ALGEBRA 2 SYLLABUS

2014-2015 Academic School-Year

1st Marking Period

Supplemental Unit on Radicals – Simplify Only - Just Square Roots

Chapter 5: Quadratic Equations and Functions (Test 5.2 – 5.5)

5.2 Properties of Parabolas (CC.9-12.F-IF.B.4, CC.9-12.F-IF.C.7.A)

5.3 Transforming Parabolas (CC.9-12.F-IF.B.4, CC.9-12.F-IF.C.7.A, CC.9-12.A-CED.A.2, CC.9-12.F-BF.B.3, CC.9-12.N-Q.A.2)

5.4 Factoring Quadratic Expressions (CC.9-12.A-SSE.A.2, CC.9-12.A-SSE.B.3.A, CC.9-12.F-IF.B.4)

5.5 Quadratic Equations (CC.9-12.A-SSE.B.3.A, CC.9-12.A-APR.B.3, CC.9-12.A-REI.A.1, CC.9-12.F-IF.C.8.A)

Chapter 5: Quadratic Equations and Functions (Test 5.6 – 5.8)

5.6 Complex Numbers (CC.9-12.N-CN.A.1, CC.9-12.N-CN.A.2, CC.9-12.N-CN.C.7, CC.9-12.A-REI.B.4.B)

5.7 Completing the Square (CC.9-12.A-SSE.B.3.B, CC.9-12.N-CN.C.7, CC.9-12.A-REI.A.1, CC.9-12.A-REI.B.4.A, CC.9-12.A-REI.B.4.B)

5.8 The Quadratic Formula (CC.9-12.A-SSE.B.3.B, CC.9-12.N-CN.C.7, CC.9-12.A-REI.A.1, CC.9-12.A-REI.B.4.B)

Chapter 3: Systems of Equations (Test on all systems)

3.1 Graphing Systems of Equations (CC.9-12.A-REI.C.6, CC.9-12.F-IF.C.7.A)

3.2 Solving Systems Algebraically (CC.9-12.A-REI.C.5)

3.6 Systems With Three Variables (CC.9-12.A-REI.C.5)

Supplemental:

- Graphically solve a mixed system of linear and quadratic equations (CC.9-12.A-REI.C.7, CC.9-12.F-IF.C.7.A)
- Algebraically solve a mixed system of linear and quadratic equations (CC.9-12.A-REI.C.5, CC.9-12.A-REI.C.7)

**Supplemental: Computer Lab PARCC problems

2nd Marking Period

Chapter 6: Polynomials and Polynomial Functions (Test 6.1 – 6.8)

6.1 Polynomial Functions (CC.9-12.A-SSE.A.1.A, CC.9-12.A-APR.A.1)

6.2 Polynomials and Linear Factors (CC.9-12.A-APR.A.1, CC.9-12.A-SSE.A.2, CC.9-12.A-CED.A.2, CC.9-12.A-APR.B.3)

6.3 Dividing Polynomials (CC.9-12.A-APR.B.2, CC.9-12.A-APR.D.6)

6.4 Solving Polynomial Equations (CC.9-12.A-SSE.B.3.A, CC.9-12.A-REI.B.4.B, CC.9-12.F-IF.C.7.C, CC.9-12.N-CN.C.7)

6.5 Theorems About Roots of Polynomial Equations (CC.9-12.N-CN.A.2, CC.9-12.N-CN.A.3, CC.9-12.A-SSE.B.3.A, CC.9-12.A-APR.B.3, CC.9-12.A-CED.A.2, CC.9-12.N-CN.C.7)

6.6 The Fundamental Theorem of Algebra (CC.9-12.N-CN.C.7, CC.9-12.N-CN.C.9, CC.9-12.A-REI.B.4.B)

6.8 The Binomial Theorem (CC.9-12.A-APR.C.4, CC.9-12.A-APR.C.5)

Chapter 7: Radical Functions and Rational Exponents (Test 7.1 – 7.5)

7.1 Roots and Radical Expressions (CC.9-12.A-SSE.B.3)

7.2 Multiplying and Dividing Radical Expressions (CC.9-12.A-SSE.B.3)

7.3 Binomial Radical Expressions (CC.9-12.A-SSE.B.3, CC.9-12.N-RN.A.2)

7.4 Rational Exponents (CC.9-12.N-RN.1, CC.9-12.N-RN.A.2)

7.5 Solving Square Root and Other Radical Equations (CC.9-12.A-REI.A.2)

**Supplemental: Computer Lab PARCC problems

MP2 Project: Survey

Chapter 12: Probability and Statistics (Test 6.7, 12.1 – 12.7)-

6.7 Permutations and Combinations (CC.9-12.S-CP.9)

9.7 Probability of Multiple Events (CC.9-12.SCP.7)

12.1 Probability Distributions (CC.9-12.S-CP.1, CC.9-12.S-CP.2)

12.2 Conditional Probability (S-CP.3, CC.9-12.S-CP.5, CC.9-12.S-CP.6)

12.3 Analyzing Data (CC.9-12.S-ID.2, CC.9-12.S-ID.3, CC.9-12.S-IC.5, CC.9-12.S-IC.6)

12.4 Standard Deviation (CC.9-12.S-ID.2)

12.5 Working with Samples (CC.9-12.S-IC.1, CC.9-12.S-IC.2, CC.9-12.S-ID.4, CC.9-12.S-IC.3, CC.9-12.S-IC.4, CC.9-12.S-ID.6)

12.6 Binomial Distributions (CC.9-12.S-MD.3 CC.9-12.S-MD.4, CC.9-12.S-MD.6, CC.9-12.S-MD.7)

12.7 Normal Distributions (CC.9-12.S-ID.4, CC.9-12.S-MD.3, CC.9-12.S-MD.4, CC.9-12.S-MD.6, CC.9-12.S-MD.7)

3rd Marking Period

Chapter 7: Radical Functions and Rational Exponents (Test 7.6 – 7.8)

7.6 Function Operations (CC.9-12.F-IF.A.1, CC.9-12.F-IF.A.2, CC.9-12.F-BF.A.1.B, CC.9-12.F-BF.A.1.C)

7.7 Inverse Relations and Functions (CC.9-12.F-BF.B.4.A, CC.9-12.F-BF.B.4.B, CC.9-12.F-BF.B.4.C)

7.8 Graphing Square Root and Other Radical Functions (CC.9-12.F-IF.C.7.B, CC.9-12.F-BF.B.3, CC.9-12.F-IFB.5)

Chapter 9: Rational Functions (Test 9.2 – 9.3)

9.2 The Reciprocal Function Family (CC.9-12.F-IF.C.7.D, CC.9-12.F-BF.B.3)

9.3 Rational Functions and Their Graphs (CC.9-12.F-IF.C.7.D, CC.9-12.F-BF.B.3)

Chapter 9: Rational Functions (Test 9.4 – 9.6)

9.4 Rational Expressions (CC.9-12.A-SSE.A.2, CC.9-12.A-APR.D.6, CC.9-12.APR.D.7, CC.9-12.F-IF.B.5)

9.5 Adding and Subtracting Rational Expressions (For Algebra 2, no complex) (CC.9-12.A-SSE.A.2, CC.9-12.A-APR.D.6, CC.9-12.A-APR.D.7, CC.9-12.F-IF.B.5)

9.6 Solving Rational Equations (CC.9-12.A-REI.A.2, CC.9-12.A-SSE.A.2, CC.9-12.A-APR.D.6, CC.9-12.A-APR.D.7, CC.9-12.F-IF.B.5)

4th Marking Period

Chapter 8: Exponential and Logarithmic Functions (Test 8.1 – 8.3)

8.1 Exploring Exponential Models (CC.9-12.F-IF.C.7.E, CC.9-12.F-IF.C.8.B, CC.9-12.F-LE.A.1.A, CC.9-12.F-LE.A.1.C, CC.9-12.F-LE.A.2, CC.9-12.F-LE.A.3, CC.9-12.S-ID.B.6.A)

8.2 Properties of Exponential Functions (CC.9-12.F-IF.C.7.E, CC.9-12.F-IF.C.8.B, CC.9-12.F-LE.A.1.A, CC.9-12.F-LE.A.1.C, CC.9-12.F-LE.A.2, CC.9-12.F-LE.A.3, CC.9-12.F-BF.B.3)

8.3 Logarithmic Functions as Inverses (CC.9-12.F-LE.A.4, CC.9-12.F-IF.C.7.E, F-BF.B.5)

Chapter 8: Exponential and Logarithmic Functions (Test 8.4 – 8.6)

8.4 Properties of Logarithms (CC.9-12.A-SSE.A.1, CC.9-12.A-SSE.B.3.C)

8.5 Exponential and Logarithmic Equations (CC.9-12.A-CED.A.1)

8.6 Natural Logarithms (CC.9-12.A-SSE.A.1, CC.9-12.A-SSE.B.3.C, CC.9-12.A-CED.A.1)

Chapter 10: Quadratic Relations and Conic Sections

Algebra 2 & 2A – Formative Assessment on circles

Algebra 2 Honors – Summative Assessment on 10.1 – 10.6

10.1 Exploring Conic Sections (CC.9-12.G-GPE.A.1, CC.9-12.G-GPE.A.2, CC.9-12.G-GPE.A.3)

10.3 Circles (CC.9-12.G-GPE.A.2, CC.9-12.F-BF.B.3)

******Supplementals needed!!!!!!**

10.4 Ellipses (CC.9-12.G-GPE.A.3, CC.9-12.F-BF.B.3)

10.5 Hyperbolas (Honors Algebra 2 only) (CC.9-12.G-GPE.A.3, CC.9-12.F-BF.B.3)

10.6 Translating Conic Sections (CC.9-12.G.GPE.A.1, CC.9-12.G-GPE.A.3, CC.9-12.F-BF.B.3)

10.4 – 10.6 Honor's Alg2 Only

Chapter 11: Sequences and Series (Test 11.1 – 11.5)

11.1 Mathematical Patterns (CC.9-12.F-IF.A.3)

11.2 Arithmetic Sequences (CC.9-12.F-IF.A.3, CC.9-12.F-BF.A.2, CC.9-12.F-LE.A.2)

11.3 Geometric Sequences (CC.9-12.F-IF.A.3, CC.9-12.F-BF.A.2, CC.9-12.F-LE.A.2)

11.4 Arithmetic Series (CC.9-12.A-SSE.B.4)

11.5 Geometric Series (CC.9-12.A-SSE.B.4)

Course Expectations and Skills

- Students are required to have proficiency in all prerequisite topics for Algebra 1 and Geometry. Those who do not demonstrate proficiency will be required to seek additional help after school to close their achievement gap in order to be successful in this course.
- Students are required to take notes in Cornell Notes format and maintain those notes in a neat and organized notebook.
- Students are required to have a scientific calculator. Students are encouraged to purchase a graphing calculator (TI-83+, TI 84+, or TI 89), but not required. Classroom sets are available for teachers to use as needed. Free on-line graphing apps and programs are promoted by teachers for students on homework.
- 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.

