

PUBLIC SCHOOLS OF EDISON TOWNSHIP
DIVISION OF CURRICULUM AND INSTRUCTION

PRE-ALGEBRA

Length of Course: Term

Elective/Required: Required

Schools: Middle Schools and High Schools

Credit Value: N/A

Date Approved: September 24, 2012

TABLE OF CONTENTS

Statement of Purpose	3
Course Objectives.....	4
Suggested Time Schedule	5
Unit 1. Variables, Expressions, and Integers	6
Unit 2. Solving Equations	8
Unit 3. Multi-Step Equations and Inequalities	10
Unit 4. Factors, Fractions and Exponents.....	12
Unit 5. Rational Numbers and Equations.....	14
Unit 6. Ratio, Proportion and Probability.....	15
Unit 7. Percents	17
Unit 8. Linear Functions.....	19
Unit 9. Real Numbers and Right Triangles	21
Unit 10. Measurement, Area and Volume.....	23
Unit 11. Data Analysis and Probability.....	25
Unit 12. Angle Relationships and Transformations.....	27

Modifications will be made to accommodate IEP mandates for classified students.

STATEMENT OF PURPOSE

Knowing that a firm understanding of mathematics is essential to success in the real world, this guide is developed to ensure that students master essential skills and concepts. The guide is based on the Common Core Standards for mathematics and is constructed to give the classroom teacher the best direction and resources for instructing the students. This Pre-Algebra course will give students a strong foundation in algebra while also preparing them for future study of geometry, probability and data analysis.

The structure of the guide is centered on conceptual understandings/essential questions which form the basis for the objectives, activities, and assessments. These conceptual understandings and essential questions will direct the teachers towards focusing their instruction on the concepts and skills that students will master throughout the course.

The guide is developed to give the accelerated student the strongest possible algebraic experience while supporting their preparation for the State mandated NJ ASK testing requirements. Students who successfully complete this course will be completely prepared for a rigorous Algebra 1 course.

As teachers and students work through the guide and the materials, it is essential that the mathematical content is taught and learned at the highest possible level. The materials provided with the textbook include a wide variety of support ranging from basic exercises to challenging assignments that will require the use of logical reasoning and problem solving to challenge even the strongest honors level student. Students must be challenged on a daily basis in the skills of algebra, the concepts of algebra, and requirements of sophisticated problem solving.

COURSE OBJECTIVES

Students will be able to:

- Perform operations with integers, decimals and fractions
- Plot points in a coordinate plane
- Use mathematical properties to simplify variable expressions
- Write and solve multi-step equations and inequalities
- Find greatest common factors and least common multiples
- Identify equivalent fractions and write fractions in simplest form
- Use rules of exponents and scientific notation
- Write fractions as decimals & decimals as fractions
- Write and compare ratios and rates
- Write and solve proportions
- Find theoretical and experimental probabilities
- Find and use equivalent fractions, decimals and percents
- Use proportions and the percent equation to solve percent problems
- Solve problems involving percent of change
- Represent and interpret relations and functions
- Write and graph linear equations, systems, and inequalities
- Use square roots and the Pythagorean theorem to solve problems
- Identify rational and irrational numbers
- Use special right triangles and trigonometric ratios to solve problems
- Find angle measures and side lengths of triangles and quadrilaterals
- Find the areas of parallelograms, trapezoids, and circles
- Find the surface areas and volumes of prisms, cylinders, pyramids and cones
- Make and interpret data displays
- Conduct surveys and analyze survey results
- Identify special pairs of angles and find their measures
- Find the measures of interior and exterior angles of polygons
- Translate, reflect, rotate and dilate geometric figures

SUGGESTED TIME LINE

	<u>UNIT</u>	<u># OF PERIODS</u>
1.	Variables, Expressions, and Integers	17
2.	Solving Equations	14
3.	Multi-Step Equations and Inequalities	14
4.	Factors, Fractions and Exponents	13
5.	Rational Numbers and Equations	15
6.	Ratio, Proportion and Probability	15
7.	Percents	14
8.	Linear Functions	20 *
9.	Real Numbers and Right Triangles	9
10.	Measurement, Area and Volume	15
11.	Data Analysis and Probability	12
12.	Angle Relationships and Transformations	12
	Total Number of Days	170

Chapter 1 – Variables, Expressions and Integers

Targeted Standards: Statistics & Probability, Rational Numbers & Exponents

Unit Objectives/Enduring Understandings: Students will be able to write and evaluate variable expressions. Perform operations with integers. Plot points in a coordinate plane.

