Lindenwold Public Schools

Unit 4
Equations and Inequalities/Polynomials/Factoring
45 Instructional School Days

Targeted Standards

HS.A-CED.A.1 Create equations that describe numbers or relationships 1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

HS.A-REI.A.1 Understand solving equations as a process of reasoning and explain the reasoning 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.

HS.A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

HS.A-APR.A.1 Perform arithmetic operations on polynomials 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.

HS.A-APR.B.2 Understand the relationship between zeros and factors of polynomials 2. Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).

Rationale and Transfer Goals:

Students will learn how to apply the strategies of creating and solving one step equations. Following the one step equations they will learn how to create multiple step equations and how to solve them. Next they will do the same thing with one step and multiple step inequalities. The students will then apply those skills to graphing basic lines and inequalities. The students will learn how to use addition, subtraction, multiplication, division and exponents with respect to polynomials. Students will learn how to factor a trinomial using various methods including the quadratic formula. Students will learn how to complete the square of a trinomial.

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Enduring Understandings:

- Real world problems may be represented by the formation and solution of linear equations.
- Equations and inequalities may be used as models to solve mathematical and real world problems.
- An inequality is another way to describe a relationship between expressions; instead of showing that the values of two expressions are equal, inequalities indicate that the value of one expression is greater than (or greater than or equal to) the value of the other expression.
- The properties of integers apply to polynomials.
- Multiplying and factoring polynomials are related.
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- Solving polynomials involves the reversal of operations, the distributive property and rules of exponents.

Essential Questions:

- What is the first step when converting real world situations into equations?
- How can we simplify equations, using the number properties, before looking for a solution?
- How should we deal with negative coefficients, when solving inequalities?
- How can polynomials be simplified and applied to solve problems?
- Can two algebraic expressions that appear to be different be equivalent?
- How are the properties of real numbers related to polynomials?
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- Can two algebraic expressions that appear to be different be equivalent?
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Content/Objectives		Instructional Actions	
Content	**Skills**	**Activities/Strategies**	**Evidence (Assessments)**

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What students will know	*What students will be able to do*	*How we teach content and skills*	*How we know students have learned*
-Evaluating Algebraic Expressions -Solving Equations by the addition property -Solving equations by the multiplication property -Combining the rules to solve equations -Formulas and problem solving -Applications of linear equations -Exponents and Polynomials -Negative exponents and scientific notation -Adding and subtracting polynomials -Multiplying polynomials -Dividing polynomials -Factoring trinomials in standard form	-Determine whether a given number is a solution for an equation -Identify expressions and equations -Use the addition and distributive property to solve an equation -Use the multiplication property to solve equations -Solve an application involving the multiplication property -Combine the addition and multiplication property to solve an equation -Solve equations containing parentheses and fractions -Solve a literal equation for one of its variables -Solve an application involving a literal equation -Translate a word phrase to an expression or an equation -Use an equation to solve an application -Solve mixture and motion problems -Solve applications involving percents -Use inequality notation	Math practice individually, whole group, and small group. Peer group leadership Student presentations of concepts and demonstration of skills App Partners or group work (groups formed heterogeneously according to ability) Students given access to Google Classroom Students given access to Screencastify Edpuzzle Khan Academy Illustrative Mathematics	**Formative** Teacher observation and questioning Seat and or group work Fist to five/ Thumbs up, thumbs down Homework Student participation at board **Summative** Edpuzzle pro quizzes Notebook Quiz Homework Checks Regular Quizzes and tests Unit 3 Benchmark Assessment Camden County Final

-Difference of squares and perfect square trinomials -Strategies for factoring -Solving quadratic equations by factoring	-Graph the solution set of an inequality -Solve an inequality and graph the solution set -Solve an application using inequalities -Identify types of polynomials -Find the degree of a polynomial -Evaluate a polynomial -Evaluate and Simplify expressions involving a zero or a negative exponent -Solve applications involving scientific notation -Add and subtract polynomials -Find the product of two binomials and polynomials -Square a binomial -Divide polynomials -Factor out the GCF -Factor out a binomial -Factor a polynomial by grouping -Factor a trinomial -Factor a trinomial in standard form -Completely factor a trinomial -Use the ac test to determine factorability -Factor a binomial that is the difference of squares		

	-Factor a perfect square trinomial -Recognize factoring patterns -Apply appropriate factoring strategies		

Spiraling for Mastery		
Content or Skill for this Unit	**Spiral Focus from Previous Unit**	**Instructional Activity**
Evaluating and solving algebraic expressions	-Adding, Subtracting, Multiplying and Dividing Fractions -Exponential Notation and the order of operations -Ratios and Proportions -Percents -Percent increase and decrease -Percents with respect to loans	Students given handouts of powerpoint notes Students provided with google slide presentations Students given access to online help from multiple locations Partners or group work (groups formed heterogeneously according to ability) IXL https://www.ixl.com/inspiration/get-started Khan Academy What is an equation? How can we solve multi-step equations? How should we apply inverse operations to solve equations and or inequalities? How can we graph solutions to multi-step inequalities? Open Source activities below from Illustrative Math

		Coupon versus discount The sign of solutions Cell phone plans Kimi and Jordan Summer swimming Introducing functions Mixing Fertilizer The bank account A cubic identity Building a general quadratic function Identifying quadratic function (Standard form) Buying a car Paying rent Throwing a ball Two squares are equal

21st Century Skills:

CRP2. Apply appropriate academic and technical skills.
CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
CRP11. Use technology to enhance productivity.

Career and Technical Education

9.2.12.C.1 Review career goals and determine steps necessary for attainment.
9.2.12.C.3 Identify transferable career skills and design alternate career plans.

Key resources:

9.2.12.CAP.2: Develop college and career readiness skills by participating in opportunities such as structured learning experiences, apprenticeships, and dual enrollment programs.
9.2.12.CAP.3: Investigate how continuing education contributes to one's career and personal growth

Interdisciplinary Connections

NJSLS ELA

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NJSLSA.R7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

NJSLA Science

HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.