Resources

Text Book: *Algebra 2*, Prentice Hall Mathematics

Supplemental Materials: Algebra 2 All-In-One Student Workbook
Explorations in CORE MATH Algebra 2 Workbook

Assessment Information

Department of Mathematics - Algebra 2 (2014-2015)

Marking Period 1	Marking Period 2	Marking Period 3	Marking Period 4
Major (MAJ): Summative 30%	Major (MAJ): Summative 30%	Major (MAJ): Summative 30%	Major (MAJ): Summative 30%
Benchmark (BMK): 20%	Benchmark (BMK): 20%	Benchmark (BMK): 20%	Benchmark (BMK): 20%
Project (PRJ): 10%	Project (PRJ): 10%	Project (PRJ): 10%	Project (PRJ): 10%
Minor (MIN): Formative 25%	Minor (MIN): Formative 25%	Minor (MIN): Formative 25%	Minor (MIN): Formative 25%
Class Participation (CP): 5%	Class Participation (CP): 5%	Class Participation (CP): 5%	Class Participation (CP): 5%
Homework (HW): 10%	Homework (HW): 10%	Homework (HW): 10%	Homework (HW): 10%

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course/Unit Title:
Algebra 2/Quadratic Equations and Functions
Grade Level(s):
10-12</td><td>Unit Summary:
In this unit (Chapter 5) students will solve quadratic equations by factoring and taking the square root; they learn to complete the square and apply the quadratic formula. They will recognize equations that are reducible to quadratic form. Students will recognize the properties of parabolas, graph quadratic functions and transform parabolas. Students will define and perform arithmetic operations with complex numbers. Use complex numbers in polynomial identities and equations.</td></tr>
<tr><td>Essential Question(s):
• How do you solve quadratic equations?
• How do you graph quadratic functions?
• How can you create quadratic equations from word problems, solutions and graphs?
• How do you use quadratic functions to model real world data?
• How do you perform operations with complex numbers and use them in solving quadratic equations?</td><td>Enduring Understanding(s):
Students will be able to:
• Graph quadratic functions
• Find maximum and minimum values of quadratic functions
• Use the vertex form of a quadratic function
• Find common and binomial factors of quadratic expressions
• Factor special quadratic expressions
• Solve quadratic equations by factoring and by finding square roots
• To identify complex numbers
• To add, subtract, and multiply complex numbers
• To solve equations by completing the square
• To rewrite functions by completing the square
• Solve quadratic equations by applying the Quadratic Formula</td></tr>
</table>

PART II:INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCSS**
5.2. Properties of Parabolas *[Standard] - For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationships. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimum; symmetries; end behavior; and periodicity.* *[Standard] – Graph linear and quadratic functions and show intercepts, maxima, and minima.*	**5.2. CC.9-12.F-IF.B.4, CC.9-12.F-IF.C.7.A**
5.3. Transforming Parabolas *[Standard] – For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationships. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimum; symmetries; end behavior; and periodicity.* *[Standard] – Graph linear and quadratic functions and show intercepts, maxima, and minima.* *[Standard] – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.* *[Standard] – 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.* *[Standard] – Define appropriate quantities for the purpose of descriptive modeling.*	**5.3. CC.9-12.F-IF.B.4, CC.9-12.F-IF.C.7.A, CC.9-12.A-CED.A.2, CC.9-12.F-BF.B.3, CC.9-12.N-Q.A.2**
5.4. Factoring Quadratic Expressions	**5.4. CC.9-12.A-SSE.A.2, CC.9-12.A-SSE.B.3.A, CC.9-12.F-IF.B.4**

[Standard] – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$. *[Standard] – Factor a quadratic expression to reveal the zeros of the function it defines.* *[Standard] – For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationships. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimum; symmetries; end behavior; and periodicity.*	
5.5. Quadratic Equations *[Standard] – Factor a quadratic expression to reveal the zeros of the function it defines.* *[Standard] – 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.* *[Standard] – 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.* *[Standard} – Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*	**5.5. CC.9-12.A-SSE.B.3.A, CC.9-12.A-APR.B.3, CC.9-12.A-REI.A.1, CC.9-12.F-IF.C.8.A**
5.6. Complex Numbers *[Standard] – Know that there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi with a and b real.* *[Standard] – Use the relationship $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.* *[Standard] – Solve quadratic equations with real coefficients that have complex solutions.*	**5.6. CC.9-12.N-CN.A.1, CC.9-12.N-CN.A.2, CC.9-12.N-CN.C.7, CC.9-12.A-REI.B.4.B**

[Standard] – Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.	
5.7. Completing the Square *[Standard] – Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.* *[Standard] – Solve quadratic equations with real coefficients that have complex solutions.* *[Standard] – 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.* *[Standard] – Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.* *[Standard] – Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*	**5.7. CC.9-12.A-SSE.B.3.B, CC.9-12.N-CN.C.7, CC.9-12.A-REI.A.1, CC.9-12.A-REI.B.4.A, CC.9-12.A-REI.B.4.B**
5.8. The Quadratic Formula *[Standard] – Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.* *[Standard] – Solve quadratic equations with real coefficients that have complex solutions.* *[Standard] – 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.* *[Standard] – Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex*	**5.8. CC.9-12.A-SSE.B.3.B, CC.9-12.N-CN.C.7, CC.9-12.A-REI.A.1, CC.9-12.A-REI.B.4.B**

solutions and write them as a ± bi for real numbers a and b.	

Inter-Disciplinary Connections:

Real-World problem solving examples:
Revenue p. 248 #28, Civil Engineering p. 254 Example 3, Cross Section of a Pipe p. 263 Example 8, Firefighting p. 268 Example 3, Fractals p. 277 Example 8, Profit p. 285 Example 7, Air Pollution p. 294 #56

Inter-Disciplinary problem solving examples:
Economics – maximum revenue p. 247 Example 4, Physics – the equation for the motion of a projectile p. 248 #29, Business – maximum profit p. 256 #42, Art – golden rectangle p. 269 Example 5, Art – golden ratio p. 291 Example 3

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions:
Students will engage in Cornell Note taking part of which is summarizing the day's lesson.
Students can describe the relationship between lal and the width of the graph of $y = ax^2 + bx + c$.
Students can describe the family of quadratic functions whose members have a given vertex.
Students can explain how to factor a given quadratic expression completely.
Students can explain how to find the intersection of a pair of functions.
Students can explain if it is possible for a student's test average to be an imaginary number.
Students can explain the process of rewriting a quadratic function in vertex form.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 5.2:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 245	Warm-Up: Check Skills You'll Need p. 245	Warm-Up: Check Skills You'll Need p. 245
Teach Teaching Options	• Graphing a Function of the Form $y = ax^2 + c$ • Graphing a Function of the Form $y = ax^2 + bx + c$ • Finding a Minimum Value • Real-World Connection	• Graphing a Function of the Form $y = ax^2 + c$ • Graphing a Function of the Form $y = ax^2 + bx + c$ • Finding a Minimum Value • Real-World Connection	• Graphing a Function of the Form $y = ax^2 + c$ • Graphing a Function of the Form $y = ax^2 + bx + c$ • Finding a Minimum Value • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 247	Embedded Questioning Technique Exit Tickets Closure TE p. 247	Embedded Questioning Technique Exit Tickets Closure TE p. 247
Practice and Apply Assigning Homework	p. 248 #1-230	pp. 248-250 #1-66	pp. 248-250 #1-73
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 5.3:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 252	Warm-Up: Check Skills You'll Need p. 252	Warm-Up: Check Skills You'll Need p. 252
Teach Teaching Options	• Using the Vertex Form to Graph a Parabola • Writing the Equation of a Parabola • Real-World Connection • Converting to Vertex Form	• Using the Vertex Form to Graph a Parabola • Writing the Equation of a Parabola • Real-World Connection • Converting to Vertex Form	• Using the Vertex Form to Graph a Parabola • Writing the Equation of a Parabola • Real-World Connection • Converting to Vertex Form
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 254	Embedded Questioning Technique Exit Tickets Closure TE p. 254	Embedded Questioning Technique Exit Tickets Closure TE p. 254
Practice and Apply	pp. 255-256 #1-35	pp. 255-257 #1-77	pp. 255-257 #1-84

Assigning Homework			
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 5.4:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 259	Warm-Up: Check Skills You'll Need p. 259	Warm-Up: Check Skills You'll Need p. 259
Teach Teaching Options	• Finding Common Factors • Factoring When $ac > 0$ and $b > 0$ • Factoring When $ac > 0$and $b < 0$ • Factoring When $ac < 0$ • Factoring When $a \neq 1$ and $ac > 0$ • Factoring When $a \neq 1$ and $ac < 0$ • Factoring a Perfect Square Trinomial • Real-World Connection	• Finding Common Factors • Factoring When $ac > 0$ and $b > 0$ • Factoring When $ac > 0$and $b < 0$ • Factoring When $ac < 0$ • Factoring When $a \neq 1$ and $ac > 0$ • Factoring When $a \neq 1$ and $ac < 0$ • Factoring a Perfect Square Trinomial • Real-World Connection	• Finding Common Factors • Factoring When $ac > 0$ and $b > 0$ • Factoring When $ac > 0$and $b < 0$ • Factoring When $ac < 0$ • Factoring When $a \neq 1$ and $ac > 0$ • Factoring When $a \neq 1$ and $ac < 0$ • Factoring a Perfect Square Trinomial • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 262	Embedded Questioning Technique Exit Tickets Closure TE p. 262	Embedded Questioning Technique Exit Tickets Closure TE p. 262
Practice and Apply Assigning Homework	pp. 263-264 #1-47	pp. 263-264 #1-70	pp. 263-265 #1-78
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 5.5:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 267	Warm-Up: Check Skills You'll Need p. 267	Warm-Up: Check Skills You'll Need p. 267
Teach Teaching Options	• Solving by Factoring • Solving by Finding Square Roots • Real-World Connection • Solving by Tables • Solving by Graphing	• Solving by Factoring • Solving by Finding Square Roots • Real-World Connection • Solving by Tables • Solving by Graphing	• Solving by Factoring • Solving by Finding Square Roots • Real-World Connection • Solving by Tables • Solving by Graphing
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 269	Embedded Questioning Technique Exit Tickets Closure TE p. 269	Embedded Questioning Technique Exit Tickets Closure TE p. 269
Practice and Apply Assigning Homework	p. 270 #1-31	pp. 270-271 #1-61	pp. 270-271 #1-66
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 5.6:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 274	Warm-Up: Check Skills You'll Need p. 274	Warm-Up: Check Skills You'll Need p. 274
Teach Teaching Options	• Simplifying Numbers Using i • Simplifying Imaginary Numbers • Finding Absolute Value • Additive Inverse of a Complex Number • Adding Complex Numbers • Multiplying Complex Numbers • Finding Complex Solutions • Real-World Connection	• Simplifying Numbers Using i • Simplifying Imaginary Numbers • Finding Absolute Value • Additive Inverse of a Complex Number • Adding Complex Numbers • Multiplying Complex Numbers • Finding Complex Solutions • Real-World Connection	• Simplifying Numbers Using i • Simplifying Imaginary Numbers • Finding Absolute Value • Additive Inverse of a Complex Number • Adding Complex Numbers • Multiplying Complex Numbers • Finding Complex Solutions • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 277	Embedded Questioning Technique Exit Tickets Closure TE p. 277	Embedded Questioning Technique Exit Tickets Closure TE p. 277
Practice and Apply Assigning Homework	p. 278 #1-49	pp. 278-279 #1-70	pp. 278-280 #1-75
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 5.7:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 282	Warm-Up: Check Skills You'll Need p. 282	Warm-Up: Check Skills You'll Need p. 282
Teach Teaching Options	• Solving a Perfect Square Trinomial Equation • Completing the Square • Solving by Completing the Square • Finding Complex Solutions • Solving When $a \neq 1$ • Rewriting in Vertex Form • Real-World Connection	• Solving a Perfect Square Trinomial Equation • Completing the Square • Solving by Completing the Square • Finding Complex Solutions • Solving When $a \neq 1$ • Rewriting in Vertex Form • Real-World Connection	• Solving a Perfect Square Trinomial Equation • Completing the Square • Solving by Completing the Square • Finding Complex Solutions • Solving When $a \neq 1$ • Rewriting in Vertex Form • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 284	Embedded Questioning Technique Exit Tickets Closure TE p. 284	Embedded Questioning Technique Exit Tickets Closure TE p. 284
Practice and Apply Assigning Homework	pp. 285-286 #1-39	pp. 285-287 #1-56	pp. 285-287 #1-63
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 5.8:

	Regular	Accelerated	Honors

Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 289	Warm-Up: Check Skills You'll Need p. 289	Warm-Up: Check Skills You'll Need p. 289
Teach **Teaching Options**	• Using the Quadratic Formula • Finding Complex Solutions • Real-World Connection • Using the Discriminant • Real-World Connection	• Using the Quadratic Formula • Finding Complex Solutions • Real-World Connection • Using the Discriminant • Real-World Connection	• Using the Quadratic Formula • Finding Complex Solutions • Real-World Connection • Using the Discriminant • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 292	Embedded Questioning Technique Exit Tickets Closure TE p. 292	Embedded Questioning Technique Exit Tickets Closure TE p. 292
Practice and Apply **Assigning Homework**	pp. 293-294 #1-40	pp. 293-295 #1-68	pp. 293-295 #1-75
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects.