Essential Questions: How do the rules for order of operations apply to evaluating algebraic expressions?

Unit Assessment: Assessment Resources (3 levels) – Ch.1

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
Investigate patterns in data. Apply/extend previous understandings of operations with fractions to use 4 operations with rational numbers. Add, subtract, multiply, divide integers. Make scatter plot Links to Core Common Standards: 7.NS.1, 7.NS.2, 7.NS.3, 8.SP.1	<ul style="list-style-type: none"> Key terms and phrases: numerical expression, variable expression, evaluate, power, order of operations, integer, absolute value, coordinates, inverse, scatter plot Substitute numbers into letters and solve Translate verbal to mathematical Use rules over integers Evaluate expressions with exponents Variable expressions that model real-life situations Identify vocabulary for a coordinate plane/plot points 	<ul style="list-style-type: none"> Evaluate variable expressions Write variable expressions Use powers to describe repeated multiplication Use order of operations to evaluate expressions Compare integers Order integers Use 4 operations with integers Identify and plot points in a coordinate plane Identify mean, median, mode, and range of a data set 	<ul style="list-style-type: none"> Technology activity: using order of operations Concept activity: add integers on number line Concept activity: multiplying integers Power presentations Test/practice/activity generators Interactive answers Real world connections Pgs 8-40 Music Connection 	<ul style="list-style-type: none"> Checkpoint exercises type A, B, C for different type learners Extra examples in book and worksheets Homework quick check Mid chapter quizzes Tests/standard tests Chapter reviews

Chapter 1 – Variables, Expressions and Integers (con't)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
		<ul style="list-style-type: none"> Prepare for solving problems 		
<p>Resources:</p> <p>Textbook pgs. 3-59, Chapter 1 Resource Book, graphing/scientific calculators, IDEA Works, modified worksheets/tests, pre-AP resources, best practices tool kit, thinkcentral.com, transparencies, Increase depth/complexity</p>			<p>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</p> <ul style="list-style-type: none"> Emphasize note taking strategies Note cards for vocabulary Tools/manipulatives Reword problems Handouts Graphic organizers 	

Chapter 2 – Solving Equations

Targeted Standards: Expressions and Equations, Rational Numbers/Exponents, Proportionality & Linear Relationships

Unit Objectives/Enduring Understandings: Students will be able to use mathematical properties to simplify variable expressions. Write and solve one-step equations. Perform operations with positive and negative decimals.

Essential Questions: How do the properties/operations apply to solving equations?

Unit Assessment: Assessment Resources (3 levels) – Ch.2

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
<p>Work with radicals and integer exponents</p> <p>Apply/extend operations with fractions to solve 4 operations with rational numbers.</p> <p>Links to Core Common Standards: 7.NS.2, 7.EE.1, 7.EG.4, 8.EE.7, 8.SP.1</p> <p>Understand properties and simplify expressions. Construct and solve linear equation in one variable to solve problems.</p>	<ul style="list-style-type: none"> Evaluate expressions with integers using properties Evaluate with distribute property Combine like terms Mental math to solve equations Operations in equations Positive/negative decimals Key terms and phrases: additive identity, multiplicative identity, equivalent numerical expressions, term, coefficient, like terms, equation, solve an equation, inverse operations 	<ul style="list-style-type: none"> Use properties of addition and multiplication Use the distributive property Simplify variable expressions Solve equations with variables Solve equations using addition or subtraction Solve equations using multiplication or division Solve equations involving decimals convert between metric/US customary units Prepare for solving 	<ul style="list-style-type: none"> Concept activity: Formalizing rules for operating with signed numbers Technology activity: Simplifying expressions Concept activity: Modeling add equations Concept activity: modeling mult. equations Projects Test practice/activity generators Interactive answers/solutions Real world connections Physical education – units ordering/properties 	<ul style="list-style-type: none"> Checkpoint exercises Different ability levels (A,B,C) Homework quick check Mid-chapter quiz Standard test Chapter reviews

