East Stroudsburg Area School District
Mathematics – Math Edge Grade 8

Description:
The East Stroudsburg Area School District's Intermediate Mathematics Planned Course reflects the Common Core Standards, Teachers of Mathematics *Principles and Standards for Mathematics Education,* the Pennsylvania State Standards for Mathematics Education and the Pennsylvania Department of Education Assessment Anchors and Eligible Content. It provides a research-based, sequential framework of content designed to maximize successful mastery of mathematics, use and application of the Standards for Mathematical Practices, as well as the Habits of Mind.

Standards for Mathematical Practices	Habits of Mind
1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	1. Persisting 2. Managing Impulsivity 3. Listening to Others with Empathy and Understanding 4. Thinking Flexibly 5. Metacognition 6. Striving for Accuracy and Precision 7. Questioning and Posing Problems 8. Applying Past Knowledge to New Situations 9. Thinking and Communicating with Clarity and Precision 10. Gathering Data through all Senses 11. Creating, Imagining, and Innovating 12. Responding with Wonderment and Awe 13. Taking Responsible Risks 14. Finding Humor

The Mathematics Curriculum is designed to address the needs of a diverse population of learners. The content builds upon student learning styles and provides for differentiated instruction. Each grade level includes opportunities for enrichment and remediation of concepts, as well as activities for English Language Learners.
Resources are provided to enhance mastery of mathematics vocabulary, basic skills, and problem solving strategies. Technology and career applications of mathematical skills are infused throughout the curriculum. As a result, learners will be offered opportunities to reason, communicate and connect mathematically in the real world.

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In Grade 8, instructional time should focus on three critical areas:

(1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations;
(2) grasping the concept of a function and using functions to describe quantitative relationships;
(3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

1. Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions (y/x = m or y = mx) as special linear equations (y = mx + b), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin. They understand that the slope (m) of a line is a constant rate of change, so that if the input or x-coordinate changes by an amount A, the output or y-coordinate changes by the amount m·A. Students also use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question and to interpret components of the relationship (such as slope and y-intercept) in terms of the situation.

Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation. Students solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line. Students use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems.

2. Students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another. They can translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and they describe how aspects of the function are reflected in the different representations.

3. Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.

The Math Edge Grade 8 course is designed to scaffold concepts and skills from elementary school and grades 6 and 7 in preparation for learning the grade eight content. Students that were not successful on the Grade 7 PSSA Mathematics Assessment, or other state assessments, will receive an additional period of mathematics to facilitate bridging those content deficits. Embedded throughout instruction are problem-solving strategies as described in the table below, enabling students to make connections to their previous instruction and understandings. Teachers will continue to promote independent employment of all problem-solving strategies.

Individual student content area gaps will be identified using assessment data, so that student specific instructional decisions can be made. Unlike the core math classroom, students have been exposed to the curricular content, and the teacher will attempt to help the students to make connections to their prior learning and develop a stronger foundation for their grade-level content.

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Problem-Solving Strategies

This document lists universal problem solving skills not explicitly stated in Common Core curriculum. Teachers must incorporate the use of these strategies throughout the instructional sequence while introducing new skills/concepts and through spiral review. These strategies continue to be employed throughout the rest of the students' math instruction.

Use Objects Act It Out Choose an Operation Try, Check, Revise	Look for a Pattern Use Logical Reasoning Draw a Picture Make a Table	Make an Organized List Work Backwards Solve a Simpler Problem Write an Equation to Match the Data	Missing/Extra Information Answering 2 Questions Using Data
(I) = Strategy Introduced	**(A) = Strategy Applied**	**(M) = Strategy Mastered, Independently Employed**	

Grade K Use Objects (I) Grade 1 Use Objects (A) Act it Out (I) Grade 2 Use Objects (M) Act it Out (A) Draw a Picture (I) Look for a Pattern (I) Missing/Extra Information (I) Try, Check, Revise (I) Answering 2 Questions (I) Using Data (I)	Grade 3 Use Objects (M) Act it Out (M) Draw a Picture (A) Look for a Pattern (A) Missing/Extra Information (A) Try, Check, Revise (A) Answering 2 Questions (A) Using Data (A) Make a Table (I) Choose an Operation (I) Write an Equation to Match Data (I)	Grade 4 Use Objects (M) Act it Out (M) Draw a Picture (M) Look for a Pattern (M) Missing/Extra Information (M) Try, Check, Revise (M) Answering 2 Questions (M) Using Data (M) Choose an Operation (A) Make a Table (A) Write an Equation to Match Data (A) Work Backwards (I) Make an Organized List (I)	Grade 5 Use Objects (M) Act it Out (M) Draw a Picture (M) Look for a Pattern (M) Missing/Extra Information (M) Try, Check, Revise (M) Answering 2 Questions (M) Using Data (M) Choose an Operation (M) Make a Table (M) Write an Equation to Match Data (M) Work Backwards (A) Make an Organized List (A) Use Logical Reasoning (I) Solve a Simpler Problem (I)

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Math Practices with Student Actions

1. Make sense of problems and persevere in solving them.	• Explain the problem. • Identify math vocabulary. • Draw a picture or diagram to understand. • Make a plan and solve the problem. • Check your answer.
2. Reason abstractly and quantitatively.	• Show the problem in a different way. • Substitute numbers to solve.
3. Construct viable arguments and critique the reasoning of others.	• Explain what you already know. • Use what you know to solve. • Explain your thinking. • Ask questions to others to help them explain. • Explain why your problem-solving process makes sense.
4. Model with mathematics.	• Relate the problem to real life situations. • Map the relationships. • Use appropriate math vocabulary to explain.
5. Use appropriate tools strategically.	• Decide which tool(s) help solve the problem. • Use tool(s) to solve problems. • Explain how tool(s) helped to solve the problem.
6. Attend to precision.	• Define any terms or symbols needed. • Calculate the solution. • Check that the solution is accurate and precise.
7. Look for and make use of structure.	• Find patterns and structure. • Use patterns and structures to solve the problem. • Explain how the structure helped you to solve the problem
8. Look for and express regularity in repeated reasoning.	• Identify any repetition in the solution. • Identify vocabulary to explain reasoning. • Identify a more efficient way to solve the problem. • Identify a method or formula to solve the problem.

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Scope of Course - Sequence will vary based upon individual student/class needs, and the time-line of class. The topics below are not presented in any prescribed order; order should be determined by the needs of the students within each class and determined by the assessment data. The order and selection of the instructional content is determined by the teacher.

Basic Math Facts Practice - These skills should be addressed on a daily basis.
- Addition and Subtraction (Including borrowing and regrouping)
- Multiplication and Division (1's through 12's)

Ratios and Proportional relationships
- Analyze proportional relationships and use them to solve real-world and mathematical problems.

The Number System
- Apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.

Expressions and Equations
- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

Geometry
- Draw, construct and describe geometrical figures and describe the relationships between them.
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Statistics and Probability
- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

Appendices:

A: Pennsylvania Standards for Mathematics

B: National Common Core Standards for Mathematics

C: Mathematics Assessment Anchors and Eligible Content: Grades 6 – 8

D: Formula Sheets: Grades 6 – 8 from PA Core

E: Anchor Checklists: Grades 6 – 8

F: Career Education and Work Standards

G: ISTE Standards

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Unit: The Number System

Estimated Course Time: Approximately 15-21 Days. (To Be Determined Based on Assessment Data)

Overview: Students will apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers. Students will solve real-world and mathematical problems involving the four operations with rational numbers. Students will understand the relationship between an integer and its additive inverse. Students will develop models and computational strategies for computing with negative numbers and solve problems in contexts that involve negative numbers. Students will extend understanding of operations and their properties for all rational numbers, including negative integers. Students will explain why the rules for adding, subtracting, multiplying, and dividing with negative numbers make sense and learn about the extended number line for all integers. Students will use the number line to locate negative and positive numbers and identify real-world situations that can be modeled by negative numbers. Students will also use the number line to model computations.

Unit Essential Questions:
- Why is subtraction of rational numbers the same as adding the additive inverse?
- How can you represent addition and subtraction of rational numbers on a horizontal or vertical number line diagram?
- How is computation with rational numbers similar to and different from whole number computation?
- How is mathematics used to quantify, compare, represent, and model numbers?
- How are relationships represented mathematically?
- How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?
- How can recognizing repetition or regularity assist in solving problems more efficiently?
- What makes a tool and/or strategy appropriate for a given task?