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, and electronic portfolios

Accommodations/Modifications:

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.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course/Unit Title:
Algebra 2/Polynomials and Polynomial Functions
Grade Level(s):
10-12</td><td>Unit Summary:
In this unit (Chapter 6) students will learn about polynomials and polynomial functions. They will define and identify polynomial functions. Basic operations on polynomials will be reviewed and extended. They will learn how to find linear factors and study the connection between zeros and linear factors. Students will divide polynomials using long division and synthetic division. They will learn how to solve polynomial equations. Students will learn theorems about roots of polynomial equations, and the Fundamental Theorem of Algebra. Students will be introduced to Pascal's Triangle and use it to multiply higher degree polynomials.</td></tr>
<tr><td>Essential Question(s):
• How do you write a polynomial function from its zeros?
• How do you divide polynomials?
• How do you solve polynomial equations with rational and irrational roots?
• What is the Fundamental Theorem of Algebra?
• What is Pascal's Triangle and when is it used?</td><td>Enduring Understanding(s):
Students will be able to:
• Classify polynomials
• Model data using polynomial functions
• Analyze the factored form of a polynomial
• Write a polynomial function from its zeros
• Divide polynomials using long division
• Divide polynomials using synthetic division
• Solve polynomial equations by graphing
• Solve polynomial equations by factoring
• Solve equations using the Rational Root Theorem
• Use the Irrational Root Theorem and the Imaginary Root Theorem
• Use the Fundamental Theorem of Algebra in solving polynomial equations with complex roots
• Use Pascal's Triangle
• Use the Binomial Theorem</td></tr>
</table>

PART II:INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	CCSS
6.1. Polynomial Functions *[Standard] - Interpret parts of an expression, such as terms, factors, and coefficients.* *[Standard] - 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.*	**6.1. CC.9-12.A-SSE.A.1A, CC.9-12.A-APR.A.1**
6.2.Polynomials and Linear Factors *[Standard] – 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.* *[Standard] – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2) (x^2 + y^2)$.* *[Standard] – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.* *[Standard] – 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.*	**6.2. CC.9-12.A-APR.A.1, CC.9-12.A-SSE.A.2, CC.9-12.A-CED.A.2, CC.9-12.A-APR.B.3**
6.3. Dividing Polynomials *[Standard] – 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).* *[Standard] – Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.*	**6.3. CC.9-12.A-APR.B.2, CC.9-12.A-APR.D.6**

6.4. Solving Polynomial Equations *[Standard] – Factor a quadratic expression to reveal the zeros of the function it defines.* *[Standard] – Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.* *[Standard] – Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.* *[Standard] – Solve quadratic equations with real coefficients that have complex solutions.*	**6.4. CC.9-12.A-SSE.B.3A, CC.9-12.A-REI.B.4B, CC.9-12.F-IF.C.7C, CC.9-12.N-CN.C.7**
6.5. Theorems About Roots of Polynomial Equations *[Standard] – Use the relationship $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.* *[Standard] – Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.* *[Standard] – Factor a quadratic expression to reveal the zeros of the function it defines.* *[Standard] – 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.* *[Standard] – Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.* *[Standard] – Solve quadratic equations with real coefficients that have complex solutions.*	**6.5. CC.9-12.N-CN.A.2, CC.9-12.N-CN.A.3, CC.9-12.A-SSE.B.3A, CC.9-12.A-APR.B.3, CC.9-12.A-CED.A.2, CC.9-12.N-CN.C.7**
6.6. The Fundamental Theorem of Algebra *[Standard] – Solve quadratic equations with real coefficients that have complex solutions.* *[Standard] – Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.*	**6.6. CC.9-12.N-CN.C.7, CC.9-12.N-CN.C.9, CC.9-12.A-REI.B.4B**

[Standard] – Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b. **6.8. The Binomial Theorem** *[Standard] – Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.* *[Standard] – Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.*	**6.8. CC.9-12.A-APR.C.4, CC.9-12.A-APR.C.5**

Inter-Disciplinary Connections:

Real-World problem solving examples:
Gold p. 308 Example 3, Travel p. 314 Example 3, Pet Transportation p. 328 Example 2, Sports p. 355 Example 4

Inter-Disciplinary problem solving examples:
World History – the volume of a sarcophagus p. 322 Example 4, Business – savings from a summer job p. 330 #10

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions:
Students will engage in Cornell Note taking part of which is summarizing the day's lesson.
Students can explain why cubic functions are useful for interpolating between known data points.
Students can explain how the graph of a polynomial function can help factor the polynomial.
Students can explain how given zeros of a polynomial function could have more than one graph.

Students can explain why given zeros (1, 2, 3, and 4) of a cubic polynomial function are incorrect.
Students can use the Rational Root Theorem to explain why if a polynomial has no constant term then the corresponding polynomial equation has only the number 0 as a possible rational root.
Students can explain why a binomial raised to the sixth power will have alternating positive and negative signs.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 6.1:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 306	Warm-Up: Check Skills You'll Need p. 306	Warm-Up: Check Skills You'll Need p. 306
Teach Teaching Options	• Classifying Polynomials • Comparing Models • Real-World Connection	• Classifying Polynomials • Comparing Models • Real-World Connection	• Classifying Polynomials • Comparing Models • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 308	Embedded Questioning Technique Exit Tickets Closure TE p. 308	Embedded Questioning Technique Exit Tickets Closure TE p. 308
Practice and Apply Assigning Homework	p. 309 #1-23	pp. 309-310 #1-59	pp. 309-311 #1-61
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 6.2:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 313	Warm-Up: Check Skills You'll Need p. 313	Warm-Up: Check Skills You'll Need p. 313
Teach Teaching Options	• Writing a Polynomial in Standard Form • Writing a Polynomial in Factored Form • Real-World Connection • Finding Zeros of a	• Writing a Polynomial in Standard Form • Writing a Polynomial in Factored Form • Real-World Connection • Finding Zeros of a	• Writing a Polynomial in Standard Form • Writing a Polynomial in Factored Form • Real-World Connection • Finding Zeros of a

	Regular	Accelerated	Honors
	Polynomial Function • Writing a Polynomial Function From its Zeros • Finding the Multiplicity of a Zero	Polynomial Function • Writing a Polynomial Function From its Zeros • Finding the Multiplicity of a Zero	Polynomial Function • Writing a Polynomial Function From its Zeros • Finding the Multiplicity of a Zero
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 316	Embedded Questioning Technique Exit Tickets Closure TE p. 316	Embedded Questioning Technique Exit Tickets Closure TE p. 316
Practice and Apply Assigning Homework	p. 317 #1-36	pp. 317-318 #1-61	pp. 317-319 #1-64
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 6.3:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 320	Warm-Up: Check Skills You'll Need p. 320	Warm-Up: Check Skills You'll Need p. 320
Teach Teaching Options	• Polynomial Long Division • Checking Factors • Using Synthetic Division • Real-World Connection • Evaluating a Polynomial by Synthetic Division	• Polynomial Long Division • Checking Factors • Using Synthetic Division • Real-World Connection • Evaluating a Polynomial by Synthetic Division	• Polynomial Long Division • Checking Factors • Using Synthetic Division • Real-World Connection • Evaluating a Polynomial by Synthetic Division
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 323	Embedded Questioning Technique Exit Tickets Closure TE p. 323	Embedded Questioning Technique Exit Tickets Closure TE p. 323
Practice and Apply Assigning Homework	p. 324 #1-33	pp. 324-325 #1-55	pp. 324-325 #1-60
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 6.4:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 327	Warm-Up: Check Skills You'll Need p. 327	Warm-Up: Check Skills You'll Need p. 327
Teach Teaching Options	• Solving by Graphing • Real-World Connection • Factoring Sum of Difference of Cubes • Solving a Polynomial Equation • Factoring by Using a Quadratic Pattern • Solving a Higher-Degree Polynomial Equation	• Solving by Graphing • Real-World Connection • Factoring Sum of Difference of Cubes • Solving a Polynomial Equation • Factoring by Using a Quadratic Pattern • Solving a Higher-Degree Polynomial Equation	• Solving by Graphing • Real-World Connection • Factoring Sum of Difference of Cubes • Solving a Polynomial Equation • Factoring by Using a Quadratic Pattern • Solving a Higher-Degree Polynomial Equation
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 329	Embedded Questioning Technique Exit Tickets Closure TE p. 329	Embedded Questioning Technique Exit Tickets Closure TE p. 329

Practice and Apply **Assigning Homework**	pp. 330-331 #1-32	pp. 330-332 #1-68	pp. 330-332 #1-71
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 6.5:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 335	Warm-Up: Check Skills You'll Need p. 335	Warm-Up: Check Skills You'll Need p. 335
Teach **Teaching Options**	• Finding Rational Roots • Using the Rational Root Theorem • Finding Irrational Roots • Finding Imaginary Roots • Writing a Polynomial Equation from Its Roots	• Finding Rational Roots • Using the Rational Root Theorem • Finding Irrational Roots • Finding Imaginary Roots • Writing a Polynomial Equation from Its Roots	• Finding Rational Roots • Using the Rational Root Theorem • Finding Irrational Roots • Finding Imaginary Roots • Writing a Polynomial Equation from Its Roots
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 337	Embedded Questioning Technique Exit Tickets Closure TE p. 337	Embedded Questioning Technique Exit Tickets Closure TE p. 337
Practice and Apply **Assigning Homework**	p. 339 #1-24	pp. 339-340 #1-39	pp. 339-340 #1-43
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 6.6:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 341	Warm-Up: Check Skills You'll Need p. 341	Warm-Up: Check Skills You'll Need p. 341
Teach **Teaching Options**	• Using the Fundamental Theorem of Algebra • Finding All Zeros of a Polynomial Function	• Using the Fundamental Theorem of Algebra • Finding All Zeros of a Polynomial Function	• Using the Fundamental Theorem of Algebra • Finding All Zeros of a Polynomial Function
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 342	Embedded Questioning Technique Exit Tickets Closure TE p. 342	Embedded Questioning Technique Exit Tickets Closure TE p. 342
Practice and Apply **Assigning Homework**	p. 343 #1-16	p. 343 #1-27	pp. 343-344 #1-31
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 6.8:

	Regular	**Accelerated**	**Honors**
Focus and Motivate	Warm-Up: Check Skills You'll Need p. 353	Warm-Up: Check Skills You'll Need p. 353	Warm-Up: Check Skills You'll Need p. 353

Starting Options			
Teach **Teaching Options**	• Using Pascal's Triangle • Expanding a Binomial • Using the Binomial Theorem • Real-World Connection	• Using Pascal's Triangle • Expanding a Binomial • Using the Binomial Theorem • Real-World Connection	• Using Pascal's Triangle • Expanding a Binomial • Using the Binomial Theorem • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 354	Embedded Questioning Technique Exit Tickets Closure TE p. 354	Embedded Questioning Technique Exit Tickets Closure TE p. 354
Practice and Apply **Assigning Homework**	pp. 355-356 #1-22	pp. 355-357 #1-64	pp. 355-357 #1-68
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects.