Chapter 2 – Solving Equations (con't)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
		problems that involve perimeter/area <ul style="list-style-type: none"> Modeling equations 		
Resources: Essential Materials, Supplementary Materials, Links to Best Practices Textbook pgs. 60-115, Chapter 2 Resource Book, graphing/scientific calculators, IDEA Works, modified worksheets/tests, pre-AP resources, best practices tool kit, thinkcentral.com, depth/complexity problems			Instructional Adjustments: Modifications, student difficulties, possible misunderstandings <ul style="list-style-type: none"> Emphasize note taking strategies Note cards for vocabulary Tools/manipulatives Dissect word problems Reword problems Handouts/organizers 	

Chapter 3 – Multi-Step Equations and Inequalities

Targeted Standards: Expressions and Equations, Statistics and Probability, Proportionality and Linear Relationships

Unit Objectives/Enduring Understandings: Students will be able to write and solve multi-step equations. Write and solve inequalities.

Essential Questions: How do the inverse operations and properties apply to inequalities being solved and graphed?

Unit Assessment: Assessment Resources (3 levels) – Ch.3

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
<p>Analyze and solve linear equations and pairs of linear equations.</p> <p>Investigate patterns with data</p> <p>Solve real-life math problems using numerical/algebraic expressions/equations</p> <p>Links to Core Common Standards: 7.EE.3, 7.EE.4, 8.EG.7, 8.SP.1</p> <p>Construct and solve multi-step linear equations and inequalities in one variable to solve problems.</p>	<ul style="list-style-type: none"> Key terms and phrases: inequality, solution of an inequality, equivalent inequalities, graph of inequalities Equations with multi-step operations Equations with distributive property Equations with variables both sides Inequalities and symbols used 	<ul style="list-style-type: none"> Solve two-step equations Solve equations using the distributive property Solve equations with variables on both sides Solve inequalities using addition or subtraction Solve inequalities using multiplication or division Solve multi-step inequalities Solve some problem arithmetically and algebraically 	<ul style="list-style-type: none"> Concept activity: modeling two-step equations Concept activity: modeling add equations Concept activity: modeling equations with variables both sides Technology activity: solving equalities Concept Activity: mult/div properties of inequality Interactive answers 	<ul style="list-style-type: none"> Standard test practice Examples each section Practice problems all levels Mid-chapter quiz Chapter review Chapter test Different type tests

Chapter 3 – Multi-Step Equations and Inequalities (con't)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Key terms and phrases: inequality, solution of an inequality, equivalent inequalities, graph of inequalities Equations with multi-step operations Equations with distributive property Equations with variables both sides Inequalities and symbols used 	<ul style="list-style-type: none"> Model equations with variables both sides Rewriting equations/formulas 		
<p>Resources: Essential Materials, Supplementary Materials, Links to Best Practices</p> <p>Textbook pgs. 116-161, Chapter 3 Resource Book, calculators, IDEA Works, modified worksheets/tests, pre-AP resources, best practices tool kit, thinkcentral.com, transparencies, increase depth/complexity</p>			<p>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</p> <ul style="list-style-type: none"> Use models/manipulatives Identify key terms-word problems Use repetition Note taking Handouts Organizers 	

Chapter 4 – Factors, Fractions, and Exponents

Targeted Standards: Expressions/Equations, Rational/Numbers/Exponents, Proportionality and Relationships

Unit Objectives/Enduring Understandings: Students will be able to find greatest common factors and least common multiplies. Identify equivalent fractions and write fractions in simplest form. Use rules of exponents and scientific notation.

Essential Questions: How does the prime factorization find you GCF/LCM of two or more numbers?