Assessment Anchor:
- **M07.A-N.1** Apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.
- **M07.A-N.1.1** Solve real-world and mathematical problems involving the four operations with rational numbers.
- **M08.A-N.1** Demonstrate an understanding of rational and irrational numbers.
- **M08.A-N.1.1** Apply concepts of rational and irrational numbers.

PSSA Eligible Content:
- **M07.A-N.1.1.1** Apply properties of operations to add and subtract rational numbers, including real-world contexts.
- **M07.A-N.1.1.2** Represent addition and subtraction on a horizontal or vertical number line.
- **M07.A-N.1.1.3** Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats.
- **M08.A-N.1.1.5** Locate/identify rational and irrational numbers at their approximate locations on a number line.

Pennsylvania Common Core Standard(s):

- **CC.2.1.7.E.1** Apply and extend previous understandings of operations with fractions to operations with rational numbers.
- **CC.2.1.8.E.1** Distinguish between rational and irrational numbers using their properties.
- **CC.2.1.8.E.4** Estimate irrational numbers by comparing them to rational numbers.

National Common Core Standard(s):

Apply and extend previous understandings of operations with fractions.

- **CC.7.NS.A.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
  a. Describe situations in which opposite quantities combine to make 0.
  b. Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
  c. Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
  d. Apply properties of operations as strategies to add and subtract rational numbers.
- **CC.7.NS.A.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
  a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(–1)(–1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
  b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $–(p/q) = (–p)/q = p/(–q)$. Interpret quotients of rational numbers by describing real-world contexts.
  c. Apply properties of operations as strategies to multiply and divide rational numbers.
  d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
- **CC.7.NS.A.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

Know that there are numbers that are not rational, and approximate them by rational numbers.

- **CC.8.NS.A.1** Know that there are numbers that are not rational, and approximate them by rational numbers. 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.
- **CC.8.NS.A.2** Know that there are numbers that are not rational, and approximate them by rational numbers. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$ (square root of 2), show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

ISTE Standards:

1. Creativity and Innovation – Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
    b. Create original works as a means of personal or group expression
    c. Use models and simulations to explore complex systems and issues
2. Communication and Collaboration – Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
    a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media
    b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats
    d. Contribute to project teams to produce original works or solve problems
3. Research and Information Fluency – Students apply digital tools to gather, evaluate, and use information.
    a. Plan strategies to guide inquiry
    b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media
    c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks
    d. Process data and report results
4. Critical Thinking, Problem Solving, and Decision Making – Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
    a. Identify and define authentic problems and significant questions for investigation
    b. Plan and manage activities to develop a solution or complete a project
    c. Collect and analyze data to identify solutions and/or make informed decisions
    d. Use multiple processes and diverse perspectives to explore alternative solutions
5. Digital Citizenship – Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
    a. Advocate and practice safe, legal, and responsible use of information and technology
    b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
    c. Demonstrate personal responsibility for lifelong learning
    d. Exhibit leadership for digital citizenship.
6. Technology Operations and Concepts – Students demonstrate a sound understanding of technology concepts, systems, and operations.
    a. Understand and use technology systems
    b. Select and use applications effectively and productively

Career Education and Work Standards

13.1.8.A. Relate careers to individual interests, abilities, and aptitudes.
13.1.8.B. Relate careers to personal interests, abilities, and aptitudes.
13.1.8.C. Explain how both traditional and nontraditional careers offer or hinder career opportunities.
13.1.8.D. Develop an individualized career portfolio including components.
13.1.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.1.8.F. Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.
13.2.8.A. Identify effective speaking and listening skills used in a job interview.
13.2.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.3.8.C. Explain and demonstrate conflict resolution skills.
13.3.8.E. Identify and apply time management strategies as they relate to both personal and work situations.
13.4.8.C. Identify and describe the basic components of a business plan.

Connecting to Common Core and Other Standards:

- PA Standards found at www.pdesas.org/standards/standardsdownloads
- National Common Core found at www.corestandards.org
- ISTE found at www.iste.org/standards/nets-for-students.aspx
- Career Education and Work found at www.pacareerstandards.com/
- See Appendix for complete documents.

ELL Differentiation: Math & LA specifics found at www.pde.sas.org/module/sas/curriculumframework/elloverlay.aspx
Generic found at http://www.easad.net/esl
Todos resources found at www.todos-math.org

Enrichment:

- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/
- Group/Research Projects

Remediation:

- Multiplication facts
- Properties of Real Numbers
- Evaluate and simplify algebraic expressions
- Solve one- and two-step single variable equations
- Solve multi-step single variable equations
- Plot points on the coordinate plane
- Graph lines on the coordinate plane when given two points on the line
- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

PSSA Eligible Content	**Unit Concepts** What students need to know	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.A-N.1.1.1 M07.A-N.1.1.2 M07.A-N.1.1.3 M08.A-N.1.1.5	● Apply properties of operations to add and subtract rational numbers, including real-world contexts. ● Represent addition and subtraction on a horizontal or vertical number line. ● Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats. ● Locate/identify rational and irrational numbers at their approximate locations on a number line.	● Simplify expressions using the order of operations ● Identify and use the properties of addition and multiplication ● Use the distributive property to multiply mentally ● Evaluate algebraic expressions using the order of operations ● List and use verbal expressions for math operations ● Translate verbal expressions into algebraic expressions ● Translate real-world problems into algebraic expressions ● Simplify algebraic expressions by combining like terms ● Graph integers and their opposites on a number line ● Compare and order integers using a number line ● Solve problems where the two quantities add to make a sum of 0 (additive inverses)	● Absolute Value ● Addend ● Additive Inverse ● Associative Property ● Coefficient ● Commutative Property ● Distance ● Distributive Property ● Divisor ● Identity Property ● Integers ● Like Terms ● Number Line ● Numerical Expression ● Opposite ● Opposite Quantities ● Order of Operations ● Quotient ● Rational Numbers ● Repeating Decimal ● Signed Numbers ● Sum ● Terminating Decimal ● Variable ● Whole Numbers	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observations ● CDT ● Study Island ● http://www.thatquiz.org/ ● http://map.mathshell.org/

PSSA Eligible Content	**Unit Concepts** What students need to know *(Continued from above)*	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.A-N.1.1.1 M07.A-N.1.1.2 M07.A-N.1.1.3 M08.A-N.1.1.5	● Apply properties of operations to add and subtract rational numbers, including real-world contexts. ● Represent addition and subtraction on a horizontal or vertical number line. ● Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats. ● Locate/identify rational and irrational numbers at their approximate locations on a number line.	● Describe real-world situation where two quantities add to make a sum of zero ● Define the sum of two rational numbers as the distance one addend is away from the total by the absolute value of the other addend ● Define the direction of the distance on a number line based on the sign of the addend o Negative is left/down o Positive is right/up ● Define additive inverse as a rational number added to its negative which results in a sum of zero ● Solve real-world problems involving adding rational numbers ● Compare subtracting rational numbers to adding the additive inverse ● Prove that the distance between two rational numbers is equal to the absolute value of their difference ● Find the absolute value of rational numbers	● Absolute Value ● Addend ● Additive Inverse ● Associative Properties ● Coefficient ● Commutative Properties ● Distance ● Distributive Property ● Divisor ● Identity Properties ● Integers ● Like Terms ● Number Line ● Numerical Expression ● Opposite ● Opposite Quantities ● Order of Operations ● Quotient ● Rational Numbers ● Repeating Decimal ● Signed Numbers ● Sum ● Terminating Decimal ● Variable ● Whole Numbers	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observations ● CDT ● Study Island ● http://www.thatquiz.org/ ● http://map.mathshell.org/