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, and electronic portfolios

Accommodations/Modifications:

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.

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Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: **Algebra 2/Radical Functions and Rational Exponents**	**Unit Summary**: **In this unit (Chapter 7) students will be introduced to radical functions and rational exponents. Students will learn about nth roots of real numbers and relate them to nth powers and rational exponents. Students will learn to perform operations on radical expressions, simplify radical expressions, study binomial radical expressions, and solve radical equations and equations with rational exponents. Operations on functions are examined, including function composition. Students are introduced to inverse relation and inverse functions. Finally, students will graph radical functions and state the domain and range using interval notation.**
Grade Level(s): **10 - 12**	
Essential Question(s): • How do you perform operations with functions? • How do you find the composition of functions? • How do find inverse relations and determine if the relation is a function? • How do you graph square root and other radical functions?	**Enduring Understanding(s):** **Students will be able to:** • Simplify *n*th roots • Multiply radical expressions • Divide radical expressions • Add and subtract radical expressions • Multiply and divide binomial radical expressions • Simplify expressions with rational exponents • Solve square root and other radical equations • Add, subtract, multiply, and divide functions • Find the composition of two functions • Find the inverse of a relation or function and determine if the inverse is a function. • Students will graph square root and other functions and state the domain and range using interval notation.

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	CCSS
7.1. Roots and Radical Expressions *[Standard] – Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*	**7.1. CC.9-12.A-SSE.B.3**
7.2 Multiplying and Dividing Radical Expressions *[Standard] – Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*	**7.2. CC.9-12.A-SSE.B.3**

7.3. Binomial Radical Expressions *[Standard] – Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.* *[Standard] – Rewrite expressions involving radicals and rational exponents using the properties of exponents.*	**7.3. CC.9-12.A-SSE.B.3, CC.9-12.N-RN.A.2**
7.4 Rational Exponents *[Standard] – 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.* *[Standard] – Rewrite expressions involving radicals and rational exponents using the properties of exponents.*	**7.4. CC.9-12.N-RN.1, CC.9-12.N-RN.A.2**
7.5 Solving Square Root and Other Radical Equations *[Standard] –Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.*	**7.5. CC.9-12.A-REI.A.2**
7.6 Function Operations *[Standard] – Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).* *[Standard] –Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.* *[Standard] – Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.* *[Standard] – (+) Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time.*	**7.6. CC.9-12.F-IF.A.1, CC.9-12.F-IF.A.2, CC.9-12.F-BF.A.1.B, CC.9-12.F-BF.A.1.C**

7.7 **Inverse Relations and Functions** *[Standard] – Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x^3 or f(x) = (x+1)/(x-1) for x ≠ 1.* *[Standard] – (+) Verify by composition that one function is the inverse of another.* *[Standard] – (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.*	**7.7. CC.9-12.F-BF.B.4.A, CC.9-12.F-BF.B.4.B, CC.9-12.F-BF.B.4.C**
7.8 Graphing Square Root and Other Radical Functions *[Standard] – Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.* *[Standard] –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.* *[Standard] –Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function*	**7.8. CC.9-12.F-IF.C.7.B, CC.9-12.F-BF.B.3, CC.9-12.F-IF.B.5**

Inter-Disciplinary Connections:

Real-World problem solving examples:
Packaging p.371 Example 4, Space Travel p. 386 Example 3, Solar Cells p. 392 Example 3, Consumer Issues p.400 Example 4, Distance p.409 Example 5

Inter-Disciplinary problem solving examples:
Physics – gravitational force p.377 #35, Physics – speed p.383 #48, Archaeology – ages of artifacts and fossils p.389 #62, Physics – velocity p.398 #51, Economics – currency conversion p.401 #44

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions
Students will engage in Cornell Note taking part of which is summarizing the day's lesson.
Students can explain why 10 is a first root of 10.
Students can explain an error in the simplification of a radical expression.
Students can explain the advantages and disadvantages of first simplifying radicals in order to estimate its decimal value.
Students can describe the similarities and differences among the graphs of three sets of simultaneous radical equations.
Students can explain how to find the range of the inverse of a function without finding the inverse itself.
Students can explain the effect that a has on the graph of $y = a\sqrt{x}$.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 7.1:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 369	Warm-Up: Check Skills You'll Need p. 369	Warm-Up: Check Skills You'll Need p. 369
Teach Teaching Options	• Finding All Real Roots • Finding Roots • Simplifying Radical	• Finding All Real Roots • Finding Roots • Simplifying Radical	• Finding All Real Roots • Finding Roots • Simplifying Radical

	Expressions • Real-World Connection	Expressions • Real-World Connection	Expressions • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 371	Embedded Questioning Technique Exit Tickets Closure TE p. 371	Embedded Questioning Technique Exit Tickets Closure TE p. 371
Practice and Apply Assigning Homework	p. 372 #1-32	pp. 372-373 #1-61	pp. 372-373 #1-69
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.2:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 374	Warm-Up: Check Skills You'll Need p. 374	Warm-Up: Check Skills You'll Need p. 374
Teach Teaching Options	• Multiplying Radicals • Simplifying Radical Expressions • Multiplying Radical Expressions • Dividing Radicals • Rationalizing the Denominator • Real-World Connection	• Multiplying Radicals • Simplifying Radical Expressions • Multiplying Radical Expressions • Dividing Radicals • Rationalizing the Denominator • Real-World Connection	• Multiplying Radicals • Simplifying Radical Expressions • Multiplying Radical Expressions • Dividing Radicals • Rationalizing the Denominator • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 376	Embedded Questioning Technique Exit Tickets Closure TE p. 376	Embedded Questioning Technique Exit Tickets Closure TE p. 376
Practice and Apply Assigning Homework	p. 377 #1-35	pp. 377-378 #1-60	pp. 377-378 #1-68
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.3:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 380	Warm-Up: Check Skills You'll Need p. 380	Warm-Up: Check Skills You'll Need p. 380
Teach Teaching Options	• Adding and Subtracting Radical Expressions • Real-World Connection • Simplifying Before Adding or Subtracting • Multiplying Binomial Radical Expressions • Multiplying Conjugates • Rationalizing Binomial Radical Denominators	• Adding and Subtracting Radical Expressions • Real-World Connection • Simplifying Before Adding or Subtracting • Multiplying Binomial Radical Expressions • Multiplying Conjugates • Rationalizing Binomial Radical Denominators	• Adding and Subtracting Radical Expressions • Real-World Connection • Simplifying Before Adding or Subtracting • Multiplying Binomial Radical Expressions • Multiplying Conjugates • Rationalizing Binomial Radical Denominators
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 381	Embedded Questioning Technique Exit Tickets Closure TE p. 381	Embedded Questioning Technique Exit Tickets Closure TE p. 381
Practice and Apply Assigning Homework	p. 382 #1-26	pp. 382-383 #1-50	pp. 382-383 #1-55

Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.4:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 385	Warm-Up: Check Skills You'll Need p. 385	Warm-Up: Check Skills You'll Need p. 385
Teach Teaching Options	• Simplifying Expressions With Rational Exponents • Converting To and From Radical Form • Real-World Connection • Simplifying Numbers With Rational Exponents • Writing Expressions in Simplest Form	• Simplifying Expressions With Rational Exponents • Converting To and From Radical Form • Real-World Connection • Simplifying Numbers With Rational Exponents • Writing Expressions in Simplest Form	• Simplifying Expressions With Rational Exponents • Converting To and From Radical Form • Real-World Connection • Simplifying Numbers With Rational Exponents • Writing Expressions in Simplest Form
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 387	Embedded Questioning Technique Exit Tickets Closure TE p. 387	Embedded Questioning Technique Exit Tickets Closure TE p. 387
Practice and Apply Assigning Homework	pp. 388-389 #1-49	pp. 388-389 #1-80	pp. 388-390 #1-87
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.5:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 391	Warm-Up: Check Skills You'll Need p. 391	Warm-Up: Check Skills You'll Need p. 391
Teach Teaching Options	• Solving Square Root Equations • Solving Radical Equations With Rational Exponents • Real-World Connection • Checking for Extraneous Solutions • Solving Equations With Two Rational Exponents	• Solving Square Root Equations • Solving Radical Equations With Rational Exponents • Real-World Connection • Checking for Extraneous Solutions Solving Equations With Two Rational Exponents	• Solving Square Root Equations • Solving Radical Equations With Rational Exponents • Real-World Connection • Checking for Extraneous Solutions Solving Equations With Two Rational Exponents
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 393	Embedded Questioning Technique Exit Tickets Closure TE p. 393	Embedded Questioning Technique Exit Tickets Closure TE p. 393
Practice and Apply Assigning Homework	pp. 394-395 #1-30	pp. 394-396 #1-52	pp. 394-396 #1-58
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.6:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 398	Warm-Up: Check Skills You'll Need p. 398	Warm-Up: Check Skills You'll Need p. 398

Teach **Teaching Options**	• Adding and Subtracting Functions • Multiplying and Dividing Functions • Composition of Functions • Real-World Connection	• Adding and Subtracting Functions • Multiplying and Dividing Functions • Composition of Functions • Real-World Connection	• Adding and Subtracting Functions • Multiplying and Dividing Functions • Composition of Functions • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 400	Embedded Questioning Technique Exit Tickets Closure TE p. 400	Embedded Questioning Technique Exit Tickets Closure TE p. 400
Practice and Apply **Assigning Homework**	pp. 400-401 #1-44	pp. 400-403 #1-76	pp.400-403 #1-84
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.7:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 406	Warm-Up: Check Skills You'll Need p. 406	Warm-Up: Check Skills You'll Need p. 406
Teach **Teaching Options**	• Finding the Inverse of a Relation • Interchanging x and y • Graphing a Relation and Its Inverse • Finding an Inverse Function • Real-World Connection • Composition of Inverse Functions	• Finding the Inverse of a Relation • Interchanging x and y • Graphing a Relation and Its Inverse • Finding an Inverse Function • Real-World Connection • Composition of Inverse Functions	• Finding the Inverse of a Relation • Interchanging x and y • Graphing a Relation and Its Inverse • Finding an Inverse Function • Real-World Connection • Composition of Inverse Functions
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 409	Embedded Questioning Technique Exit Tickets Closure TE p. 409	Embedded Questioning Technique Exit Tickets Closure TE p. 409
Practice and Apply **Assigning Homework**	p. 410 #1-34	pp. 410-411 #1-62	pp. 410-411 #1-68
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 7.8:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 414	Warm-Up: Check Skills You'll Need p. 414	Warm-Up: Check Skills You'll Need p. 414
Teach **Teaching Options**	• Translating Square Root Functions Vertically • Translating Square Root Functions Horizontally • Graphing Square Root Functions • Graphing Cube Root Functions • Solving Square Root Equations by Graphing	• Translating Square Root Functions Vertically • Translating Square Root Functions Horizontally • Graphing Square Root Functions • Graphing Cube Root Functions • Solving Square Root Equations by Graphing	• Translating Square Root Functions Vertically • Translating Square Root Functions Horizontally • Graphing Square Root Functions • Graphing Cube Root Functions • Solving Square Root Equations by Graphing
Checking for Understanding	Embedded Questioning Technique	Embedded Questioning Technique	Embedded Questioning Technique

		Exit Tickets Closure TE p. 416	Exit Tickets Closure TE p. 416	Exit Tickets Closure TE p. 416
	Practice and Apply **Assigning Homework**	p. 417 #1-36	pp. 417-418 #1-64	pp. 417-419 #1-70
	Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.

Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, electronic portfolios

Accommodations/Modifications:

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.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: **Algebra 2/Radical Functions and Rational Exponents**	**Unit Summary**: **In this unit (Chapter 8) students will learn about exponential and logarithmic functions. Students will define and identify both exponential and logarithmic functions. Students will learn to find and apply exponential growth and decay models. The will learn to find and apply logarithmic function models. Students will solve exponential and logarithmic equations. Students will learn to graph exponential and logarithmic function and identify transformations of the graphs. Students will be introduced to the properties of logarithms and use the properties to solve both exponential and logarithmic functions.**
Grade Level(s): **10 - 12**	
Essential Question(s): • How can the properties of exponential models be used to analyze situations? • How can the properties of logarithms and exponents be used to solve equations and analyze situations?	**Enduring Understanding(s):** **Students will be able to:** • Model exponential growth • Model exponential decay • To identify the role of constants in $y = ab^{cx}$ • Use e as a base • Write and evaluate logarithmic expressions • Graph logarithmic functions • Use the properties of logarithms • Solve exponential equations • Solve logarithmic equations • Evaluate natural logarithmic expressions • Solve equations using natural logarithms

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCSS**
8.1 Exploring Exponential Models *[Standard] – Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.* *[Standard] – Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)^t, y = (0.97)^t, y = (1.01)12^t, y = (1.2)^t/10, and classify them as representing exponential growth or decay.* *[Standard] – Prove that linear functions grow by equal differences over equal intervals,*	**8.1. CC.9-12.F-IF.C.7.E, CC.9-12.F-IF.C.8.B, CC.9-12.F-LE.A.1.A, CC.9-12.F-LE.A.1.C, CC.9-12.F-LE.A.2, CC.9-12.F-LE.A.3, CC.9-12.S-ID.B.6.A**

and that exponential functions grow by equal factors over equal intervals. *[Standard] – Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another* *[Standard] – Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).* *[Standard] – Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.* *[Standard] – Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.*	
8.2 Properties of Exponential Function *[Standard] – Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.* *[Standard] – Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^t/10$, and classify them as representing exponential growth or decay.* *[Standard] – Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.* *[Standard] – Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another* *[Standard] – Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).* *[Standard] – Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.* *[Standard] – 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*	**8.2. CC.9-12.F-IF.C.7.E, CC.9-12.F-IF.C.8.B, CC.9-12.F-LE.A.1.A, CC.9-12.F-LE.A.1.C, CC.9-12.F-LE.A.2, CC.9-12.F-LE.A.3, CC.9-12.F-BF.B.3**

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.	
8.3. Logarithmic Functions as Inverses *[Standard] – For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.* *[Standard] –Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.* *[Standard] – (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.*	**8.3. CC.9-12.F-LE.A.4, CC.9-12.F-IF.C.7.E, CC.9-12.F-BF.B.5**
8.4 Properties of Logarithms *[Standard] – Interpret expressions that represent a quantity in terms of its context.* *[Standard] – Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*	**8.4. CC.9-12.A-SSE.A.1, CC.9-12.A-SSE.B.3.C**
8.5 Exponential and Logarithmic Equations *[Standard] –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.*	**8.5. CC.9-12.A-CED.A.1**
8.6 Natural Logarithms *[Standard] – Interpret expressions that represent a quantity in terms of its context.* *[Standard] – Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.* *[Standard] –Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple*	**8.6. CC.9-12.A-SSE.A.1, CC.9-12.A-SSE.B.3.C, CC.9-12.A-CED.A.1**

rational and exponential functions.	

Inter-Disciplinary Connections:

Real-World problem solving examples:
Population growth p. 431 Example 2, Car depreciation p. 434 Example 6, Medicine p. 440 Example 3, Compound Interest p. 442 Example 5, Noise control p. 456 Example 4, Zoology p. 462 Example 4, Space p. 471 Example 2, Compound Interest p. 472 Example 5

Inter-Disciplinary problem solving examples:
Business – depreciation p. 435 #35, Economics – gross domestic product p. 437 #59, Physics – atmospheric pressure p. 443 #36, Biology – infectious disease p. 444 #48, Seismology – Richter scale p. 446 Example 1, Chemistry – hydrogen ions p. 448 Example 4, Music – pitch/frequency p. 467 #97, Biology – bacteria p. 473 #44 – 46, Physics – Newton's Law of Cooling p. 474 #65

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions
Students will engage in Cornell Note taking part of which is summarizing the day's lesson.
Students will explain how a negative growth rate affects the equation of an exponential model.
Students will write a function to model a countries' gross domestic product.
Students will explain how to model a deficit that is growing exponentially.
Students will describe a real-world problem that could be modeled with an exponential growth function.
Students will write a logarithm as the sum or difference of two logarithms.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 8.1:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 430	Warm-Up: Check Skills You'll Need p. 430	Warm-Up: Check Skills You'll Need p. 430
Teach **Teaching Options**	• Graphing Exponential Growth • Real-World Connection • Writing an Exponential Function • Analyzing a Function • Graphing Exponential Decay • Real-World Connection	• Graphing Exponential Growth • Real-World Connection • Writing an Exponential Function • Analyzing a Function • Graphing Exponential Decay • Real-World Connection	• Graphing Exponential Growth • Real-World Connection • Writing an Exponential Function • Analyzing a Function • Graphing Exponential Decay • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 434	Embedded Questioning Technique Exit Tickets Closure TE p. 434	Embedded Questioning Technique Exit Tickets Closure TE p. 434
Practice and Apply **Assigning Homework**	p. 434-435 #1-35	pp. 434-436 #1-55	pp.434-436 #1-59
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 8.2:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 439	Warm-Up: Check Skills You'll Need p. 439	Warm-Up: Check Skills You'll Need p. 439
Teach **Teaching Options**	• Graphing $y = ab^x$ for $0 < \|a\| < 1$ • Translating $y = ab^x$ • Real-World Connection • Evaluating e^x • Real-World Connection	• Graphing $y = ab^x$ for $0 < \|a\| < 1$ • Translating $y = ab^x$ • Real-World Connection • Evaluating e^x • Real-World Connection	• Graphing $y = ab^x$ for $0 < \|a\| < 1$ • Translating $y = ab^x$ • Real-World Connection • Evaluating e^x • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 441	Embedded Questioning Technique Exit Tickets Closure TE p. 441	Embedded Questioning Technique Exit Tickets Closure TE p. 441

Practice and Apply **Assigning Homework**	p. 442 #1-26	pp. 442-444 #1-47	pp. 442-444 #1-50
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 8.3:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 446	Warm-Up: Check Skills You'll Need p. 446	Warm-Up: Check Skills You'll Need p. 446
Teach **Teaching Options**	• Real-World Connection • Writing in Logarithmic Form • Evaluating Logarithms • Real-World Connection • Graphing a Logarithmic Function • Translating $y = \log_b x$	• Real-World Connection • Writing in Logarithmic Form • Evaluating Logarithms • Real-World Connection • Graphing a Logarithmic Function • Translating $y = \log_b x$	• Real-World Connection • Writing in Logarithmic Form • Evaluating Logarithms • Real-World Connection • Graphing a Logarithmic Function • Translating $y = \log_b x$
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 448	Embedded Questioning Technique Exit Tickets Closure TE p. 448	Embedded Questioning Technique Exit Tickets Closure TE p. 448
Practice and Apply **Assigning Homework**	pp.449-450 #1-40	pp. 449-451 #1-84	pp. 449-452 #1-90
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 8.4:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 454	Warm-Up: Check Skills You'll Need p. 454	Warm-Up: Check Skills You'll Need p. 454
Teach **Teaching Options**	• Identifying the Properties of Logarithms • Simplifying Logarithms • Expanding Logarithms • Real-World Connection	• Identifying the Properties of Logarithms • Simplifying Logarithms • Expanding Logarithms • Real-World Connection	• Identifying the Properties of Logarithms • Simplifying Logarithms • Expanding Logarithms • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 456	Embedded Questioning Technique Exit Tickets Closure TE p. 456	Embedded Questioning Technique Exit Tickets Closure TE p. 456
Practice and Apply **Assigning Homework**	p.457 #1-32	pp. 457-458 #1-87	pp. 457-459 #1-90
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 8.5:

	Regular	**Accelerated**	**Honors**
Focus and Motivate	Warm-Up: Check Skills You'll Need p. 461	Warm-Up: Check Skills You'll Need p. 461	Warm-Up: Check Skills You'll Need p. 461

Starting Options			
Teach **Teaching Options**	• Solving an Exponential Equation • Solving an Exponential Equation by Graphing • Solving an Exponential Equation by Tables • Real-World Connection • Using the Change of Base Formula • Solving a Logarithmic Equation • Using Logarithmic Properties to Solve an Equation	• Solving an Exponential Equation • Solving an Exponential Equation by Graphing • Solving an Exponential Equation by Tables • Real-World Connection • Using the Change of Base Formula • Solving a Logarithmic Equation • Using Logarithmic Properties to Solve an Equation	• Solving an Exponential Equation • Solving an Exponential Equation by Graphing • Solving an Exponential Equation by Tables • Real-World Connection • Using the Change of Base Formula • Solving a Logarithmic Equation • Using Logarithmic Properties to Solve an Equation
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 463	Embedded Questioning Technique Exit Tickets Closure TE p. 463	Embedded Questioning Technique Exit Tickets Closure TE p. 463
Practice and Apply **Assigning Homework**	pp. 464-465 #1-47	pp. 464-466 #1-96	pp.464-467 #1-105
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 8.6:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 470	Warm-Up: Check Skills You'll Need p. 470	Warm-Up: Check Skills You'll Need p. 470
Teach **Teaching Options**	• Simplifying Natural Logarithms • Real-World Connection • Solving a Natural Logarithmic Equation • Solving an Exponential Equation • Real-World Connection	• Simplifying Natural Logarithms • Real-World Connection • Solving a Natural Logarithmic Equation • Solving an Exponential Equation • Real-World Connection	• Simplifying Natural Logarithms • Real-World Connection • Solving a Natural Logarithmic Equation • Solving an Exponential Equation • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 472	Embedded Questioning Technique Exit Tickets Closure TE p. 472	Embedded Questioning Technique Exit Tickets Closure TE p. 472
Practice and Apply **Assigning Homework**	pp. 472-473 #1-30	pp. 472-474 #1-62	pp.472-474 #1-66
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, electronic portfolios

Accommodations/Modifications:

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.** *(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).*	

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course/Unit Title:
Algebra 2/Rational Functions
Grade Level(s):
10-12</td><td>Unit Summary:
In this unit (Chapter 9) students will graph reciprocal and rational functions; they learn to find horizontal and vertical asymptotes, points of discontinuity, and holes. They will define, simplify, and perform arithmetic operations with rational expressions. Students will solve rational equations and check for extraneous solutions.</td></tr>
<tr><td>Essential Question(s):
• How do you graph reciprocal and rational functions?
• How do you perform operations rational expressions?
• How do you solve rational equations?
• How can you create rational equations from word problems?
• How do you use rational functions to model real world data?</td><td>Enduring Understanding(s):
Students will be able to:
• Graph reciprocal functions
• Graph translations of reciprocal functions
• Identify properties of rational functions
• Graph rational functions
• Simplify rational expressions
• Multiply and divide rational expressions
• Add and subtract rational expressions
• Simplify complex fractions
• Solve rational equations
• Use rational equations in solving problems</td></tr>
</table>