Unit Assessment: Assessment Resources (3 levels) – Ch.4

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
<p>Work with radicals/integer exponents.</p> <p>Use properties of operations to generate expressions.</p> <p>Links to Core Common Standard: 7.EG.1, 8.EE.1, 8.EE.3, 8.EE.4</p> <p>Understand properties of exponents.</p> <p>Perform operations with numbers in scientific notation.</p>	<ul style="list-style-type: none"> Key terms and phrases: prime number, composite number, prime factorization, factor tree, monomial, GCF, LCM, relatively prime, common multiple, scientific notation Factor trees for prime factorization GCF/LCM of numbers Simplest form of fractions Rules for exponents Scientific notation rules 	<ul style="list-style-type: none"> Write the prime factorization of a number Find the GCF of two or more whole numbers Write equivalent fractions Find the least common multiple of two numbers Multiply and divide powers Work with negative and zero exponents Write numbers using scientific notation Find prime numbers Write numbers using powers of 10 	<ul style="list-style-type: none"> Concept activity: finding prime numbers Concept activity: finding rules of exponents Technology activity: using scientific notation Real world applications 	<ul style="list-style-type: none"> Standard/ practice test/quizzes Homework quick check Practice problems (different ability levels)

Chapter 4 – Factors, Fractions, and Exponents (con't)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
		<ul style="list-style-type: none"> Perform operations with numbers written in scientific notation 		
<p>Resources: Essential Materials, Supplementary Materials, Links to Best Practices</p> <p>Textbook pgs. 170-217, Chapter 4 Resource Book, calculators, IDEA works, worksheets/tests, pre-AP resources, best practices tool kit, thinkcentral.com, transparencies depth/complexity, employ alternate approaches, cross-curricular connections</p>			<p>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</p> <ul style="list-style-type: none"> Reinforce prerequisite skills Manipulatives Provide extra examples Focus on vocabulary Revise the order Note taking/organizers 	

Chapter 5 – Rational Numbers and Equations

<p>Targeted Standards: 7.NS.1, 7.NS.5, 7.NS.3, 7.EE.1, 7.EE.4, 8.NS.1</p> <p>Unit Objectives/Enduring Understandings: Students will be able to extend properties to rational numbers. Add, subtract, multiply and divide rational numbers.</p> <p>Essential Questions: What is a rational number and how is it used in equations?</p> <p>Unit Assessment: Chapter 5 Standardized test and performance assessment</p>
--

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
7.NS.2d 8.NS.1 7.NS.3 7.NS.3 7.NS.1c 7.EE.3 7.EE.4a and b	<ul style="list-style-type: none"> How to define a rational number Fraction operations <ul style="list-style-type: none"> Add Subtract Multiply Divide Multiplicative Inverse to solve equations 	<ul style="list-style-type: none"> Writing fractions as decimals and vice versa Adding and subtracting like and unlike fractions Multiplying fractions Dividing fractions Use multiplicative inverses to solve equations 	<ul style="list-style-type: none"> Motivating the lesson Extra examples in book Hwk quick check Emphasize vocabulary Daily puzzler Extended problem-solving in each section 	<ul style="list-style-type: none"> Mixed review Standardized test practice Lesson quiz Mid chapter quiz Ready to go on Chapter review
<p>Resources: Essential Materials, Supplementary Materials, Links to Best Practices</p> <ul style="list-style-type: none"> Warm-up exercises Assessment resources Countdown to testing Thinkcentral. Com 			<p>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</p> <ul style="list-style-type: none"> Incorporate alternate teaching strategies Utilize prerequisite skills for 6-H and 7-1 to ensure readiness Review common errors 	

Chapter 6 – Ratio, Proportion and Probability

Targeted Standards: 7.RP.1, 7.RP.2a-c, 7.G.6, 7.SP.5, 7.SP.7 a-b, 7.SP.8

Unit Objectives/Enduring Understandings: Students will be able to utilize rates and unit rates. Solve proportions using ratios. Find probability of events.

Essential Questions: How can I utilize rations, proportions, and probability to solve real world problems?

Unit Assessment: Chapter 6 Standardized test and performance assessment

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> • Ratios and unit rates • Systems of measurement • Solve proportion • Similar and congruent figures • Scale drawings • Probability and multiplication principle 	<ul style="list-style-type: none"> • Find ratios and unit rates • Convert rates from one system to another • Solve proportions using cross products • Identify similar and congruent figures • Find unknown side lengths of similar figures • Use proportions for scale drawings • Find probabilities • Use multiplication principle to find probabilities 	<ul style="list-style-type: none"> • Motivating the lesson • Extra examples in book • Hwk quick check • Emphasize vocabulary • Daily puzzler • Practice extended problem-solving in each section 	<ul style="list-style-type: none"> • Mixed review • Standardized test practice • Lesson quiz • Mid chapter quiz • Ready to go on • Chapter review • Discuss essential questions