PSSA Eligible Content	**Unit Concepts** What students need to know *(Continued from above)*	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.A-N.1.1.1 M07.A-N.1.1.2 M07.A-N.1.1.3 M08.A-N.1.1.5	● Apply properties of operations to add and subtract rational numbers, including real-world contexts. ● Represent addition and subtraction on a horizontal or vertical number line. ● Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats. ● Locate/identify rational and irrational numbers at their approximate locations on a number line.	● Apply the commutative, associative, additive inverse, and distributive properties to solve addition and subtraction of rational numbers ● Model integer addition on a number line ● Add integers using absolute values ● Find the additive inverse for numbers and real-world values ● Model integer subtraction on a number line ● Subtract integers by adding the opposite ● Evaluate expressions with integers ● Multiply and divide integers ● Solve real-world problems involving the distances between two rational numbers and their absolute values (one-step equations) ● Solve problems involving fractions and mixed numbers (addition, subtraction, multiplication, division) ● Convert fractions to decimals o Terminating o Repeating	● Absolute Value ● Addend ● Additive Inverse ● Associative Property ● Coefficient ● Commutative Property ● Distance ● Distributive Property ● Divisor ● Identity Property ● Integers ● Like Terms ● Number Line ● Numerical Expression ● Opposite ● Opposite Quantities ● Order of Operations ● Quotient ● Rational Numbers ● Repeating Decimal ● Signed Numbers ● Sum ● Terminating Decimal ● Variable ● Whole Numbers	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observations ● CDT ● Study Island ● http://www.thatquiz.org/ ● http://map.mathshell.org/

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Unit: Expressions and Equations

Estimated Course Time: Approximately 15-21 Days. (To Be Determined Based on Assessment Data)

Overview: Students will examine various numeric and symbolic patterns. Students will determine missing values from given patterns and extend given patterns. Students will analyze patterns and identify whether given patterns represent linear functions by examining the rate of change. Students will identify whether given functions are linear by examining the function and looking at its graph. Students will identify slope and *y*-intercept from an equation, table, or graph and make connections to constant rate of change and linearity. Students will identify and understand components of linear functions, including slope, *y*-intercept, domain, and range. Students will prove expressions equivalent, prove or disprove solutions to equations and inequalities, and use the properties of addition and multiplication. Students will represent linear functions in equation, tabular, and graphical forms and relate linear functions to the real-world and understand real-world context of the *y*-intercept.

Unit Essential Questions:
- What are the connections among the different representations of a linear relationship?
- What are the components of a linear function, and what do these mean in a real-world context?
- How do we generate equivalent expressions?
- How do we solve real-world and mathematical problems using numerical and algebraic expressions and equations?
- How can we best represent a pattern/relationship in a given situation?
- How can we show that algebraic properties and processes are extensions of arithmetic properties and processes and how can we use algebraic properties and processes to solve problems?
- How would you describe the relationship between quantities that are represented by linear equations and/or linear inequalities?

Assessment Anchor:
- **M07.B-E.1** Represent expressions in equivalent forms.
- **M07.B-E.1.1** Use properties of operations to generate equivalent expressions.
- **M07.B-E.2** Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities.
- **M07.B-E.2.1** Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers.
- **M07.B-E.2.2** Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems.
- **M07.B-E.2.3** Determine the reasonableness of the answer(s) in problem-solving situations.
- **M08.B-E.3** Analyze and solve linear equations and pairs of simultaneous linear equations.
- **M08.B-E.3.1** Write, solve, graph, and interpret linear equations in one or two variables using various methods.

PSSA Eligible Content:

- **M07.B-E.1.1.1** Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients.
- **M07.B-E.2.1.1** Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate.
- **M07.B-E.2.2.1** Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers.
- **M07.B-E.2.2.2** Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers, and graph the solution set of the inequality.
- **M07.B-E.2.3.1** Determine the reasonableness of answer(s) or interpret the solution(s) in the context of the problem.
- **M08.B-E.3.1.1** Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
- **M08.B-E.3.1.2** Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Pennsylvania Common Core Standard(s):

- **CC.2.2.7.B.1** Apply properties of operations to generate equivalent expressions.
- **CC.2.2.7.B.3** Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.
- **CC.2.2.8.B.3** Analyze and solve linear equations and pairs of simultaneous linear equations.

National Common Core Standard(s):

Use properties of operations to generate equivalent expressions.

- **CC.7.EE.A.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- **CC.7.EE.A.2** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- **CC.7.EE.B.3** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- **CC.7.EE.B.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
  a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
  b. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.

Analyze and solve linear equations and pairs of simultaneous linear equations.

- **CC.8.EE.C.7** Solve linear equations in one variable.
  a. Given examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form *x = a, a = a, or a = b* results (where a and b are different numbers).
  b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

ISTE Standards:

1. Creativity and Innovation – Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
   b. Create original works as a means of personal or group expression
   c. Use models and simulations to explore complex systems and issues
2. Communication and Collaboration – Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
   a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media
   b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats
   d. Contribute to project teams to produce original works or solve problems
3. Research and Information Fluency – Students apply digital tools to gather, evaluate, and use information.
   a. Plan strategies to guide inquiry
   b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media
   c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks
   d. Process data and report results
4. Critical Thinking, Problem Solving, and Decision Making – Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
   a. Identify and define authentic problems and significant questions for investigation
   b. Plan and manage activities to develop a solution or complete a project
   c. Collect and analyze data to identify solutions and/or make informed decisions
   d. Use multiple processes and diverse perspectives to explore alternative solutions
5. Digital Citizenship – Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
   a. Advocate and practice safe, legal, and responsible use of information and technology
   b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
   c. Demonstrate personal responsibility for lifelong learning
   d. Exhibit leadership for digital citizenship.
6. Technology Operations and Concepts – Students demonstrate a sound understanding of technology concepts, systems, and operations.
   a. Understand and use technology systems
   b. Select and use applications effectively and productively

Career Education and Work Standards

13.1.8.A. Relate careers to individual interests, abilities, and aptitudes.
13.1.8.B. Relate careers to personal interests, abilities, and aptitudes.
13.1.8.C. Explain how both traditional and nontraditional careers offer or hinder career opportunities.
13.1.8.D. Develop an individualized career portfolio including components.
13.1.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.1.8.F. Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.
13.2.8.A. Identify effective speaking and listening skills used in a job interview.
13.2.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.3.8.C. Explain and demonstrate conflict resolution skills.
13.3.8.E. Identify and apply time management strategies as they relate to both personal and work situations.
13.4.8.C. Identify and describe the basic components of a business plan.

Connecting to Common Core and Other Standards:

- PA Standards found at www.pdesas.org/standards/standardsdownloads
- National Common Core found at www.corestandards.org
- ISTE found at www.iste.org/standards/nets-for-students.aspx
- Career Education and Work found at www.pacareerstandards.com/
- See Appendix for complete documents.

ELL Differentiation: Math & LA specifics found at www.pde.sas.org/module/sas/curriculumframework/elloverlay.aspx
Generic found at http://www.easad.net/esl
Todos resources found at www.todos-math.org

Enrichment:

- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/
- Group/Research Projects

Remediation:

