negative numbers.
Break problems into smaller pieces.
Have students keep and turn in a notebook.
Allow students to use calculator.
Review needed skills prior to the lesson.
Provide checklists for solving problems.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the PARCC curriculum/syllabus at the conclusion of an instructional time period.
- Projects
- Assessments
- Standardized Tests

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Provide checklists for solving problems.
Allow students to use calculator.
Provide students with a resource page that has number lines drawn and pre-marked for the scale

Performance Assessments:

Student performance will be based on daily participation, projects, performance based class activities and ALEKS.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Allow students extra time to complete projects.
Provide students with an example of project for reference.
Make a clear rubric for students to understand exactly what is expected.

Unit 2 Patterns and Algebra:

PART I: UNIT RATIONALE

<u>WHY</u> ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Patterns and Algebra	In this unit students will learn about domain and range of functions. Students will examine arithmetic and geometric sequences; solve and transform trigonometric, linear and quadratic functions. Students will also solve systems of linear equations and inequalities.
Grade Level(s): 11	

Essential Question(s):	Enduring Understanding(s):
- What is the domain and range of a function? - What is a vertical line test? - What is a sequence? - What is the difference between an arithmetic sequence and a geometric sequence? - What is a common ratio, and a common difference? - What is the limit of a function? - What is inductive reasoning? - What is rate and unit rate? - How do you find the slope of a line? - From two linear equations, how can you tell if the lines are parallel, perpendicular, same, or neither? - What is a solution to a system of linear equations, and how do you find it? - What is a solution to a system of inequalities, and how do you find it? - What is a quadratic function, and how do you graph it? - How do you graph an exponential function? - How can we transform a function? - How do you perform the basic operations with	Students will be able to: - Identify the domain and the range of a function. - Use the vertical line test to test for a function. - Follow rules to create sequences and vice versa. - Find the common ratio and common difference to identify arithmetic or geometric sequences. - Obtain a basic understanding of limits of functions. - Make conjectures and find counterexamples while using inductive reasoning. - Identify and find the slope and y-intercept of a line. - Identify if two lines are parallel or perpendicular by examining their equations. - Find the solution to systems of linear equations through a variety of methods. - Find the solution to systems of linear inequalities through a variety of methods. - Graph quadratic and exponential functions using ordered pairs. - Identify a variety of functions from their graphs by knowing their properties. - Identify the elements of a function transformation. - Add, subtract, multiply, and divide polynomials. - Solve linear equations and inequalities. - Use various factoring techniques to manipulate polynomials. - Solve a quadratic equation by using a variety of methods. - Model and solve problems by using functions.

polynomials? - How can we use substitution to evaluate expressions? - How can we use algebra to solve linear equations? - How can we use algebra to solve linear inequalities? - How do you factor an expression? - How do you solve a quadratic equation? - How do you model a problem using functions?	

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.
After each target, identify the New Jersey Student Learning Standards that are applicable

<u>Learning Target and NJSLS</u>

NJSLS-8.F.A.1

Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

NJSLS-8.F.A.2

Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.

NJSLS-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.

NJSLS-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.

NJSLS-8.EE.C.8.b

Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.

NJSLS-8.EE.C.8.c

Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

NJSLS-A-SSE.A.1

Interpret expressions that represent a quantity in terms of its context.

NJSLS-A-SSE.A.1.a

Interpret parts of an expression, such as terms, factors, and coefficients.

NJSLS-A-SSE.B.3.a

Factor a quadratic expression to reveal the zeros of the function it defines.

NJSLS-A-SSE.B.3.b

Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

NJSLS-F-BF.A.2

Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

NJSLS-F-BF.B.3

Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

NJSLS-F-IF.B.6

Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

NJSLS-F-LE.A.1

Distinguish between situations that can be modeled with linear functions and with exponential functions.

NJSLS-A-APR.A.1

Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

NJSLS-A.APR.B.3

Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

NJSLS-A-REI.A.1

Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

NJSLS-A-REI.A.2

Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

NJSLS-A-REI.B.3

Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Inter-Disciplinary Connections:

When possible, lessons will have real-world application and free response questions.

Students will engage with the following text:

Explorations in CORE MATH for Common Core (Holt McDougal Mathematics)
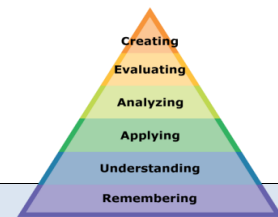
Students will write:

Where applicable, lessons begin with students answering essential questions.
Students will also write as they summarize, restate and re-explain concepts during warm-up, exit ticket activities and reviews.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS
DESCRIBE THE LEARNING EXPERIENCE.
<u>How</u> will students uncover content and build skills?