Chapter 6 – Ratio Proportion and Probability (con't)**Resources:** Essential Materials, Supplementary Materials, Links to Best Practices

- Warm-up exercises
- Assessment resources
- Countdown to testing
- Thinkcentral. Com

Instructional Adjustments: Modifications, student difficulties, possible misunderstandings

- Incorporate alternate teaching strategies
- Utilize prerequisite skills for 6-H and 7-1 to ensure readiness
- Review common errors

Chapter 7 – Percents

Targeted Standards:

Unit Objectives/Enduring Understandings: Students will be able to use percents to solve real word problems. Students will find the percent of a number, percent of change to calculate markups, discounts, sales tax, tips, and interest earned.

Essential Questions: What is the percent of a number and how is it used in real world applications?

Unit Assessment: Chapter 7 Standardized test and performance assessment

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> • Percents & fractions • Percents & proportions • Percents & decimals • The percent equation • Percent of change • Percent applications • Simple and compound interest 	<ul style="list-style-type: none"> • Use a fraction to find the percent of a number • Use proportions to solve percent problems • Use decimals to solve percent problems • Use equations to solve percent problems • Find percent of change in a quantity • Find markups, discounts, sales tax, and tips • Calculate interest earned and account balances 	<ul style="list-style-type: none"> • Motivating the lesson • Extra examples in book • Hwk quick check • Emphasize vocabulary • Daily puzzler • Extended problem-solving in each section 	<ul style="list-style-type: none"> • Mixed review • Standardized test practice • Lesson quiz • Mid chapter quiz • Ready to go on • Chapter review

Chapter 7 – Percents**Resources:** Essential Materials, Supplementary Materials, Links to Best Practices

- Warm-up exercises
- Assessment resources
- Countdown to testing
- Thinkcentral. Com

Instructional Adjustments: Modifications, student difficulties, possible misunderstandings

- Incorporate alternate teaching strategies
- Utilize prerequisite skills for 6-H and 7-1 to ensure readiness
- Review common errors

Chapter 8 – Liner Functions

Targeted Standards:

Unit Objectives/Enduring Understandings: Students will be able to represent relations and functions, find and interpret slopes of lines and graph and solve linear and systems of equations.

Essential Questions: How can you use math to describe the steepness or vertical change to horizontal change?

Unit Assessment: Chapter 8 Standardized test and performance assessment

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> • Relations and Functions • Linear Equations in two variables • X and Y intercepts • The slope of a line • Slope intercept form • Writing linear equations • Function Notation • Systems of Linear Equations • Graphs of Linear Inequalities 	<ul style="list-style-type: none"> • Use graphs to represent relations and functions • Find solutions of equations in two variable (x,y) • Use x and y intercepts to graph linear equations • Find and interpret slopes of lines • Graph linear equations in slope intercept form • Write linear equations • Use function notation in relation to equations • Graph inequalities in two variables 	<ul style="list-style-type: none"> • Motivating the lesson • Extra examples in book • Hwk quick check • Emphasize vocabulary • Daily puzzler • Extended problem-solving in each section 	<ul style="list-style-type: none"> • Mixed review • Standardized test practice • Lesson quiz • Mid chapter quiz • Ready to go on • Chapter review

Chapter 8 – Linear Functions (con't)**Resources:** Essential Materials, Supplementary Materials, Links to Best Practices

- Warm-up exercises
- Assessment resources
- Countdown to testing
- Thinkcentral. Com

Instructional Adjustments: Modifications, student difficulties, possible misunderstandings

- Incorporate alternate teaching strategies
- Utilize prerequisite skills for 6-H and 7-1 to ensure readiness
- Review common errors

Chapter 9 – Real Numbers and Right Triangles

Targeted Standards: **Standard 8.NS.1:** Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. **Standard 8.NS.2:** use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). **Standard 8.EE.2:** Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. **Standard 8.G.5:** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. **Standard 8.G.6:** Explain a proof of the Pythagorean Theorem and its converse. **Standard 8.G.7:** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **Standard 8.G.8:** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Unit Objectives/Enduring Understandings: Students will be able to understand square roots and irrational numbers, and use, apply and prove the Pythagorean Theorem.