- Multiplication facts
- Properties of Real Numbers
- Evaluate and simplify algebraic expressions
- Solve one- and two-step single variable equations
- Solve multi-step single variable equations
- Plot points on the coordinate plane
- Graph lines on the coordinate plane when given two points on the line
- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.B-E.1.1.1 M07.B-E.2.1.1 M07.B-E.2.2.1 M07.B-E.2.2.2 M07.B-E.2.3.1 M08.B-E.3.1.1 M08.B-E.3.1.2	● Use properties of operations to generate equivalent expressions. ● Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities. ● Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers. ● Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems. ● Determine the reasonableness of the answer(s) in problem-solving situations.	● Add linear expressions with rational coefficients ● Subtract linear expressions with rational coefficients ● Factor linear expressions with rational coefficients ● Expand linear expressions with rational coefficients ● Apply properties of arithmetic to all operations with rational coefficients ● Translate word situations to algebraic expressions ● Identify the GCF of rational coefficients in linear expressions ● Translate words to expressions ● Translate situation problems to algebraic expressions ● Simplify expressions ● Rewrite expressions to help analyze problems ● Explain how an equivalent expression relates to the original situation problem ● Simplify problems using the distributive property ● Use the concept of factoring as ‘undoing’ the distributive property	● Equivalent ● Coefficient ● Linear ● Expression ● Equation ● Inequality ● Algebraic Expression ● Algebraic Inequality ● Compound Inequality ● Variable ● Constant ● Solution(s) ● Solution Set ● Reasonableness of Answer ● Properties of Numbers ● Like Terms ● Monomial ● Binomial ● Factor ● Integers ● Rational Numbers ● Inverse Operations ● Greatest Common Factor (GCF) ● Greater Than (>) ● Greater Than or Equal To (≥) ● Less Than (<) ● Less Than or Equal To (≤)	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/ ● http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.B-E.1.1.1 M07.B-E.2.1.1 M07.B-E.2.2.1 M07.B-E.2.2.2 M07.B-E.2.3.1 M08.B-E.3.1.1 M08.B-E.3.1.2	• Use properties of operations to generate equivalent expressions. • Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities. • Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers. • Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems. • Determine the reasonableness of the answer(s) in problem-solving situations.	• Solve multi-step real-world problems involving all types of rational numbers • Justify the reasonableness of solutions using mental computation and estimation • Apply properties of arithmetic to solve multi-step real-world problems with all rational numbers • Convert fluently between forms of common decimals, fractions, and percents • Explain the connection between different forms of equivalent rational numbers • Explore solutions to equations involving ratios • Solve one-step equations • Solve two-step equations • Solve one-step inequalities (>, ≥, <, ≤) • Solve two-step inequalities (>, ≥, <, ≤) • Use the distributive property while solving equations and inequalities • Construct and solve two-step linear equations and inequalities from real-world problems	• Equivalent • Coefficient • Linear • Expression • Equation • Inequality • Algebraic Expression • Algebraic Inequality • Compound Inequality • Variable • Constant • Solution(s) • Solution Set • Reasonableness of Answer • Properties of Numbers • Like Terms • Monomial • Binomial • Factor • Integers • Rational Numbers • Inverse Operations • Greatest Common Factor (GCF) • Greater Than (>) • Greater Than or Equal To (≥) • Less Than (<) • Less Than or Equal To (≤)	• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org • http://www.smarterbalanced.org/sample-items-and-performance-tasks/	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observation • CDT • Study Island • NWEA • http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.B-E.1.1.1 M07.B-E.2.1.1 M07.B-E.2.2.1 M07.B-E.2.2.2 M07.B-E.2.3.1 M08.B-E.3.1.1 M08.B-E.3.1.2	● Use properties of operations to generate equivalent expressions. ● Solve real-world and mathematical problems using numerical and algebraic expressions, equations, and inequalities. ● Solve multi-step real-world and mathematical problems posed with positive and negative rational numbers. ● Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems. ● Determine the reasonableness of the answer(s) in problem-solving situations.	● Identify slope and y-intercept from an equation, table of values or graph. ● Identify and understand components of linear functions, including slope, y-intercept, domain and range. ● Graph the solution set of two-step linear inequalities from real-world problems ● Interpret and describe the solution in the context of the problem ● Identify when the inequality symbol changes to its opposite ● Explain when/why an open or closed dot is used on a number line ● Write a linear inequality from a given graph ● Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions, including equations whose solutions require expanding expressions using the distributive property and collecting like terms	● Equivalent ● Coefficient ● Linear ● Expression ● Equation ● Inequality ● Algebraic Expression ● Algebraic Inequality ● Compound Inequality ● Variable ● Constant ● Solution(s) ● Solution Set ● Reasonableness of Answer ● Properties of Numbers ● Like Terms ● Monomial ● Binomial ● Factor ● Integers ● Rational Numbers ● Inverse Operations ● Greatest Common Factor (GCF) ● Greater Than (>) ● Greater Than or Equal To (≥) ● Less Than (<) ● Less Than or Equal To (≤)	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA ● http://www.parcconline.org/samples/item-task-prototypes#7

East Stroudsburg Area School District
Math Edge Grade 8

Unit: Ratios and Proportional Relationships

Estimated Course Time: Approximately 15-21 Days. (To Be Determined Based on Assessment Data)

Overview: Students will demonstrate an understanding of proportional relationships. Students will use division to find unit rates and ratios in proportional relationships. Students will estimate and find solutions to application problems involving proportional relationships. Students will use ratios and proportions in scale drawings and scale models, as well as real-world and mathematical problems. Students will use percents to calculate a specific proportion of a given quantity, and recognize that percents allow us to compare different quantities.

Unit Essential Questions:

- How do we translate a situation into a mathematical model?
- How do we choose the appropriate strategy to solve this problem?
- Why do we use percents?
- How do changes in constant proportionality affect the graph of its relationship?
- Why do proportional relationships always go through the origin?
- What is the constant of proportionality?
- How do you use formulas to solve proportional relationships?
- How are quantitative relationships represented by numbers?
- How do people use ratios and proportions to understand the world around them, make decisions, and solve problems?
- How can real-life situations be represented with ratios and/or proportions, and how can writing and solving them be helpful in the real world?
- How can ratios be used to make decisions and solve problems?

Assessment Anchor:

- **M07.A-R.1** Demonstrate an understanding of proportional relationships.
- **M07.A-R.1.1** Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.
- **M08.B-E.2** Understand the connections between proportional relationships, lines, and linear equations.
- **M08.B-E.2.1** Analyze and describe linear relationships between two variables, using slope.

PSSA Eligible Content:

- **M07.A-R.1.1.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units.
- **M07.A-R.1.1.2** Determine whether two quantities are proportionally related (e.g., by testing for equivalent ratios in a table, graphing on a coordinate plane and observing whether the graph is a straight line through the origin).
- **M07.A-R.1.1.3** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- **M07.A-R.1.1.4** Represent proportional relationships by equations.
- **M07.A-R.1.1.5** Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention

to the points (0, 0) and (1, *r*), where r is the unit rate.
- **M07.A-R.1.1.6** Use proportional relationships to solve multi-step ratio and percent problems.
- **M08.B-E.2.1.1** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
- **M08.B-E.2.1.2** Use similar right triangles to show and explain why the slope *m* is the same between any two distinct points on a non-vertical line in the coordinate plane.

Pennsylvania Common Core Standard(s):
- **CC.2.1.7.D.1** Analyze proportional relationships and use them to model and solve real-world and mathematical problems.
- **CC.2.2.8.B.2** Understanding the connections between proportional relationships, lines, and linear equations.

National Common Core Standard(s):
Analyze proportional relationships and use them to solve real-world and mathematical problems.
- **CC.7.RP.A.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- **CC.7.RP.A.2** Recognize and represent proportional relationships between quantities.
  a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
  b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
  c. Represent proportional relationships by equations.
  d. Explain what a point *(x, y)* on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r)* where *r* is the unit rate.
- **CC.7.RP.A.3** Use proportional relationships to solve multi-step ratio and percent problems.

Understand the connections between proportional relationships, lines, and linear equations.
- **CC.8.EE.B.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

ISTE Standards:
1. Creativity and Innovation – Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
   b. Create original works as a means of personal or group expression
   c. Use models and simulations to explore complex systems and issues
2. Communication and Collaboration – Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
   a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media
   b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats
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3. Research and Information Fluency – Students apply digital tools to gather, evaluate, and use information.
    a. Plan strategies to guide inquiry
    b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media
    c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks
    d. Process data and report results
4. Critical Thinking, Problem Solving, and Decision Making – Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
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    b. Plan and manage activities to develop a solution or complete a project
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    d. Use multiple processes and diverse perspectives to explore alternative solutions
5. Digital Citizenship – Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
    a. Advocate and practice safe, legal, and responsible use of information and technology
    b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
    c. Demonstrate personal responsibility for lifelong learning
    d. Exhibit leadership for digital citizenship.
6. Technology Operations and Concepts – Students demonstrate a sound understanding of technology concepts, systems, and operations.
    a. Understand and use technology systems
    b. Select and use applications effectively and productively

Career Education and Work Standards

13.1.8.A. Relate careers to individual interests, abilities, and aptitudes.
13.1.8.B. Relate careers to personal interests, abilities, and aptitudes.
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13.1.8.F. Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.
13.2.8.A. Identify effective speaking and listening skills used in a job interview.
13.2.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.3.8.C. Explain and demonstrate conflict resolution skills.
13.3.8.E. Identify and apply time management strategies as they relate to both personal and work situations.
13.4.8.C. Identify and describe the basic components of a business plan.

Connecting to Common Core and Other Standards:

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- ISTE found at www.iste.org/standards/nets-for-students.aspx
- Career Education and Work found at www.pacareerstandards.com/
- See Appendix for complete documents.