Students will uncover and build skills through various classroom learning activities. Cornell Notes and Guided Notes will be used to facilitate study skills. A blend of group activities, whole class discussion, modeling examples, applying real-life applications are strategies used in order to promote critical thinking, problem solving and the performance skills of all learners. Smart Board Technologies and ALEKS are used for individual students' needs and for developmental progress.

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Use manipulative material to build patterns or represent symbols.
Provide Graphic organizers to use in solving problems.
Provide guided notes/handouts.
Provide visual glossaries, blank number lines for use with positive and negative numbers.
Break problems into smaller pieces.
Have students keep and turn in a notebook.
Allow students to use calculator.
Review needed skills prior to the lesson.
Provide checklists for solving problems.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the PARCC curriculum/syllabus at the conclusion of an instructional time period.
- Projects
- Assessments
- Standardized Tests

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Provide checklists for solving problems.
Allow students to use calculator.
Provide students with a resource page that has number lines drawn and pre-marked for the scale

Performance Assessments:

Student performance will be based on daily participation, projects, performance based class activities and ALEKS.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Allow students extra time to complete projects.
Provide students with an example of project for reference.
Make a clear rubric for students to understand exactly what is expected.

Unit 3: Data Analysis, Probability, and Discrete Mathematics
PART I: UNIT RATIONALE
WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Data Analysis, Probability, and Discrete Mathematics	In this unit students will learn about Discrete Mathematics topics such as counting, probability (theoretical v. empirical, independent v. dependent), and statistical data analysis through surveys and sampling, scatterplots, and topics such as variance and expected value.
Grade Level(s): 11	

Essential Question(s):	Enduring Understanding(s):
- What are the different types of Sampling Methods? - What is a hypothesis? - What is an experiment? - What elements are needed to design a good experiment? - What is a scatter plot? - What is standard deviation? - What is a bell curve? - What is a sample event? - What is the probability of an event? - What is the difference between Theoretical and Empirical Probability? - What is conditional probability? - What is an expected value? - What is a permutation? - What is the fundamental counting principle? - What is graph theory?	Students will be able to: - Identify the various types of Sampling methods. - Make a hypothesis based on data. - Design an experiment using all the proper survey elements. - Read, create, and interpret scatter plots. - Calculate standard deviation. - Analyze data using a bell curve and normal distribution. - Find the probability of a variety of events. - Determine the type of probability being used and calculate results of events. - Use conditional probability techniques to calculate complex events. - Calculate the fairness of a variety of complex events. - Use permutations and the fundamental counting principle to calculate events. - Use vector edge graphs and matrices to solve Euler circuits.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.
After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target and NJSLS

NJSLS-G-MG.A.3
Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).
NJSLS-S-CP.A.1
Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").
NJSLS-S-CP.A.2
Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
NJSLS-S-CP.B.6
Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.
NJSLS-S-CP.B.8
(+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
NJSLS-S-CP.B.9
(+) Use permutations and combinations to compute probabilities of compound events and solve problems.
NJSLS-S-IC.A.2
Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?
NJSLS-S-ID.A.2
Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
NJSLS-S-ID.A.4
Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.
NJSLS-S-ID.B.5
Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data
NJSLS-S-ID.B.6.c
Fit a linear function for a scatter plot that suggests a linear association.

Inter-Disciplinary Connections:

When possible lessons will have real-world application and free response questions.

Students will engage with the following text:

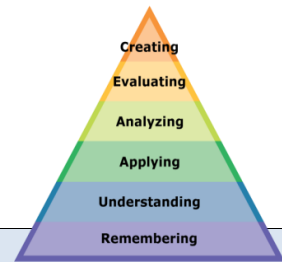Explorations in CORE MATH for Common Core (Holt McDougal Mathematics)

Students will write:

Where applicable, lessons begin with students answering essential questions.
Students will also write as they summarize, restate and re-explain concepts during warm-up, exit ticket activities and reviews.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS
DESCRIBE THE LEARNING EXPERIENCE.
How will students uncover content and build skills?

Students will uncover and build skills through various classroom learning activities. Cornell Notes and Guided Notes will be used to facilitate study skills. A blend of group activities, whole class discussion, modeling examples, applying real-life applications are strategies used in order to promote critical thinking, problem solving and the performance skills of all learners. Smart Board Technologies and ALEKS are used for individual students' needs and for developmental progress.