Essential Questions: Why is it useful to approximate a square root without a calculator? How can a square root expression be simplified? How can understanding the Pythagorean Theorem be helpful in problem-solving?

Unit Assessment: “Performance Assessment” Pre-Algebra Assessment Book – Chapter 9, page 157

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Key terms and phrases: square root, perfect square, radical expression, hypotenuse, leg, Pythagorean theorem, irrational number, real number, midpoint, trigonometric ration, sine, cosine, tangent Perfect squares can be used to approximate square roots An expression is in simplest form when it has no factor 	<ul style="list-style-type: none"> Use vocabulary Find and approximate square roots Simplify radical expressions Use the Pythagorean theorem Compare and order real numbers 	<ul style="list-style-type: none"> Use the Teacher’s edition pages 474 A-H to help plan the chapter Review finding the prime factorization of a number, then apply this to identifying perfect square factors Concept Activity 9.3 could be used to investigate how the lengths of a right triangle’s sides are related Encourage students to show 	<ul style="list-style-type: none"> Utilize Lesson quizzes found within each lesson in the teacher’s edition Standardized Test Practice questions at the end of each lesson provide practice in answering different types of test items Thinkcentral.com

Chapter 9 – Real Numbers and Right Triangles (con't)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	other than one, and there are no fractions under the radical sign and no radical in the denominator <ul style="list-style-type: none"> • Square roots can be multiplied or divided using product and quotient properties of square roots • Rational numbers can be written as the quotient of 2 integers 	<ul style="list-style-type: none"> • Use the distance and midpoint formulas • Find unknown side lengths in special right triangles • Use the tangent ratio to find an unknown length in a right triangle • Use the sine and cosine ratios to find unknown lengths in a right triangle 	their work at each step when using formulas <ul style="list-style-type: none"> • Use mnemonic devices to help student remember the sine and cosine ratios • Consider the “Problem Solving Workshop” from page 114 of the Chapter 9 Resource Book for application of the distance and midpoint formulas 	online quizzes can be used <ul style="list-style-type: none"> • Daily puzzlers like those on pages 511 and 522 allow students to use their reasoning skills and multiple math concepts to solve problems
Resources: Essential Materials, Supplementary Materials, Links to Best Practices <ul style="list-style-type: none"> • Textbooks pgs. 474-533, Chapter 9 Resources, scientific calculators, graph paper 			Instructional Adjustments: Modifications, student difficulties, possible misunderstandings <ul style="list-style-type: none"> • Provide note taking guides from Student Resources • Use Differentiating instruction strategies from pgs. 474G-H in teacher’s edition • Use the Video Tutor found at thinkcentral.com to reinforce each lesson • Teacher may omit sections 9.7 & 9.8 due to time constraints 	

Chapter 10 – Measurement, Area, and Volume

Targeted Standards: **Standard 7.RP.1:** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. **Standard 7.G.2:** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. **Standard 7.G.3:** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. **Standard 7.G.4:** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. **Standard 7.G.6:** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. **Standard 8.G.7:** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **Standard 8.G.9:** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Unit Objectives/Enduring Understandings: Students will be able to find area, surface area, and volume of geometric figures, and find circumference and area of circles.

Essential Questions: How can we find the measure of other angles when one angle of a triangle is known? When classifying figures, what characteristics do you look for? What information is needed to find the area, surface area, and volume of various figures?

Unit Assessment: “Problem Solving Workshops” Student Resource Book – Chapter 10, page 158 and 183

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Key terms and phrases: convex, concave, surface area, volume, lateral, net, base, height, diagonal, polygons, quadrilaterals, circumference Triangles can be classified by angles and sides There are differences between convex and concave polygons 	<ul style="list-style-type: none"> Use vocabulary Solve problems involving triangles Classify polygons and quadrilaterals Find the area of parallelograms and trapezoids Find the circumference and area of circles 	<ul style="list-style-type: none"> Use the Teacher’s edition pages 534 A-H to help plan the chapter Have students draw various circles on graph paper, estimate the area by counting and compare with the area using the formula To illustrate surface area of a cylinder, remove labels from a can and flatten it to see that the circumference = the length of the rectangle. For prisms, flatten empty boxes 	<ul style="list-style-type: none"> Utilize Lesson quizzes found within each lesson in the teacher’s edition Standardized Test Practice questions at the end of each lesson provide practice in answering different types of test items Thinkcentral.com on line quizzes can be