PART II:INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCSS**
9.2. The Reciprocal Function Family *[Standard] - Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.* *[Standard] – 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.*	**9.2. CC.9-12.F-IF.C.7.D, CC.9-12.F-BF.B.3**
9.3. Rational Functions and Their Graphs *[Standard] - Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.* *[Standard] – 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.*	**9.3. CC.9-12.F-IF.C.7.D, CC.9-12.F-BF.B.3**
9.4. Rational Expressions *[Standard] – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$.* *[Standard] – Rewrite simple rational expressions in different forms; write $^{a(x)}/_{b(x)}$ in the form $q(x) + {}^{r(x)}/_{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.* *[Standard] – Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.*	**9.4. CC.9-12.A-SSE.A.2, CC.9-12.A-APR.D.6, CC.9-12.APR.D.7, CC.9-12.F-IF.B.5**

*[Standard] – Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**	
9.5. Adding and Subtracting Rational Expressions *[Standard] – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.* *[Standard] – Rewrite simple rational expressions in different forms; write $^{a(x)}/_{b(x)}$ in the form $q(x) + {}^{r(x)}/_{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.* *[Standard] – Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.* *[Standard] – Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.**	**9.5. CC.9-12.A-SSE.A.2, CC.9-12.A-APR.D.6, CC.9-12.A-APR.D.7, CC.9-12.F-IF.B.5**
9.6. Solving Rational Equations *[Standard] – Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.* *[Standard] – Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.* *[Standard] – Rewrite simple rational expressions in different forms; write $^{a(x)}/_{b(x)}$ in the form $q(x) + {}^{r(x)}/_{b(x)}$, where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.* *[Standard] – Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.*	**9.6. CC.9-12.A-REI.A.2, CC.9-12.A-SSE.A.2, CC.9-12.A-APR.D.6, CC.9-12.A-APR.D.7, CC.9-12.F-IF.B.5**

*[Standard] – Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.** .	

Inter-Disciplinary Connections:

Real-World problem solving examples:
Gasoline Mileage p. 499 #47, Basketball p. 506 #42, Architecture p. 510 Example 2, Camera Lens p. 515 Example 1, Aerodynamics p. 523 Example 3, Volunteerism p. 524 Example 4

Inter-Disciplinary problem solving examples:
Business – budgeting p. 498 #25, Business – average cost p. 505 Example 5, Physics – acceleration p. 512 #37, Physics – camera lens equation p. 519 #55, Woodworking – tapered cylinder p. 525 #35

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions:
Students will engage in Cornell Note taking part of which is summarizing the day's lesson.
Students can explain how knowing the asymptotes of a translation of $y = \frac{k}{x}$ can help graph the function.
Students can describe the conditions that will produce a rational function with a graph that has no vertical asymptotes.
Students can explain how they can tell whether a rational expression is in simplest form.
Students can explain how factoring is used when adding or subtracting rational expressions.
Students can write and solve a problem that can be modeled by a rational equation.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 9.2:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 495	Warm-Up: Check Skills You'll Need p. 495	Warm-Up: Check Skills You'll Need p. 495
Teach Teaching Options	• Graphing an Inverse Variation • Graphing Reciprocal Functions • Real-World Connection • Graphing a Translation • Writing the Equation of a Transformation	• Graphing an Inverse Variation • Graphing Reciprocal Functions • Real-World Connection • Graphing a Translation • Writing the Equation of a Transformation	• Graphing an Inverse Variation • Graphing Reciprocal Functions • Real-World Connection • Graphing a Translation • Writing the Equation of a Transformation
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 497	Embedded Questioning Technique Exit Tickets Closure TE p. 497	Embedded Questioning Technique Exit Tickets Closure TE p. 497
Practice and Apply Assigning Homework	p. 498 #1-24	pp. 498-499 #1-47	pp. 498-500 #1-52
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 9.3:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 501	Warm-Up: Check Skills You'll Need p. 501	Warm-Up: Check Skills You'll Need p. 501
Teach Teaching Options	• Finding Points of Discontinuity • Finding Vertical Asymptotes • Finding Horizontal Asymptotes • Sketching Graphs of Rational Functions • Real-World Connection	• Finding Points of Discontinuity • Finding Vertical Asymptotes • Finding Horizontal Asymptotes • Sketching Graphs of Rational Functions • Real-World Connection	• Finding Points of Discontinuity • Finding Vertical Asymptotes • Finding Horizontal Asymptotes • Sketching Graphs of Rational Functions • Real-World Connection
Checking for	Embedded Questioning	Embedded Questioning	Embedded Questioning

Understanding	Technique Exit Tickets Closure TE p. 504	Technique Exit Tickets Closure TE p. 504	Technique Exit Tickets Closure TE p. 504
Practice and Apply Assigning Homework	pp. 505-506 #1-31	pp. 505-506 #1-43	pp. 505-507 #1-45
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 9.4:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 509	Warm-Up: Check Skills You'll Need p. 509	Warm-Up: Check Skills You'll Need p. 509
Teach Teaching Options	• Simplifying Rational Expressions • Real-World Connection • Multiplying Rational Expressions • Dividing Rational Expressions	• Simplifying Rational Expressions • Real-World Connection • Multiplying Rational Expressions • Dividing Rational Expressions	• Simplifying Rational Expressions • Real-World Connection • Multiplying Rational Expressions • Dividing Rational Expressions
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 510	Embedded Questioning Technique Exit Tickets Closure TE p. 510	Embedded Questioning Technique Exit Tickets Closure TE p. 510
Practice and Apply Assigning Homework	p. 511 #1-18	pp. 511-512 #1-37	pp. 511-513 #1-41
Assess and Reteach Differentiating Instruction	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

Section 9.5:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 514	Warm-Up: Check Skills You'll Need p. 514	Warm-Up: Check Skills You'll Need p. 514
Teach Teaching Options	• Real-World Connection • Finding Least Common Multiples • Adding Rational Expressions • Subtracting Rational Expressions	• Real-World Connection • Finding Least Common Multiples • Adding Rational Expressions • Subtracting Rational Expressions • Simplifying Complex Fractions	• Real-World Connection • Finding Least Common Multiples • Adding Rational Expressions • Subtracting Rational Expressions • Simplifying Complex Fractions
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 516	Embedded Questioning Technique Exit Tickets Closure TE p. 516	Embedded Questioning Technique Exit Tickets Closure TE p. 516
Practice and Apply Assigning Homework	pp. 517-518 #1-21	pp. 517-519 #1-53	pp. 517-519 #1-55
Assess and Reteach Differentiating	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource*

	Instruction	*Book*	*Book*	*Book*

Section 9.6:

	Regular	**Accelerated**	**Honors**
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p. 522	Warm-Up: Check Skills You'll Need p. 522	Warm-Up: Check Skills You'll Need p. 522
Teach **Teaching Options**	• Solving Rational Equations • Solving Rational Equations • Real-World Connection • Real-World Connection	• Solving Rational Equations • Solving Rational Equations • Real-World Connection • Real-World Connection	• Solving Rational Equations • Solving Rational Equations • Real-World Connection • Real-World Connection
Checking for Understanding	Embedded Questioning Technique Exit Tickets Closure TE p. 524	Embedded Questioning Technique Exit Tickets Closure TE p. 524	Embedded Questioning Technique Exit Tickets Closure TE p. 524
Practice and Apply **Assigning Homework**	pp. 524-525 #1-25	pp. 524-526 #1-55	pp. 524-527 #1-58
Assess and Reteach **Differentiating Instruction**	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*	*Study Guide: Workbook* *Tutorial Software* *Challenge: Chapter Resource Book*

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects.

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, and electronic portfolios

Accommodations/Modifications:

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.

(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: **Algebra 2/Probability and Statistics**	**Unit Summary**: **In this unit (Chapter 12) students will learn about probability and statistics. This chapter introduces students to probability distribution, ways of organizing and displaying data, and measures of central tendency. Students study measures of variation to describe how data in a data set are spread out. They consider samples and the relationship between sample size and margin of error. Finally they learn about binomial experiments, binomial distributions, and normal distributions.**
Grade Level(s): **10 - 12**	
Essential Question(s): • Why is data collected and analyzed? • How do people use data to influence others? • How can predictions be made based on data?	**Enduring Understanding(s):** **Students will be able to:** • Make a probability distribution • Use a probability distribution in conducting a simulation • Find conditional probability • Use formulas and tree diagrams • Calculate measures of central tendency • Draw and interpret box-and-whisker plots • Find the standard deviation of a set of values • Use standard deviation in real-world situations • Find sample proportions • Find margin of error • Find binomial probabilities • Use binomial distributions • Use normal distribution • Use the standard normal curve

PART II: INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCS**
12.1 Probability Distributions *[Standard] – 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").* *[Standard] – 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.*	**12.1. CC.9-12.S-CP.A.1, CC.9-12.S-A.2**

12.2 Conditional Probability *[Standard] – Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.* *[Standard] – Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.* *[Standard] – . 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*	**12.2. CC.9-12.CP.S-A.3, CC.9-12.S-CP.A.5, CC.9-12.S-CP.B.6**
12.3. Analyzing Data *[Standard] – 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.* *[Standard] – Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).* *[Standard] – Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.* *[Standard] –Evaluate reports based on data.*	**12.3. CC.9-12.S-ID.A.2, CC.9-12.S-ID.A.3, CC.9-12.S-IC.B.5, CC.9-12.S-IC.B.6**
12.4 Standard Deviation *[Standard] – 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.*	**12.4. CC.9-12.S-ID.A.2**
12.5 Working with Samples *[Standard] – . Understand statistics as a process for making inferences about population parameters based on a random sample from that population* *[Standard] –. Decide if a specified model is consistent with results from a given data-*	**12.5. CC.9-12.S-IC.A.1, CC.9-12.S-IC.A.2, CC.9-12.S-ID.A.4, CC.9-12.S-IC.B.3, CC.9-12.S-IC.B.4, CC.9-12.S-ID.B.6**

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? *[Standard] – 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.* *[Standard] –. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.* *[Standard] – Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.* *[Standard] – Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.* **12.6 Binomial Distributions** *[Standard] – (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.* *[Standard] – (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?* *[Standard] – (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).* *[Standard] –(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).*	**12.6. CC.9-12. S-MD.A.3, CC.9-12.S-MD.A.4, CC.9-12.S-MD.B.6, CC.9-12.S-MD.B.7**

12.7 Normal Distributions *[Standard] - 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.* *[Standard] – (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.* *[Standard] – (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?* *[Standard] – (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).* *[Standard] –(+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game).*	**12.7 CC.9-12.S-IDA.4, CC.9-12.S-MD.A.4, CC.9-12.S-MD.B.6, CC.9-12.S-MD.B.7**

Inter-Disciplinary Connections:

Real-World problem solving examples:
Social Science p. 469 Example 2, Market Research p. 650 Example 5, Weather p. 657 #19, Oceanography p. 661 Example 2, Meteorology p. 665 #13, Energy p. 671 Example 3, Public Opinion p. 678 Example 2, Surveys p. 681 #17, Computer Science p. 682 #25, Elections p. 682 #31, Merchandising p. 686 Example 2, Quality Control p. 687 Example 3, Medicine p.692 Example 1, Education p.694 Example 4, Agriculture p.696 #19, Seismology p.696 #28

Inter-Disciplinary problem solving examples:
Genetics - p. 650 Example 4, Marketing – p. 653 #20, Business – p. 673 #17, Business – p. 674 #30, Genetics – p. 680 Example 5, Marketing – p. 689 #15, Sociology – p.689 #18, Genetics – p. 689 #24, Statistics – p.690 #27, Biology – p.693 Example 2, Biology – p.695 #1, Track – p.696 #18

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Students will engage in Cornell Note taking part of which is summarizing the day's lesson.
Students will explain how in a simulation, how do equally likely outcomes help to represent the probability distribution.
Students will explain which branches of a tree diagram represent conditional probabilities.
Students will explain how the removal of outliers affect a box-and-whisker plot.
Students will explain how the removal of outliers affect the median of a data set.
Students will use the range of a data set to describe how income varied.
Students will compare and contrast the wages of union and nonunion workers.
Students will write a news article describing the sample proportion and margin of error for a poll result.
Students will explain how a binomial experiment is related to a binomial expansion.