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Use manipulative material to build patterns or represent symbols.
Provide Graphic organizers to use in solving problems.
Provide guided notes/handouts.
Provide visual glossaries, blank number lines for use with positive and negative numbers.
Break problems into smaller pieces.
Have students keep and turn in a notebook.
Allow students to use calculator.
Review needed skills prior to the lesson.
Provide checklists for solving problems.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the PARCC curriculum/syllabus at the conclusion of an instructional time period.

- Projects
- Assessments
- Standardized Tests

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Provide checklists for solving problems.
Allow students to use calculator.
Provide students with a resource page that has number lines drawn and pre-marked for the scale

Performance Assessments:

Student performance will be based on daily participation, projects, performance based class activities and ALEKS.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Allow students extra time to complete projects.
Provide students with an example of project for reference.
Make a clear rubric for students to understand exactly what is expected.

Unit 4 Geometry and Measurement:

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Geometry and Measurement	In this unit students will learn about the various angles and angle pair relationships. Students will learn about polygons, circles, and tessellations. The will discover and use Theorems and basic trigonometric properties. Students will also solve problems with mid segments and vectors. Finding area, volume and surface area will also be explored.
Grade Level(s): 11	

Essential Question(s):	Enduring Understanding(s):
- What is a transversal? - What is the difference between the different angles created be a transversal? - What is the triangle inequality theorem? - What are all the different types of quadrilaterals? - What are the minimum conditions that need to be met to have a specific kind of quadrilateral? - What is congruency? - How can I use the Midsegment Theorem? - What are the parts of a circle? - What are the various geometric transformations? - What is the Pythagorean Theorem and how can the theorem be used? - What are the basic elements of trigonometry? - How do you find the distance between two points and a midpoint of a segment? - What types of real-world problems can be solved with geometry? - What are some strategies for finding perimeter, area, surface area, and volume?	Students will be able to: - Identify and calculate the angles that were created by a transversal and two parallel lines. - Use the triangle inequality theorem to justify if a shape is a triangle. - Use minimum conditions to define and identify the various types of quadrilaterals. - Identify congruent parts of triangles. - Use mid segment theorem to find measures on a triangle. - Calculate a variety of measures on the circle. - Use counter examples decide whether a statement is true or false. - Identify and perform a variety of geometric transformations such as translations, reflections, rotations, and dilations. - Use the Pythagorean Theorem to find measures of similar triangles. - Use the distance formula to find the distance between two points and a midpoint of a segment. - Find various measures by using the equation of a circle. - Perform operations with vectors. - Use geometry skills to solve a variety of real-world problems. - Round the area or volume to an appropriate number of significant digits. - Use a variety of methods to find perimeter, area, surface area, and volume.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.
After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target and NJSLS

NJSLS-8.G.A.4
Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
NJSLS-8.G.A.5
Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle/angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.
NJSLS-G-CO.C.9
Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints
NJSLS-G-GMD.A.1
Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
NJSLS-G-GMD.A.3
Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
NJSLS-G-MG.A.1
Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
NJSLS-G-MG.A.2
Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

Inter-Disciplinary Connections:

When possible, lessons will have real-world application and free response questions.

Students will engage with the following text:

Explorations in CORE MATH for Common Core (Holt McDougal Mathematics)
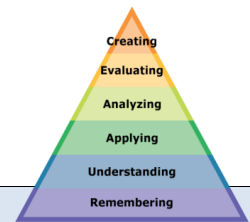
Students will write:

Where applicable, lessons begin with students answering essential questions.
Students will also write as they summarize, restate and re-explain concepts during warm-up, exit ticket activities and reviews.

PART III: TRANSFER OF KNOWLEDGE AND SKILLS
DESCRIBE THE LEARNING EXPERIENCE.

How will students uncover content and build skills?

Students will uncover and build skills through various classroom learning activities. Cornell Notes and Guided Notes will be used to facilitate study skills. A blend of group activities, whole class discussion, modeling examples, applying real-life applications are strategies used in order to promote critical thinking, problem solving and the performance skills of all learners. Smart Board Technologies and ALEKS are used for individual students' needs and for developmental progress.

PART IV: EVIDENCE OF LEARNING
IDENTIFY THE METHODS BY WHICH STUDENTS WILL DEMONSTRATE THEIR UNDERSTANDING OF CONTENT AND THEIR ABILITY TO APPLY SKILLS.
IDENTIFY BLOOM'S LEVELS.