Chapter 10 – Measurement, Area, and Volume (con’t)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Formulas are used to find the area, surface area, circumference and volume of figures The parts of geometric figures to plug the appropriate numbers into the formulas 	<ul style="list-style-type: none"> Find the surface areas of prisms, cones, pyramids and cylinders Find the volumes of prisms, cylinders, pyramids and cones 	<ul style="list-style-type: none"> Students should write the formula, substitution, and all steps when using geometric formulas to solve problems Concept Activity 10.1 on page 536A will allow students to discover the relationship among the side lengths of a triangle Review the Pythagorean theorem before presenting lesson 10.6 Concept Activity 10.7 on pages 576-577 leads into calculating the volume of prisms Technology Activity on page 583 utilizes spreadsheets to compare SA and V of solids 	<p>used</p> <ul style="list-style-type: none"> Daily puzzlers like those on pages 538 and 556 allow students to use their reasoning skills and multiple math concepts to solve problems A performance assessment, such as the Cooperative Project found on page 77 of the Chapter 10 Resource Book, is a good idea since this unit lends itself to hands on activities
<p>Resources: Essential Materials, Supplementary Materials, Links to Best Practices</p> <ul style="list-style-type: none"> Textbooks pgs. 534-599, Chapter 10 Resources, scientific calculators, models of geometric figures and solids, empty boxes/containers, protractors, dot paper, unit cubes 			<p>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</p> <ul style="list-style-type: none"> Provide note taking guides from Student Resources Use Differentiating instruction strategies from pgs. 534G-H in teacher’s edition Utilize hands on activities often during this unit Use the Video Tutor found at thinkcentral.com to reinforce each lesson 	

Chapter 11 – Data Analysis and Probability

Targeted Standards: **Standard 7.SP.1:** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. **Standard 7.SP.2:** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. **Standard 7.SP.3:** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. **Standard 7.SP.4:** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. **Standard 7.SP.8:** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. **Standard 8.SP.1:** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. **Standard 8.SP.4:** Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

Unit Objectives/Enduring Understandings: Students will be able to understand samples, populations, and data distributions. They also will understand how to find probabilities.

Essential Questions: Which factors determine the best type of graph to display a given set of data? How does an outlier affect data? What is the difference between permutations and combinations? What methods can be used to determine the probability of an event?

Unit Assessment: “Real-Life Project: Weather” Chapter 11 Resource Book, page 87

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Key terms and phrases: stem-and-leaf plot, frequency, histogram, box-and-whisker plot, quartile, extreme, interquartile range, categorical data, numerical data, population, census, sample, bias, margin of error, permutation, combination, n factorial, disjoint event 	<ul style="list-style-type: none"> Use vocabulary Make stem-and-leaf plots, histograms and box-and-whisker plots Choose appropriate displays for data sets Identify populations and sampling methods 	<ul style="list-style-type: none"> Review measures of data (mean, median, mode) Include a sketch of each type of data display in the students' notes Technology Activity 11.2 can be used to create box-and-whisker plots on a graphing calculator 	<ul style="list-style-type: none"> Utilize Lesson quizzes found within each lesson in the teacher's edition Standardized Test Practice questions at the end of each lesson provide practice in answering different types of test