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. Investigating algebra activities, modeling examples, using real-life application, studying note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Teaching options include, but are not limited to whole class instruction and discussion, pair, share, and compare activities, cooperative learning, and discovery activities.

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 teacher observations, students completing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects

Accommodations/Modifications:

Use manipulatives 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.** **Provide checklists for solving problems.** *(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).*	

Summative Assessments:

Periodic benchmark tests, summative assessments, state assessments, PSATs, End of Course tests, SATs, and PARCC

Accommodations/Modifications:

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.** **Break problems and test sections into smaller pieces.**	

Performance Assessments:

Projects, display of student work, electronic portfolios

Accommodations/Modifications:

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.** *(Reference materials are located in District shared directory, mathematics, modifications/accommodations folder, by chapter and section).*	

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

<table>
<tr><td>Course/Unit Title:
Algebra 2/Systems of Equations
Grade Level(s):
10-12</td><td>Unit Summary:
In this unit (Chapter 3), students will solve systems of two equations with two variables graphically and algebraically. Students will then solve systems of three equations with three variables algebraically. Mixed systems of linear and quadratic equations will be solved graphically and algebraically.</td></tr>
<tr><td>Essential Question(s):
• How do you solve a linear system?
• How do you solve systems with 3 equations?
• How do you solve a mixed system?</td><td>Enduring Understanding(s):
Students will be able to:
• Solve a linear system graphically
• Solve a linear system algebraically
• Solve a system of equations with three variables
• Solve a system of linear and quadratic equations graphically
• Solve a system of linear and quadratic equations algebraically
• Write systems of equations to model real-world situations</td></tr>
</table>

PART II:INSTRUCTIONAL STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCSS**
3.1 Graphing Systems of Equations *[Standard] –Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.* *[Standard] - Graph linear and quadratic functions and show intercepts, maxima, and minima.*	**3.1 CC.9-12.A.REI.C.6, CC.9-12.F-IF.C.7A**
3.2.Solving Systems Algebraically *[Standard]-Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions..*	**3.2 CC.9-12.A.REI.C.5**
3.6.Systems with Three Variables *[Standard] -Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.* **Supplemental Graphically Solve a Mixed System** *[Standard] -Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle $x^2 + y^2 = 3$.* *[Standard]-Graph linear and quadratic functions and show intercepts, maxima, and minima.*	**3.6 CC.9-12.A.REI.C.5**
Supplemental Graphically Solve a Mixed System *[Standard] -Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle $x^2 + y^2 = 3$.* *[Standard]-Graph linear and quadratic functions and show intercepts, maxima, and minima.*	**Supplemental CC.9-12. A-REI.C.7, CC.9-12.F.IF.C.7A**

Inter-Disciplinary Connections:

Real-World problem solving examples:
Sports- comparing times of races p. 119 Example 2, Fees for gym membership p. 126 Example 2, Money management investments p. 156 Example 4

Inter-Disciplinary problem solving examples:
Business- comparing monthly revenue p. 121 #12, Physical Science-weather temperatures p. 130 #63, Finance-income p. 157 #19

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions:
Students will engage in Cornell Note taking part of summarizing the day's lesson
Student can create and solve their own word problems that involve systems of equations.
Students can explain how to decide which is the best method to use to solve a systems of equations
Students can summarize the possible relationships between the slopes of linear equations and the solutions to the system.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 3.1:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 118	Warm-Up: Check Skills You'll Need p. 118	Warm-Up: Check Skills You'll Need p. 118
Teach Teaching Options	• Solving by Graphing • Real-World Connection • Classifying systems without graphing	• Solving by Graphing • Real-World Connection • Classifying systems without graphing	• Solving by Graphing • Real-World Connection • Classifying systems without graphing
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 120	Embedded questioning technique, exit tickets Closure: TE p. 120	Embedded questioning technique, exit tickets Closure: TE p. 120
Practice and Apply Assigning Homework	pp. 120-121 #1-24	pp. 120-122 #1-50	pp. 120-121 #1-55
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 3.2:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 125	Warm-Up: Check Skills You'll Need p. 125	Warm-Up: Check Skills You'll Need p. 125
Teach Teaching Options	• Solving by Substitution • Real-World Connection • Solving by Elimination • Solving an equivalent system • Solving a system without a unique solution	• Solving by Substitution • Real-World Connection • Solving by Elimination • Solving an equivalent system • Solving a system without a unique solution	• Solving by Substitution • Real-World Connection • Solving by Elimination • Solving an equivalent system • Solving a system without a unique solution
Checking for	Embedded questioning technique, exit tickets	Embedded questioning technique, exit tickets	Embedded questioning technique, exit tickets

Understanding	Closure: TE p. 127	Closure: TE p. 127	Closure: TE p. 127
Practice and Apply Assigning Homework	pp. 128-129 #1-43	pp.128-130 #1-62	pp. 128-130 #1-66
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 3.6:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 152	Warm-Up: Check Skills You'll Need p. 152	Warm-Up: Check Skills You'll Need p. 152
Teach Teaching Options	• Solving by Elimination • Solving an Equivalent System • Solving by Substitution • Real-World Connection	• Solving by Elimination • Solving an Equivalent System • Solving by Substitution • Real-World Connection	• Solving by Elimination • Solving an Equivalent System • Solving by Substitution • Real-World Connection
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 156	Embedded questioning technique, exit tickets Closure: TE p. 156	Embedded questioning technique, exit tickets Closure: TE p. 156
Practice and Apply Assigning Homework	p. 157 #1-21	pp. 157-158 #1-41	pp. 157-159 #1-45
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section Supplemental:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Graph a linear equation. Graph a quadratic equation.	Warm-Up: Graph a linear equation. Graph a quadratic equation.	Warm-Up: Graph a linear equation. Graph a quadratic equation.
Teach Teaching Options	• Solve mixed systems graphically • Solve mixed systems algebraically	• Solve mixed systems graphically • Solve mixed systems algebraically	• Solve mixed systems graphically • Solve mixed systems algebraically
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 156	Embedded questioning technique, exit tickets Closure: TE p. 156	Embedded questioning technique, exit tickets Closure: TE p. 156
Practice and Apply Assigning Homework	**Supplemental materials**	**Supplemental materials**	**Supplemental materials**
Assess and Reteach Differentiating	Study Guide: workbook Tutorial Software Challenge: Chapter Resource	Study Guide: workbook Tutorial Software Challenge: Chapter Resource	Study Guide: workbook Tutorial Software Challenge: Chapter Resource

Instruction	Book	Book	Book

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects.

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in the District shared directory, mathematics, modifications/accommodations folder, by chapter and section.)

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, and electronic portfolios

Accommodations/Modifications:

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.

(Reference materials are located in the District shared directory, mathematics, modifications/accommodations folder, by chapter and section.)

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: Algebra 2/Quadratic Relations and Conic Sections **Grade Level(s):** **10-12**	**Unit Summary**: **In this unit (Chapter 10), students will learn that conic sections are curves that can be formed by intersecting a plane with a double cone. The next step is identifying the different conic sections from their equations. Students will then graph circles, ellipses, hyperbolas and parabolas. Working backwards, students will derive the equation for a circle, hyperbola, parabola and an ellipse.**
Essential Question(s): • How do you create a conic section? • How do you identify a conic section from the equation? • How do you graph a conic section? • How do you derive the equation for a conic section?	**Enduring Understanding(s):** Students will be able to: • Identify conic sections • Graph circles including translations • Derive the equation of a circle • Graph parabolas including translations • Derive the equation of a parabola • Graph ellipses including translations • Derive the equation of an ellipse • Graph hyperbolas including translations • Derive the equation of a hyperbola

STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCSS**
10.1 Exploring Conic Sections *[Standard] –Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.* *[Standard] - Derive the equation of a parabola given a focus and directrix.* *[Standard]- Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.*	**10.1. CC.9-12.G.-GPE.A.1, CC.9-12.G.-GPE.A.2, CC.9-12.G.-GPE.A.3**

10.2.Parabolas *[Standard] - Derive the equation of a parabola given a focus and directrix.*	**10.2.CC.9-12.G-.GPE.A.2**
10.3 Circles *[Standard] –Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.*	**10.3 .CC.9-12.G.GPE.A.1**
10.4.Ellipses *[Standard]- Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.*	**10.4 CC.9-12.G.GPE.A.3**
10.5 Hyperbolas *[Standard]- Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.*	**10.5 CC.9-12.G.GPE.A.3**
10.6 Translating Conic Sections *[Standard] –Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.* *[Standard] - Derive the equation of a parabola given a focus and directrix.* *[Standard]- Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.*	**10.6 CC.9-12.G.-GPE.A.1, CC.9-12.G.-GPE.A.2, CC.9-12.G.-GPE.A.3**

Inter-Disciplinary Connections:

Real-World problem solving examples:
Design-Moire patterns p. 550 Example 5, Solar Energy- parabolic shape of solar collectors p. 557 Example 3, Machinery- gears in a motor p. 563 Example 3, Aerodynamics- Transonic Tunnel p. 569 Example 2, Space-gravitational pull p. 577 Example 3,

Inter-Disciplinary problem solving examples:
Science- speed of sound p. 552 #49, Science- tsunamis p. 559 #42, Astronomy- elliptical orbit p. 573 #66, History- symbols from ancient writing systems

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions:
Students will engage in Cornell Note taking part of summarizing the day's lesson
Student can describe how the translation of a hyperbola effects the equations of the asymptotes.
Students can describe the similarities and differences between hyperbolas and ellipses.
Students can explain why x^2 +y^2 = 0 does not make a circle.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 10.1:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 547	Warm-Up: Check Skills You'll Need p. 547	Warm-Up: Check Skills You'll Need p. 547
Teach Teaching Options	• Graphing a circle • Identify graphs of conic sections • Real-World Connection	• Graphing a circle • Identify graphs of conic sections • Real-World Connection	• Graphing a circle • Graphing an ellipse • Graphing a hyperbola • Identify graphs of conic sections • Real-World Connection
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 549	Embedded questioning technique, exit tickets Closure: TE p. 549	Embedded questioning technique, exit tickets Closure: TE p. 549
Practice and Apply Assigning Homework	p. 550 #1-16 (Identify conic section)	p. 550 #1-16 (Identify conic section)	pp. 550-552 #1-49
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 10.2:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 555	Warm-Up: Check Skills You'll Need p. 555	Warm-Up: Check Skills You'll Need p. 555
Teach Teaching Options	• Using the definition of a parabola • Writing the equation of a parabola • Real-World	• Using the definition of a parabola • Writing the equation of a parabola • Real-World	• Using the definition of a parabola • Writing the equation of a parabola • Real-World

	connection • Identifying Focus and Directrix Graph the equation of	connection • Identifying Focus and Directrix Graph the equation of	connection • Identifying Focus and Directrix • Graph the equation of a parabola
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 557	Embedded questioning technique, exit tickets Closure: TE p. 557	Embedded questioning technique, exit tickets Closure: TE p. 557
Practice and Apply Assigning Homework	pp. 558-560 #1-61	pp. 558-560 #1-61	pp. 558-560 #1-61
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 10.3:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 561	Warm-Up: Check Skills You'll Need p. 561	Warm-Up: Check Skills You'll Need p. 561
Teach Teaching Options	• Writing the equation of a circle • Using translations to write an equation • Real-World connection • Finding the center and radius • Graphing a circle using center and radius	• Writing the equation of a circle • Using translations to write an equation • Real-World connection • Finding the center and radius • Graphing a circle using center and radius	• Writing the equation of a circle • Using translations to write an equation • Real-World connection • Finding the center and radius • Graphing a circle using center and radius
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 563	Embedded questioning technique, exit tickets Closure: TE p.563	Embedded questioning technique, exit tickets Closure: TE p. 563
Practice and Apply Assigning Homework	p. 564-565 #1-34	pp. 564-565 #1-66	pp. 564-566 #1-70
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 10.4:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 568	. Warm-Up: Check Skills You'll Need p. 568	Warm-Up: Check Skills You'll Need p. 568
Teach Teaching Options	• Writing the equation of an ellipse • Real-World connection • Finding the foci of an ellipse	• Writing the equation of an ellipse • Real-World connection • Finding the foci of an ellipse	• Writing the equation of an ellipse • Real-World connection • Finding the foci of an ellipse