ELL Differentiation: Math & LA specifics found at www.pde.sas.org/module/sas/curriculumframework/elloverlay.aspx
Generic found at http://www.easad.net/esl
Todos resources found at www.todos-math.org

Enrichment:

- Internet/Research Activities
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  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/
- Group/Research Projects

Remediation:

- Multiplication facts
- Properties of Real Numbers
- Evaluate and simplify algebraic expressions
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  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
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IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.A-R.1.1.1 M07.A-R.1.1.2 M07.A-R.1.1.3 M07.A-R.1.1.4 M07.A-R.1.1.5 M07.A-R.1.1.6 M08.B-E.2.1.1 M08.B-E.2.1.2	• Demonstrate an understanding of proportional relationships. • Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems. • Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. • Determine whether two quantities are proportionally related. • Represent proportional relationships by equations. • Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*), where r is the unit rate. • Use proportional relationships to solve multi-step ratio and percent problems.	• Convert between fractions, decimals, and percents • Estimate and find percents using number patterns and the distributive property • Calculate the percent one amount is of another amount • Determine tax, tips, and discounts • Calculate unit rates from o Proportional graphs o Tables o Equations o Verbal descriptions • Calculate average speed • Determine whether ratios are proportional by comparing ratios in simplest form • Compare ratios using a common denominator	• Analyze • Complex Fractions • Constant • Constant of Proportionality • Coordinate Plane • Corresponding Angles • Corresponding Sides • Cross Multiply • Cross Products • Denominator • Directly Proportional • Discount • Distributive Property • Divisor • Equation • Equivalent • Equivalent Ratios • Estimate • Graph • In Proportion • Numerator • Ordered Pair • Origin • Percent of Change • Percent of Error • Percent of Decrease • Percent of Increase	• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org • http://www.smarterbalanced.org/sample-items-and-performance-tasks/	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observation • CDT • Study Island • NWEA • http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (continued from above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.A-R.1.1.1 M07.A-R.1.1.2 M07.A-R.1.1.3 M07.A-R.1.1.4 M07.A-R.1.1.5 M07.A-R.1.1.6 M08.B-E.2.1.1 M08.B-E.2.1.2	● Demonstrate an understanding of proportional relationships. ● Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems. ● Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. ● Determine whether two quantities are proportionally related. ● Represent proportional relationships by equations. ● Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*), where r is the unit rate. ● Use proportional relationships to solve multi-step ratio and percent problems.	● Find equivalent ratios and write proportions ● Solve unit rate problems that have fractional quantities, including complex fractions ● Solve proportions using cross products ● Determine whether two geometric shapes are similar ● Find unknown measures in similar figures ● Estimate with indirect measurement ● Find scale factors ● Use scale factors to find unknown lengths ● Solve ratio problems whose quantities are lengths of the same unit and different units ● Solve ratio problems whose quantities are areas of the same unit and different units ● Solve ratio problems of other quantities with the same unit and different units	● Principle ● Proportion ● Proportional Relationship ● Rate ● Ratio ● Reciprocal ● Reduce ● Scale ● Scale Drawing ● Scale Model ● Similar ● Similar Figures ● Simple Interest ● Simplify ● Slope ● Solution ● Tax/Tax Rate ● Tip ● Unit Price ● Unit Rate ● Units ● x-Coordinate ● y-Coordinate	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA ● http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (see above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.A-R.1.1.1 M07.A-R.1.1.2 M07.A-R.1.1.3 M07.A-R.1.1.4 M07.A-R.1.1.5 M07.A-R.1.1.6 M08.B-E.2.1.1 M08.B-E.2.1.2	● Demonstrate an understanding of proportional relationships. ● Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems. ● Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. ● Determine whether two quantities are proportionally related. ● Represent proportional relationships by equations. ● Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*), where r is the unit rate. ● Use proportional relationships to solve multi-step ratio and percent problems.	● Divide fractions by using the reciprocal of the divisor ● Calculate the cross product to determine if the two ratios are in proportion (equivalent) ● Analyze ratios in a table to determine if the ratios are equivalent by finding the constant of proportionality (slope) ● Graph ratios on a coordinate plane to determine if the ratios are proportional by observing if the graph is a straight line through the origin ● Write and solve proportions ● Calculate the constant of proportionality/unit rate from a table or diagram ● Compute the rate of change from a graph or an equation		● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA ● http://www.parcconline.org/samples/item-task-prototypes#7

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M07.A-R.1.1.1 M07.A-R.1.1.2 M07.A-R.1.1.3 M07.A-R.1.1.4 M07.A-R.1.1.5 M07.A-R.1.1.6 M08.B-E.2.1.1 M08.B-E.2.1.2	● Demonstrate an understanding of proportional relationships. ● Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems. ● Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. ● Determine whether two quantities are proportionally related. ● Represent proportional relationships by equations. ● Explain what a point (*x, y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r*), where r is the unit rate. ● Use proportional relationships to solve multi-step ratio and percent problems.	● Calculate the constant of proportionality/unit rate given a verbal description of a proportional relationship ● Write an equation from a proportional relationship ● Solve equations created from proportional relationships ● Define the rate of proportionality from a graph ● Explain the meaning of a point on a graph when the x-coordinate is 1, the y-coordinate is the unit rate ● Solve real-world problems		● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA ● http://www.parcconline.org/samples/item-task-prototypes#7

East Stroudsburg Area School District
Math Edge Grade 8

Unit: Statistics and Probability

Estimated Course Time: Approximately 15-21 Days. (To Be Determined Based on Assessment Data)

Overview: Students will review determining all possible outcomes from actions that are not equally likely. Students will create an organized list, chart, and/or tree diagram to arrange and analyze data sets and compare experimental and theoretical probability. Students will use experimental probability to make predictions and conjectures and understand the distinction between equally-likely and unequally-likely events. Students will use tree diagrams to list outcomes of compound events and calculate probabilities using tree diagrams. Students will create and use area models to calculate probability and know the difference between area models and organized charts of outcomes. Students will understand and determine theoretical and experimental probabilities. They will reason using theoretical probabilities associated with experiments. Students will make predictions about outcomes. The overall goal of this unit is to learn how to make predictions and decisions using knowledge of probability and expected values, in preparation of analyzing and interpreting bivariate data.

Unit Essential Questions:
- How can you use a sample to gain information about a population?
- How can you use samples to make and compare predictions about populations?
- How can you use measures of center and variability to compare two populations?
- How can you describe the likelihood of an event? What is the difference between dependent and independent events?
- How can you find the theoretical probability of an event? How do find the experimental probability of an event?
- Does experimental probability reflect theoretical probability? Why or why not?
- How do you find the probability of a compound event?
- How can you use simulations to estimate probabilities?
- How can you use a stem and leaf plots to organize a set of numbers?
- How do histograms show the differences in distributions of data?
- How can you use a circle graph to show the results of a survey?
- How do we interpret data from statistical representations?
- How do you predict future probabilities based on data?

Assessment Anchor:
- **M07.D-S.1** Use random sampling to draw inferences about a population.
- **M07.D-S.1.1** Use random samples.
- **M07.D-S.2** Draw comparative inferences about populations.
- **M07.D-S.2.1** Use statistical measures to compare two numerical data distributions.
- **M07.D-S.3** Investigate chance processes and develop, use, and evaluate probability models.
- **M07.D-S.3.1** Predict or determine the likelihood of outcomes.
- **M07.D-S.3.2** Use probability to predict outcomes.
- **M08.D-S.1** Investigate patterns of association in bivariate data.
- **M08.D-S.1.1** Analyze and interpret bivariate data displayed in multiple representations.

PSSA Eligible Content:

- **M07.D-S.1.1.1** Determine whether a sample is a random sample given a real-world situation.
- **M07.D-S.1.1.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
- **M07.D-S.2.1.1** Compare two numerical data distributions using measures of center and variability.
- **M07.D-S.3.1.1** Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible (i.e., a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event).
- **M07.D-S.3.2.1** Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability.
- **M07.D-S.3.2.2** Find the probability of a simple event, including the probability of a simple event not occurring.
- **M07.D-S.3.2.3** Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.
- **M08.D-S.1.1.1** 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 correlation, linear association, and nonlinear association.

Pennsylvania Common Core Standard(s):

- **CC.2.4.7.B.1** Draw inferences about populations based on random sampling concepts.
- **CC.2.4.7.B.2** Draw informal comparative inferences about two populations.
- **CC.2.4.7.B.3** Investigate chance processes and develop, use, and evaluate probability models.

National Common Core Standard(s):

Use random sampling to draw inferences about a population.

- **CC.7.SP.A.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.
- **CC.7.SP.A.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.

Draw informal comparative inferences about two populations.

- **CC.7.SP.B.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.
- **CC.7.SP.B.4** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

Investigate chance processes and develop, use, and evaluate probability models.