Chapter 11 – Data Analysis and Probability (con't)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Circle graphs display data as part of a whole Line graphs display numerical data which changes over time Line plots show how often numerical data occur Bar graphs compare categorical data Independent events do not, while dependent events do affect the probability of the occurrence of the other event 	<ul style="list-style-type: none"> Make conclusions about populations using surveys Use permutations and combinations to count possibilities Find probabilities of disjoint and overlapping events Find probabilities of independent and dependent events 	<ul style="list-style-type: none"> Gather authentic data Technology Activity 11.4 utilizes the Internet and spreadsheet activities to create data displays Make sure students are clear about the difference between permutation and combination Concept Activity 11.9 on page 667 uses a simulation to find probability For lesson 11.9, have students conduct experiments such as those described on pages 668-669 Utilize the chapter review game from page 269 in the Chapter 11 resource book 	<p>items</p> <ul style="list-style-type: none"> Thinkcentral.com online quizzes can be used Daily puzzlers like those on pages 637 and 656 allow students to use their reasoning skills and multiple math concepts to solve problems
<p>Resources: Essential Materials, Supplementary Materials, Links to Best Practices</p> <ul style="list-style-type: none"> Textbooks pgs. 608-681, Chapter 11 Resources, scientific calculators, graphing calculators, graph paper, number cubes, coins, spinners 			<p>Instructional Adjustments: Modifications, student difficulties, possible misunderstandings</p> <ul style="list-style-type: none"> Provide note taking guides from Student Resources Use Differentiating instruction strategies from pgs. 608G-H in teacher's edition Use the Video Tutor found at thinkcentral.com to reinforce each lesson 	

Chapter 12 – Angle Relationships and Transformations

Targeted Standards: **Standard 7.G.5:** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. **Standard 8.G.1:** Verify experimentally the properties of rotations, reflections, and translations. **Standard 8.G.2:** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **Standard 8.G.3:** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. **Standard 8.G.4:** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. **Standard 8.G.5:** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

Unit Objectives/Enduring Understandings: Students will be able to find angles in parallel lines and polygons, and understand transformation.

Essential Questions: Which are the different angles formed by intersecting lines? How can you describe different transformations?

Unit Assessment: “Performance Assessment” Chapter 12 - Assessment Book, page 209

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	<ul style="list-style-type: none"> Key terms and phrases: angle types-complementary, vertical, supplementary, corresponding, alternate interior/exterior, interior and exterior, transformation, transversal, image symmetry, rotation, translation, tessellation, dilation, scale factor, rotational symmetry Many types of angle relationships are formed by intersecting lines There are formulas to find the sum of the measures of 	<ul style="list-style-type: none"> Use vocabulary Identify and find measures of complementary, supplementary, and vertical angles Identify angles formed by a transversal Find measures of angles of convex polygons Translate, rotate, and reflect figures in a coordinate plane 	<ul style="list-style-type: none"> Provide various study techniques to help students remember the vocabulary words (ie: complementary vs supplementary) Provide organized methods for drawing exterior angles, such as all clockwise, so students don't get confused Use manipulatives to perform hands-on rotations, reflections, and translations Demonstrate dilation by photocopying enlargements and 	<ul style="list-style-type: none"> Utilize Lesson quizzes found within each lesson in the teacher's edition Standardized Test Practice questions at the end of each lesson provide practice in answering different types of test items Thinkcentral.com online quizzes can be used

Chapter 12 – Angle Relationships and Transformations (con’t)

	Core Content		Instructional Actions	
Cumulative Progress Indicators	Concepts <i>What students will know.</i>	Skills <i>What students will be able to do.</i>	Activities/Strategies Technology Implementation/ Interdisciplinary Connections	Assessment Check Points
	convex and regular polygons <ul style="list-style-type: none"> • Transformations occur when figures are changed or moved in some way • Many transformations can be found in nature and art 	<ul style="list-style-type: none"> • Dilate figures in a coordinate plane 	reductions of a figure <ul style="list-style-type: none"> • Concept Activity 12.3 on page 697 provides a hands-on activity to find the sum of the measures of convex polygons • Technology Activity 12.5 uses a graphing calculator to perform reflections • Lesson 12.6 has an interactive animated tutorial found on Thinkcentral.com which reinforces the lesson well • Ask the art & science departments for examples of transformations • Concept Activity 12.7 can be used to show that figures are similar 	<ul style="list-style-type: none"> • Daily puzzlers like those on pages 694 and 711 allow students to use their reasoning skills and multiple math concepts to solve problems

Resources: Essential Materials, Supplementary Materials, Links to Best Practices

- Textbooks pgs. 684-733, Chapter 12 Resources, scientific calculators, protractors, graph paper

Instructional Adjustments: Modifications, student difficulties, possible misunderstandings

- Provide note taking guides from Student Resources
- Use Differentiating instruction strategies from pgs. 684G-H in teacher's edition
- Use the Video Tutor found at thinkcentral.com to reinforce each lesson