	Using the foci of an ellipse	Using the foci of an ellipse	• Using the foci of an ellipse
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 570	Embedded questioning technique, exit tickets Closure: TE p. 570	Embedded questioning technique, exit tickets Closure: TE p. 570
Practice and Apply Assigning Homework	pp. 571-573 #1-68	pp. 571-573 #1-68	pp. 571-573 #1-68
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 10.5:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 574	. Warm-Up: Check Skills You'll Need p. 574	Warm-Up: Check Skills You'll Need p. 574
Teach Teaching Options	• Graphing a hyperbola • Finding the foci of a hyperbola Real-world connection	• Graphing a hyperbola • Finding the foci of a hyperbola Real-world connection	• Graphing a hyperbola • Finding the foci of a hyperbola • Real-world connection
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 577	Embedded questioning technique, exit tickets Closure: TE p. 577	Embedded questioning technique, exit tickets Closure: TE p. 577
Practice and Apply Assigning Homework	pp. 578-579 #1-48	pp. 578-579 #1-48	pp. 578-579 #1-48
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 10.6:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 582	. Warm-Up: Check Skills You'll Need p. 582	Warm-Up: Check Skills You'll Need p. 582
Teach Teaching Options	• Writing the equation of a translated ellipse • Writing the equation of a translated hyperbola • Real-world connection Identifying a translated conic section	• Writing the equation of a translated ellipse • Writing the equation of a translated hyperbola • Real-world connection Identifying a translated conic section	• Writing the equation of a translated ellipse • Writing the equation of a translated hyperbola • Real-world connection • Identifying a translated conic section
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 584	Embedded questioning technique, exit tickets Closure: TE p. 584	Embedded questioning technique, exit tickets Closure: TE p. 584

Practice and Apply **Assigning Homework**	pp. 585-587 #1-57	pp. 585-587 #1-57	pp. 585-587 #1-57
Assess and Reteach **Differentiating Instruction**	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects.

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in the District shared directory, mathematics, modifications/accommodations folder, by chapter and section.)

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, and electronic portfolios

Accommodations/Modifications:

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.

(Reference materials are located in the District shared directory, mathematics, modifications/accommodations folder, by chapter and section.)

Black Horse Pike Regional School District Curriculum Template

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

PART I: UNIT RATIONALE

WHY ARE STUDENTS LEARNING THIS CONTENT AND THESE SKILLS?

Course/Unit Title: Algebra 2/Sequences and Series **Grade Level(s):** **10-12**	**Unit Summary**: **In this unit (Chapter 11), students will be introduced to sequences and series with a lesson on mathematical patterns. Students will then learn to identify and use arithmetic and geometric sequences and series. The idea of finding finite sums will be helpful when finding the area under a curve in Calculus.**
Essential Question(s): • How do you identify mathematical patterns? • How do you use a formula to find the nth term of a sequence? • How do you identify and predict a sequence? • How do you write and evaluate series? • How do you use summation notation? • How do you evaluate an infinite geometric series?	**Enduring Understanding(s):** Students will be able to: • Identify mathematical patterns • Use formulas to find the nth term of a sequence • Identify and generate arithmetic sequences • Identify and generate geometric sequences • Write and evaluate arithmetic series • Use summation notation • Write and evaluate geometric series • Evaluate an infinite geometric series

STRATEGIES AND RESOURCES

DESCRIBE THE LEARNING TARGETS.

After each target, identify the Common Core Standards that are applicable

Learning Target	**CCSS**
11.1 Mathematical Patterns *[Standard] –Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.* **11.2.Arithmetic Sequences**	**11.1 CC.9-12.F-IF.A.3** **11.2 CC.9-12.F-IF.A.3, CC.9-12.F-BF.A2, CC.9-12.F-LE.A.2**

[Standard] –Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1. *[Standard] - Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.* *[Standard] -Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*	
11.3 Geometric Sequences *[Standard] –Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.* *[Standard] - Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.* *[Standard] -Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).*	**11.3 CC.9-12.F-IF.A.3, CC.9-12.F-BF.A2, CC.9-12.F-LE.A.2**
11.4.Arithmetic Series *[Standard]- Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.*	**11.4 CC.9-12.A-SSE.B.4**
11.5 Geometric Series *[Standard]- Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.*	**11.5 CC.9-12.A-SSE.B.4**

Inter-Disciplinary Connections:

Real-World problem solving examples:
Entertainment- Stacking cards p. 603 #32, Fund-Raising- bike-a-thon p. 607 Example 2, Nature- Fibonacci Sequence p. 611, Design- Reduce picture size p. 613 Example 2, Crafts- Cross Stitch p. 620 Example 2, Communication- Phone Chain p. 629 #30

Inter-Disciplinary problem solving examples:
Geometry- Stacking boxes p. 604 #51, Financial Literacy- Savings p. 609 #71, Physics- swinging on a swing p. 614 Example 3, Theater- Seats in the rows of a theater p. 622 #31, Physics- Pendulum p. 630 #48

Students will engage with the following text:

Prentice Hall New Jersey Algebra 2
Holt McDougal Explorations in CORE MATH Algebra 2 Workbook

Students will write:

Writing/Open Ended questions:
Students will engage in the Cornell Note taking part of summarizing the day's lesson
Student can explain the difference between a recursive formula and an explicit formula.
Students can describe the advantages and disadvantages of a recursive and an explicit formula.
Students can describe the similarities and differences between a common difference and a common ratio.

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. Investigating algebra activities, modeling examples, using real-life application, using note-taking strategies, and using Smart Board technologies will all be explored as a blend of learning strategies to promote critical thinking, problem solving and performance skills of all learners. Other learning experiences could include alternative lesson openers, math and history applications, problem-solving workshops, interdisciplinary applications and projects.

Suggested warm-up activities, instructional strategies/activities, and assignments:

Section 11.1:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 600	Warm-Up: Check Skills You'll Need p. 600	Warm-Up: Check Skills You'll Need p. 600
Teach Teaching Options	• Generating a sequence • Real-World connection • Using a recursive formula	• Generating a sequence • Real-World connection • Using a recursive formula	• Generating a sequence • Real-World connection • Using a recursive formula
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p.602	Embedded questioning technique, exit tickets Closure: TE p. 602	Embedded questioning technique, exit tickets Closure: TE p. 602
Practice and Apply Assigning Homework	p. 603 #1-23	pp. 603-604 #1-51	pp. 603-605 #1-57
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 11.2:

	Regular	Accelerated	Honors
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 606	Warm-Up: Check Skills You'll Need p. 606	Warm-Up: Check Skills You'll Need p. 606
Teach Teaching Options	• Identifying an arithmetic sequence • Real-world connection • Using the arithmetic mean	• Identifying an arithmetic sequence • Real-world connection • Using the arithmetic mean	• Identifying an arithmetic sequence • Real-world connection • Using the arithmetic mean
Checking for Understanding	Embedded questioning technique, exit tickets	Embedded questioning technique, exit tickets	Embedded questioning technique, exit tickets

	Closure: TE p. 607	Closure: TE p. 607	Closure: TE p. 607
Practice and Apply Assigning Homework	p. 608 #1-30	pp. 608-609 #1-74	pp. 608-610 #1-86
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 11.3:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p. 612	Warm-Up: Check Skills You'll Need p. 612	Warm-Up: Check Skills You'll Need p. 612
Teach Teaching Options	• Identifying a geometric sequence • Real-world connections	• Identifying a geometric sequence • Real-world connections	• Identifying a geometric sequence • Real-world connections
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 614	Embedded questioning technique, exit tickets Closure: TE p.614	Embedded questioning technique, exit tickets Closure: TE p. 614
Practice and Apply Assigning Homework	p. 614-615 #1-27	pp. 614-615 #1-54	pp. 614-616 #1-60
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 11.4:

	Regular	**Accelerated**	**Honors**
Focus and Motivate Starting Options	Warm-Up: Check Skills You'll Need p.619	Warm-Up: Check Skills You'll Need p.619.	Warm-Up: Check Skills You'll Need p.619
Teach Teaching Options	• Writing and evaluating a series • Real-world connections • Writing a series in summation notation • Finding the sum of a series	• Writing and evaluating a series • Real-world connections • Writing a series in summation notation • Finding the sum of a series	• Writing and evaluating a series • Real-world connections • Writing a series in summation notation • Finding the sum of a series
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p.621	Embedded questioning technique, exit tickets Closure: TE p.621	Embedded questioning technique, exit tickets Closure: TE p.621
Practice and Apply Assigning Homework	p. 622 #1-24	pp. 622-623 #1-42	pp. 622-623 #1-48
Assess and Reteach Differentiating Instruction	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

Section 11.5:

	Regular	Accelerated	Honors
Focus and Motivate **Starting Options**	Warm-Up: Check Skills You'll Need p.626	Warm-Up: Check Skills You'll Need p.626.	Warm-Up: Check Skills You'll Need p.626
Teach **Teaching Options**	• Using a geometric series formula • Real-world connection • Determining divergence and convergence	• Using a geometric series formula • Real-world connection • Determining divergence and convergence	• Using a geometric series formula • Real-world connection • Determining divergence and convergence
Checking for Understanding	Embedded questioning technique, exit tickets Closure: TE p. 628	Embedded questioning technique, exit tickets Closure: TE p. 628	Embedded questioning technique, exit tickets Closure: TE p. 628
Practice and Apply **Assigning Homework**	pp. 628-629 #1-23	pp. 628-629 #1-44	pp. 628-630 #1-50
Assess and Reteach **Differentiating Instruction**	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book	Study Guide: workbook Tutorial Software Challenge: Chapter Resource Book

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 teacher observations, students doing quality of work together, questioning strategies, self and peer assessment, student record-keeping, quizzes, essays, journal writing, performance tasks, diagnostic tests, homework, and projects.

Accommodations/Modifications:

Use manipulatives 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.
Provide checklists for solving problems.

(Reference materials are located in the District shared directory, mathematics, modifications/accommodations folder, by chapter and section.)

Summative Assessments:

Periodic Benchmark Assessments, Summative Assessments, State Assessments (PARCC), PSATs, SATs, ACTs, Accuplacer Math, ASVAB- AFQT, and End of Course Benchmark
The teachers will continually interpret results to evaluate and promote student learning in order to foster the continuous development of students.

Accommodations/Modifications:

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.
Break problems and test sections into smaller pieces.

Performance Assessments:

Performance tasks, projects, display of student work, and electronic portfolios

Accommodations/Modifications:

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.

(Reference materials are located in the District shared directory, mathematics, modifications/accommodations folder, by chapter and section.)