- **CC.7.SP.C.5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- **CC.7.SP.C.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- **CC.7.SP.C.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed

frequencies; if the agreement is not good, explain possible sources of the discrepancy.
   a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
   b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
- **CC.7.SP.C.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
   c. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
   d. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.
   e. Design and use a simulation to generate frequencies for compound events.

ISTE Standards:

1. Creativity and Innovation – Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
   b. Create original works as a means of personal or group expression
   c. Use models and simulations to explore complex systems and issues
2. Communication and Collaboration – Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
   a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media
   b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats
   d. Contribute to project teams to produce original works or solve problems
3. Research and Information Fluency – Students apply digital tools to gather, evaluate, and use information.
   a. Plan strategies to guide inquiry
   b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media
   c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks
   d. Process data and report results
4. Critical Thinking, Problem Solving, and Decision Making – Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
   a. Identify and define authentic problems and significant questions for investigation
   b. Plan and manage activities to develop a solution or complete a project
   c. Collect and analyze data to identify solutions and/or make informed decisions
   d. Use multiple processes and diverse perspectives to explore alternative solutions
5. Digital Citizenship – Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
   a. Advocate and practice safe, legal, and responsible use of information and technology
   b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
   c. Demonstrate personal responsibility for lifelong learning
   d. Exhibit leadership for digital citizenship.
6. Technology Operations and Concepts – Students demonstrate a sound understanding of technology concepts, systems, and operations.

a. Understand and use technology systems
b. Select and use applications effectively and productively

Career Education and Work Standards

13.1.8.A. Relate careers to individual interests, abilities, and aptitudes.
13.1.8.B. Relate careers to personal interests, abilities, and aptitudes.
13.1.8.C. Explain how both traditional and nontraditional careers offer or hinder career opportunities.
13.1.8.D. Develop an individualized career portfolio including components.
13.1.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.1.8.F. Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.
13.2.8.A. Identify effective speaking and listening skills used in a job interview.
13.2.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.3.8.C. Explain and demonstrate conflict resolution skills.
13.3.8.E. Identify and apply time management strategies as they relate to both personal and work situations.
13.4.8.C. Identify and describe the basic components of a business plan.

Connecting to Common Core and Other Standards:

- PA Standards found at www.pdesas.org/standards/standardsdownloads
- National Common Core found at www.corestandards.org
- ISTE found at www.iste.org/standards/nets-for-students.aspx
- Career Education and Work found at www.pacareerstandards.com/
- See Appendix for complete documents.

ELL Differentiation: Math & LA specifics found at www.pde.sas.org/module/sas/curriculumframework/elloverlay.aspx
Generic found at http://www.easad.net/esl
Todos resources found at www.todos-math.org

Enrichment:

- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/
- Group/Research Projects

Remediation:

- Multiplication facts
- Properties of Real Numbers
- Evaluate and simplify algebraic expressions
- Solve one- and two-step single variable equations
- Solve multi-step single variable equations
- Plot points on the coordinate plane
- Graph lines on the coordinate plane when given two points on the line
- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

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M07.D-S.1.1.1 M07.D-S.1.1.2 M07.D-S.2.1.1 M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2 M07.D-S.3.2.3 M08.D-S.1.1.1	• Determine whether a sample is a random sample given a real-world situation. • Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. • Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible • Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. • Find the probability of a simple event, including the probability of a simple event not occurring. • Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.	• Predict future probabilities based on data collected • Identify the complement of an event • Use the probability of an event, and the probability of the complement of an event, to solve problems: P(event) + P(complement) = 1 • Create a uniform probability model (a situation in which all outcomes are equally likely) • Calculate simple probabilities of events • Design an experiment to investigate the likelihood of an outcome • Compare the results of a series of trials and draw conclusions • Calculate compound probabilities • Determine the total number of possible outcomes (sample space or Counting Principle) • Define compound probabilities as fractions based on the sample space provided	• Independent Event • Inferences • Interquartile Range • Likelihood • Line Graph • Lower Quartile • Mean • Measures of Center • Median • Mode • Negative Trend • No Trend • Outcomes • Outliers • Permutation • Population • Positive Trend • Prediction • Probability • Random Sample • Range • Sample • Sample Space • Scatter Plot • Set of Data • Simulation • Stem and Leaf Plot • Tables	• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observation • CDT • Study Island • NWEA • http://www.smarterbalanced.org/sample-items-and-performance-tasks/ • http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (Continued from above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.D-S.1.1.1 M07.D-S.1.1.2 M07.D-S.2.1.1 M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2 M07.D-S.3.2.3 M08.D-S.1.1.1	● Determine whether a sample is a random sample given a real-world situation. ● Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. ● Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible ● Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. ● Find the probability of a simple event, including the probability of a simple event not occurring. ● Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.	● Construct a tree diagram, list, and/or table to illustrate all possible outcomes of a compound event ● Calculate the probability of a compound event based on a table, list, or tree diagram ● Design a simulation to generate data for compound events ● Calculate the probability of a compound event from data generated in a simulation ● Determine whether events are independent or dependent ● Use a table to find combinations ● Use a tree diagram to find possible combinations ● Explain how tables and tree diagrams help to determine probability of an event ● Use lists to find permutations ● Use the Fundamental Counting Principle to find the number of permutations ● Use an organized list to find probability ● Use a tree diagram to find probability	● Theoretical Probability ● Tree Diagram ● Trend Line ● Two-Way Table ● Trial ● Upper Quartile ● Variable ● Variability ● Venn Diagram	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/ ● http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (see above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.D-S.1.1.1 M07.D-S.1.1.2 M07.D-S.2.1.1 M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2 M07.D-S.3.2.3 M08.D-S.1.1.1	• Determine whether a sample is a random sample given a real-world situation. • Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. • Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible • Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. • Find the probability of a simple event, including the probability of a simple event not occurring. • Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.	• Use a table to find the probability of compound events • Find the mean, median, mode, and range of a set of data • Choose the best measure to describe a set of data o Mean – the data are spread fairly evenly o Median – the data has an outlier o Mode – the data involve a subject in which many data points of one value are important • Identify outliers • Explore the effects of outliers on measures of central tendency • Make and use box-and-whisker plots and find: o Upper and Lower Extremes o Mean o Median o Lower quartile o Upper quartile o Interquartile range • Solve algebraic equations involving mean • Analyze sampling methods and justify method chosen • Identify potentially biased samples • Verify claims based on statistical data		• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observation • CDT • Study Island • NWEA • http://www.smarterbalanced.org/sample-items-and-performance-tasks/ • http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (see above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.D-S.1.1.1 M07.D-S.1.1.2 M07.D-S.2.1.1 M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2 M07.D-S.3.2.3 M08.D-S.1.1.1	• Determine whether a sample is a random sample given a real-world situation. • Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. • Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible • Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. • Find the probability of a simple event, including the probability of a simple event not occurring. • Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.	• Explain why it might be difficult to obtain a truly random sample of a very large population • Make circle graphs for a set of data • Answer questions regarding circle graphs • Create stem-and-leaf plots • Answer questions based on data provided in a stem-and-leaf plot • Make scatter plots for a set of bivariate data • Interpret scatter plots in terms of the bivariate data • Draw a trend line for a scatter plot and determine the type of trend • Describe patterns for clustering of data • Describe patterns for outliers of data • Describe and identify positive and negative correlation of data • Describe a linear relationship from a scatter plot • Draw a line of best fit on a scatter plot based on the data presented • Select appropriate graphs based on types of data • Sort data and answer questions using Venn Diagrams		• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observation • CDT • Study Island • NWEA • http://www.smarterbalanced.org/sample-items-and-performance-tasks/ • http://www.parcconline.org/samples/item-task-prototypes#7

East Stroudsburg Area School District
Math Edge Grade 8

Unit: Geometry

Estimated Course Time: Approximately 15-21 Days. (To Be Determined Based on Assessment Data)

Overview: Students will study circumference and area of circles, and explore volume and surface area of right prisms and polygons. Students will have opportunities to see patterns and develop rules/formulas for finding surface area and volume of prisms. Students will also look at how figures may have the same volume but different surface areas, and how changing the scale of a box affects its surface area and volume. Students will also extend their understanding of similarity and scale factor to three-dimensional figures. Students will continue to use and apply proportional relationships, similar figures, and scale models and corresponding scale factors. Students will classify two- and three-dimensional figures according to their characteristics, such as sides, angles, and bases. Students will explore similarity and congruence while using transformations, such as translations, rotations, reflections, and dilations. Students will draw, construct, and describe geometrical figures and describe the relationships between them. Students will explore triangles and their properties. Students will use and apply the triangle inequality theorem. Students will also identify and use the properties of angles formed when two parallel lines are cut by a transversal.