Formative Assessments:

The effectiveness of the instructional program will be based on numerous activities and strategies including the following: teacher observations, students collaborating with peers, questioning strategies, student record-keeping, quizzes, exit/admit assignments, peer/self-assessments, learning/response logs, discussions and practice presentations.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Use manipulative material to build patterns or represent symbols.
Provide Graphic organizers to use in solving problems.
Provide guided notes/handouts.
Provide visual glossaries, blank number lines for use with positive and negative numbers.
Break problems into smaller pieces.
Have students keep and turn in a notebook.
Allow students to use calculator.
Review needed skills prior to the lesson.
Provide checklists for solving problems.

Summative Assessments:

The following assessments will be used to evaluate student learning, skill acquisition and academic achievement of the Standards of Mathematical Practice and the New Jersey Learning Standards for Mathematics listed under each chapter in the PARCC curriculum/syllabus at the conclusion of an instructional time period.
- Projects
- Assessments
- Standardized Tests

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Provide checklists for solving problems.
Allow students to use calculator.
Provide students with a resource page that has number lines drawn and pre-marked for the scale

Performance Assessments:

Student performance will be based on daily participation, projects, performance based class activities and ALEKS.

Accommodations/Modifications:

Accommodations may include but are not limited to the following:
Allow students extra time to complete projects.
Provide students with an example of project for reference.
Make a clear rubric for students to understand exactly what is expected.

Unit 5 Basic Mathematical Skills:

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title:	Unit Summary:
Basic Mathematical Skills	In this unit students will relearn and review basic mathematical skills such as operations on whole numbers, proportions, operations on rational numbers and mixed numbers, operations on decimals, and problems involving percentages
Grade Level(s): 11	

Essential Question(s):	Enduring Understanding(s):
- What are Whole Numbers? - What strategies can I use to Add and Subtract large whole numbers without a calculator? - What strategies can I use to multiply and divide by one and two-digit whole numbers without a calculator? - What are proportions? - How do I add and subtract fractions without a calculator? - How do I multiply and divide fractions without a calculator? - How do I add and subtract mixed numbers without a calculator? - How do I multiply and divide mixed numbers without a calculator? - How do I determine place value and round a number? - How do I order decimals? - How do I add and subtract decimals without a calculator? - How do I multiply and divide decimals without a calculator? - How do I find the percent of number without a calculator?	Students will be able to: - Add and subtract large whole numbers without a calculator. - Multiply and divide by one and two-digit whole numbers without a calculator. - Solve proportions without a calculator. - Add and subtract fractions without a calculator. - Multiply and divide fractions without a calculator. - Add and subtract mixed numbers without a calculator. - Multiply and divide mixed numbers without a calculator. - Determine place value and round a number. - Add and subtract decimals without a calculator. - Multiply and divide decimals without a calculator. - Find the percent of a number without a calculator. - Determine equivalent measure without a calculator. - Find angle measure of complimentary and supplementary angles. - Find area and perimeter of rectangles, triangles, parallelograms, and trapezoids without a calculator. - Find the volume of basic shapes without a calculator.

- How do I determine equivalent measure without a calculator? - How do I find angle measure? - How do I find area and perimeter? - How do I find volume of basic shape.	

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES
DESCRIBE THE LEARNING TARGETS.
After each target, identify the New Jersey Student Learning Standards that are applicable

Learning Target and NJSLS

NJSLS-4.NBT.B.5

Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

NJSLS-4.NBT.B.6

Find whole-number quotients and remainders with up to four-digit dividends and one-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.

NJSLS-4.OA.A.1

Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.

NJSLS-4.OA.A.3

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

NJSLS-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. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because 3/4 of 8/9 is 2/3. (In general, $(a/b) \div (c/d) = ad/bc$). How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4- cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?

NJSLS-6.NS.B.2

Fluently divide multi-digit numbers using the standard algorithm.

NJSLS-6.NS.B.3

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

NJSLS-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.

NJSLS-7.NS.A.2.D

Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

NJSLS-7.RP.A.1

Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.

NJSLS-7.RP.A.2
Recognize and represent proportional relationships between quantities.
NJSLS-7.RP.A.3
Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
NJSLS-N-Q.A.1
Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
NJSLS-N-Q.A.2
Define appropriate quantities for the purpose of descriptive modeling.
NJSLS-N-Q.A.3
Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

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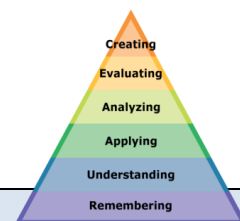
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<u>Formative Assessments</u>:

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