Unit Essential Questions:
- How are the characteristics of two-dimensional and three-dimensional shapes alike and different?
- Which two-dimensional figures can result from slicing three-dimensional figures?
- How can we use transformations to help determine congruence, similarity, and symmetry?
- How can you use scale drawings to solve problems?
- How can you draw shapes that satisfy given conditions?
- How can you identify cross sections of three-dimensional figures?
- How can you use angle pairs to solve problems?
- How can you find the area of composite figures?
- How do you find the surface area of a composite three-dimensional figure (e.g., a cone sitting on top of a cylinder)?
- How do you find the volume of a figure made up of cubes and prisms?
- What is the difference between surface area and volume of three-dimensional figures?
- How are two-dimensional objects different from three-dimensional objects?
- How do we measure the space an object takes up?
- How can surface area and volume help you to make decisions in your life?
- Given some measurements of a shape, how can we calculate the missing measurements?
- What methods can we use to match a three-dimensional solid to its corresponding net?
- How can you determine a strategy for calculating volume using area formulas?
- What impact does a change in dimension have on volume?
- What real-world situations require knowledge of volume, and how do you solve these types of problems?
- How are prisms and cylinders alike and how are they different?

Assessment Anchor:
- **M07.C-G.1** Describe an understanding of geometric figures and their properties.
- **M07.C-G.1.1** Describe and apply properties of geometric figures.
- **M07.C-G.2** Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume.
- **M07.C-G.2.1** Identify, use, and describe properties of angles and their measures.
- **M07.C-G.2.2** Determine circumference, area, surface area, and volume.
- **M08.C-G.3** Solve real-world and mathematical problems involving volume.
- **M08.C-G.3.1** Apply volume formulas of cones, cylinders, and spheres.

PSSA Eligible Content:
- **M07.C-G.1.1.1** Solve problems involving scale drawings of geometric figures, including finding length and area.
- **M07.C-G.1.1.2** Identify or describe the properties of all types of triangles based on angle and side measures.
- **M07.C-G.1.1.3** Use and apply the triangle inequality theorem.
- **M07.C-G.1.1.4** Describe the two-dimensional figures that result from slicing three-dimensional figures. Example: Describe plane sections of right rectangular prisms and right rectangular pyramids.
- **M07.C-G.2.1.1** Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- **M07.C-G.2.1.2** Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior, alternate exterior, vertical, corresponding).
- **M07.C-G.2.2.1** Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s).
- **M07.C-G.2.2.2** 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.
- **M08.C-G.3.1.1** Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.

Pennsylvania Common Core Standard(s):
- **CC.2.3.7.A.1** Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.
- **CC.2.3.7.A.2** Visualize and represent geometric figures and describe the relationships between them.
- **CC.2.3.8.A.1** Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.

National Common Core Standard(s):
Draw, construct, and describe geometrical figures and describe the relationships between them.
- **CC.7.G.A.1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing from a different scale.
- **CC.7.G.A.2** Draw (freehand, with a 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.
- **CC.7.G.A.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.

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- **CC.7.G.B.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.
- **CC.7.G.B.5** Use factors 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.
- **CC.7.G.B.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.

Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- **CC.8.G.C.9** Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

ISTE Standards:

1. Creativity and Innovation – Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
    b. Create original works as a means of personal or group expression
    c. Use models and simulations to explore complex systems and issues
2. Communication and Collaboration – Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
    a. Interact, collaborate, and publish with peers, experts, or others employing a variety of digital environments and media
    b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats
    d. Contribute to project teams to produce original works or solve problems
3. Research and Information Fluency – Students apply digital tools to gather, evaluate, and use information.
    a. Plan strategies to guide inquiry
    b. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media
    c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks
    d. Process data and report results
4. Critical Thinking, Problem Solving, and Decision Making – Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
    a. Identify and define authentic problems and significant questions for investigation
    b. Plan and manage activities to develop a solution or complete a project
    c. Collect and analyze data to identify solutions and/or make informed decisions
    d. Use multiple processes and diverse perspectives to explore alternative solutions
5. Digital Citizenship – Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
    a. Advocate and practice safe, legal, and responsible use of information and technology
    b. Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity
    c. Demonstrate personal responsibility for lifelong learning
    d. Exhibit leadership for digital citizenship.

6. Technology Operations and Concepts – Students demonstrate a sound understanding of technology concepts, systems, and operations.
    a. Understand and use technology systems
    b. Select and use applications effectively and productively

Career Education and Work Standards

13.1.8.A. Relate careers to individual interests, abilities, and aptitudes.
13.1.8.B. Relate careers to personal interests, abilities, and aptitudes.
13.1.8.C. Explain how both traditional and nontraditional careers offer or hinder career opportunities.
13.1.8.D. Develop an individualized career portfolio including components.
13.1.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.1.8.F. Analyze the relationship of school subjects, extracurricular activities, and community experiences to career preparation.
13.2.8.A. Identify effective speaking and listening skills used in a job interview.
13.2.8.E. Explain, in the career acquisition process, the importance of the essential workplace skills/knowledge.
13.3.8.C. Explain and demonstrate conflict resolution skills.
13.3.8.E. Identify and apply time management strategies as they relate to both personal and work situations.
13.4.8.C. Identify and describe the basic components of a business plan.

Connecting to Common Core and Other Standards:

- PA Standards found at www.pdesas.org/standards/standardsdownloads
- National Common Core found at www.corestandards.org
- ISTE found at www.iste.org/standards/nets-for-students.aspx
- Career Education and Work found at www.pacareerstandards.com/
- See Appendix for complete documents.

ELL Differentiation: Math & LA specifics found at www.pde.sas.org/module/sas/curriculumframework/elloverlay.aspx
Generic found at http://www.easad.net/esl
Todos resources found at www.todos-math.org

Enrichment:

- Internet/Research Activities
    - Compass Learning Odyssey https://www.thelearningodyssey.com/
    - Cool Math http://www.coolmath.com/
    - Khan Academy http://www.khanacademy.org/
    - Classzone http://www.classzone.com/cz/login.htm
    - Study Island http://www.studyisland.com/
- Group/Research Projects

Remediation:

- Multiplication facts
- Properties of Real Numbers
- Evaluate and simplify algebraic expressions
- Solve one- and two-step single variable equations
- Solve multi-step single variable equations
- Plot points on the coordinate plane
- Graph lines on the coordinate plane when given two points on the line
- Internet/Research Activities
  - Compass Learning Odyssey https://www.thelearningodyssey.com/
  - Cool Math http://www.coolmath.com/
  - Khan Academy http://www.khanacademy.org/
  - Classzone http://www.classzone.com/cz/login.htm
  - Study Island http://www.studyisland.com/

IEP/GIEP: Refer to individual student's education plan under specially designed instruction.

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M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4 M07.C-G.2.1.1 M07.C-G.2.1.2 M07.C-G.2.2.1 M07.C-G.2.2.2 M08.C-G.3.1.1	● Identify or describe the properties of all types of triangles based on angle and side measures. ● Solve problems involving scale drawings of geometric figures, including finding length and area. ● Use and apply the triangle inequality theorem. ● Describe the two-dimensional figures that result from slicing three-dimensional figures. ● Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. ● Identify and use properties of angles formed when two parallel lines are cut by a transversal.	● Identify points, lines, line segments, rays, and planes ● Identify congruent line segments in geometric figures ● Use rotations, translations and reflections to help with identifying congruence ● Measure angles with a protractor ● Classify and describe angles as acute, right, obtuse, or straight ● Identify and describe complementary and supplementary angles ● Solve problems involving complementary and supplementary angles ● Identify parallel, perpendicular, and skew lines ● Use angle relationships to find angle measures: o Adjacent Angles o Vertical Angles o Alternate Interior Angles	● Acute Angle ● Adjacent Angle ● Alternate Exterior Angles ● Alternate Interior Angles ● Angle ● Base ● Cartesian Plane ● Classify ● Complementary Angles ● Cone ● Congruent ● Constructions ● Corresponding Angles ● Cylinder ● Decagon ● Diagonal ● Diameter ● Edge ● Endpoint ● Face ● Geometric Figure ● Heptagon ● Hexagon ● Line ● Line Segment ● n-Gon ● Nonagon ● Obtuse Angle	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (continued from above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4 M07.C-G.2.1.1 M07.C-G.2.1.2 M07.C-G.2.2.1 M07.C-G.2.2.2 M08.C-G.3.1.1	● Identify or describe the properties of all types of triangles based on angle and side measures. ● Solve problems involving scale drawings of geometric figures, including finding length and area. ● Use and apply the triangle inequality theorem. ● Describe the two-dimensional figures that result from slicing three-dimensional figures. ● Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. ● Identify and use properties of angles formed when two parallel lines are cut by a transversal.	● Use angle relationships to find angle measures: o Alternate Exterior Angles o Corresponding Angles o Use angle measures to prove lines are parallel ● Find missing angle measures in triangles ● Construct a triangle given three angle measures (freehand, with ruler and protractor, and technology) ● Construct a triangle given three side measures (freehand, with ruler and protractor, and technology) ● Construct a geometric shape given side lengths/angle measures ● Describe when angle measures determine a unique triangle (a+b>c) or no triangle (a+b<c)	● Octagon ● Ordered Pair ● Parallel ● Parallel Lines ● Pentagon ● Perpendicular Lines ● Plane ● Point ● Polygon ● Polyhedron ● Protractor ● Pyramid ● Quadrilateral ● Radius ● Ray ● Right Angle ● Right Rectangular Prism ● Right Rectangular Pyramid ● Scale ● Scale Drawing ● Similar ● Skew Lines ● Sphere ● Straight Angle ● Supplementary Angles	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/ ● http://www.parcconline.org/samples/item-task-prototypes#7	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (continued from above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4 M07.C-G.2.1.1 M07.C-G.2.1.2 M07.C-G.2.2.1 M07.C-G.2.2.2 M08.C-G.3.1.1	● Identify or describe the properties of all types of triangles based on angle and side measures. ● Solve problems involving scale drawings of geometric figures, including finding length and area. ● Use and apply the triangle inequality theorem. ● Describe the two-dimensional figures that result from slicing three-dimensional figures. ● Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. ● Identify and use properties of angles formed when two parallel lines are cut by a transversal.	● Describe when angle measures determine a triangle (given angles equal 180^0) or no triangle (given angles are greater or less than 180^0) ● Use similarity and/or scale factor to find missing measures of lengths and geometric figures ● Find missing angle measures in quadrilaterals ● Use the diagonals in quadrilaterals to find missing angle measures ● Draw triangles to find the sum of the interior angles of a polygon ● Identify congruent triangles and other polygons ● Use congruence to find unknown angle and side measures ● Use angle and side measures to identify congruent figures	● Three-Dimensional ● Transversal ● Triangle ● Triangle Inequality Theorem ● Triangular Pyramid ● Two-Dimensional ● Vertex (Vertices) ● Vertical Angle	● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/ ● http://www.parcconline.org/samples/item-task-prototypes#7	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA

PSSA Eligible Content	**Unit Concepts** What students need to know:	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (See Above)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4 M07.C-G.2.1.1 M07.C-G.2.1.2 M07.C-G.2.2.1 M07.C-G.2.2.2 M08.C-G.3.1.1	● Identify or describe the properties of all types of triangles based on angle and side measures. ● Solve problems involving scale drawings of geometric figures, including finding length and area. ● Use and apply the triangle inequality theorem. ● Describe the two-dimensional figures that result from slicing three-dimensional figures. ● Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. ● Identify and use properties of angles formed when two parallel lines are cut by a transversal.	● Classify triangles as isosceles, equilateral, scalene, obtuse, right, and/or acute, ● Classify polygons by the number of sides ● Name prisms and pyramids ● Define two-dimensional figures that result from slicing: o A right rectangular prism o A cube o A cylinder o A cone		● Supplementary workbooks ● PSSA Math Assessment ● Teacher-generated activities ● Calculators ● Promethean Boards ● CPS ● Study Island ● moodle.esasd.net/moodle/course/view.php?id=129 ● moodle.esasd.net/moodle/course/view.php?id=234 ● SAS: http://www.pdesas.org/ ● http://map.mathshell.org.uk/materials/tasks.php ● http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default ● http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month ● http://algebraicthinking.org/assessments ● www.algebralab.org ● http://www.smarterbalanced.org/sample-items-and-performance-tasks/ ● http://www.parcconline.org/samples/item-task-prototypes#7	● Teacher generated tests and quizzes ● Projects ● Journals ● Homework ● Teacher Observation ● CDT ● Study Island ● NWEA

PSSA Eligible Content	**Unit Concepts** What students need to know	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary** (New List of Terms)	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4 M07.C-G.2.1.1 M07.C-G.2.1.2 M07.C-G.2.2.1 M07.C-G.2.2.2 M08.C-G.3.1.1	• Solve problems involving scale drawings of geometric figures, including finding length and area. • Describe the two-dimensional figures that result from slicing three-dimensional figures. • Find the area and circumference of a circle. • Solve problems involving area and circumference of a circle(s). • 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.	• Compute the actual length of a figure from a scale drawing • Solve problems utilizing the circumference of a circle formula • Derive the relationship between the circumference and area of a circle • Solve problems utilizing the area of a circle formula • Compute the actual area of a figure from a scale drawing • Solve perimeter problems • Solve perimeter problems involving composite figures • Solve area problems • Solve area problems with composite figures • Solve surface area problems • Solve volume problems • Select the appropriate formula and calculate for the measure specified: o Perimeter o Circumference o Area o Surface Area o Volume	• Area • Circle • Circumference • Constructions • Cube • Cylinder • Diameter • Geometric Figures • Net • Perimeter • Pi (π) • Plane Sections • Planes • Polygon • Prism • Protractor • Pyramid • Quadrilateral • Radius • Rectangle • Rectangular • Right Rectangular Prism • Right Rectangular Pyramid • Sphere • Square • Surface Area • Three-Dimensional • Triangle • Two-Dimensional • Volume	• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observations • CDT • Study Island • NWEA • http://www.smarterbalanced.org/sample-items-and-performance-tasks/ • http://www.parcconline.org/samples/item-task-prototypes#7

PSSA Eligible Content	**Unit Concepts** What students need to know	**Unit Competencies** What students need to be able to do (skills): (Students will:)	**Content Vocabulary**	**Materials, Resources, & Instructional Activities**	**Assessments**
M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4 M07.C-G.2.1.1 M07.C-G.2.1.2 M07.C-G.2.2.1 M07.C-G.2.2.2 M08.C-G.3.1.1	• Solve problems involving scale drawings of geometric figures, including finding length and area. • Describe the two-dimensional figures that result from slicing three-dimensional figures. • Find the area and circumference of a circle. • Solve problems involving area and circumference of a circle(s). • 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.	• Find the radius and/or diameter when given the circumference • Find a missing side length when given the perimeter • Find a missing side length when given the area • Find a missing side length when given the surface area • Find a missing side length when given the volume • Make the connection that volume is the area of the base multiplied by the height • Explore three-dimensional objects that have the same volume but different surface areas • Solve problems involving conversions of metric and customary units of measure • Solve area, volume, and surface area problems of two- and three-dimensional objects from real world situations	• Area • Circle • Circumference • Constructions • Cube • Cylinder • Diameter • Geometric Figures • Net • Perimeter • Pi (π) • Plane Sections • Planes • Polygon • Prism • Protractor • Pyramid • Quadrilateral • Radius • Rectangle • Rectangular • Right Rectangular Prism • Right Rectangular Pyramid • Sphere • Square • Surface Area • Three- Dimensional • Triangle • Two-Dimensional • Volume	• Supplementary workbooks • PSSA Math Assessment • Teacher-generated activities • Calculators • Promethean Boards • CPS • Study Island • moodle.esasd.net/moodle/course/view.php?id=129 • moodle.esasd.net/moodle/course/view.php?id=234 • SAS: http://www.pdesas.org/ • http://map.mathshell.org.uk/materials/tasks.php • http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default • http://www.insidemathematics.org/index.php/tools-for-teachers/problems-of-the-month • http://algebraicthinking.org/assessments • www.algebralab.org	• Teacher generated tests and quizzes • Projects • Journals • Homework • Teacher Observations • CDT • Study Island • NWEA • http://www.smarterbalanced.org/sample-items-and-performance-tasks/ • http://www.parcconline.org/samples/item-task-prototypes#7