Math Enhancement: Grade 7

Course Description:
Math Enhancement for grade 7 will focus on content, strategies, and test taking skills for the grade 7 PSSA. Primary content focus will be based on integration of previous student deficiencies based on data into the relevant grade 7 PSSA Eligible Content Standards. Continued integration and spiral review of non-proficient topics will be incorporated into lessons during the course to help ensure mastery of eligible content standards.

Students will receive 55 minutes of math instruction in addition to their regularly scheduled math class. The additional time for instruction will be scheduled in place of one out of the two related arts rotations for 90 days. Ongoing communication between the Math Enhancement teacher, students and parents will occur through progress reports, report cards, phone contacts, email, conferences, etc.

Student Selection:
Students were recommended for this 55 minute class based on the following criteria:

- PSSA Scores
- Marking period grades and local benchmark assessments

Instructional Strategies:
Core instructional content based on eligible content standards will be reinforced through the use of:

- Direct instruction
- Guided instruction
- Modeling/Discussion
- Independent practice
- Computer assisted technology (Ex. StudyIsland and other resources listed in curriculum)
- Cooperative Learning
- Constructed response through guided and independent problem solving
- Other strategies/activities based on class and individual needs

Data and Assessment:
Previous data will be utilized to identify areas of need at the beginning of the course along with the pre-test.

Ongoing Assessment:
As each topic is taught, teachers will track proficiency using a checklist based on eligible content standards.

- Deficiencies will be addressed through spiraling and integration of content into future lessons to help students meet proficiency.
    - Formative and summative assessments will be utilized as part of classroom assessment practices.
    - Diagnostic assessments including the CDT's and StudyIsland assessments will be used as additional information for differentiation.
        - All assessments will be shared through communication between the Math Enhancement and 7th grade math teachers on an ongoing basis.

A post-test will be given to determine growth of each student at the end of the 90 days.

- Student data from the post-test will be distributed to students' year-long math teacher for review and use in addressing any additional areas of need.
- Post-test information will also be used to continually evaluate the Math Enhancement course focus and strategies.

Differentiating Instruction:
Study Island, PearsonSuccessNet, CK12Math, and other resources listed in the curriculum will be utilized to help differentiate instruction based on student data and needs.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

MATH ENHANCEMENT: GRADE 7 90 Day Course	STATE STANDARD AREA/UNIT:	Numbers and Operations: Ratios and Proportional Relationships	TIME FRAME:	Ongoing

NATIONAL COMMON CORE STANDARDS:

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

- **7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks ½ mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour.
- **7.RP.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. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t=pn.*
  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.
- **7.RP.3** Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

MATHEMATICAL PRACTICES:

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.

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT
• **How do you compute unit rates associated with ratios of fractions?** • **How do you recognize and represent proportional relationships between quantities?** • **How do you represent proportional relationships using equations?** • **How do you analyze proportional relationships and use them to solve real-world and mathematical problems?**	• analyze • proportions • unit rate • rate • ratio • equivalent • complex fractions • units • origin • coordinate plane	• equation • constant • proportional relationship • simple interest • percent of increase • percent of decrease • ordered pair • tax • percent of error	**Formative:** • Journals/logs • KWL chart • At the bell activities • Question and answer • Thumbs up/thumbs down • Individual white boards/Promethean Board ActiVotes • Homework • Quizzes • Constructed response/open-ended problem solving • Performance tasks • Exit slips

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT

			Summative:
			• Benchmark assessments
			• Performance based assessments
			  o Quizzes
			  o Tests
			  o Constructed response/open-ended problem solving
			  o Performance tasks
			  o Project
			  o Spiral Review
			  o Study Island Practice

UNIT OF INSTRUCTION: RATIOS AND PROPORTIONAL RELATIONSHIPS	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	CC.2.1.7.D.1: Analyze proportional relationships and use them to model and solve real-world and mathematical problems. **Essential Skills and Understanding** • Ability to describe and identify complex fractions. • Ability to recognize the difference(s) between a unit rate and a ratio. • Ability to recognize in a given proportional situation that the two "between ratios" and the two "within ratios" are the same. • Ability to distinguish between additive and multiplicative situations. • Ability to recognize that two equal ratios represent a proportion. • Ability to recognize and represent the connection between equivalent ratios, values in a table, and graphed ordered pairs. • Ability to express unit rates using a variety of representations, given a contextual situation. • Ability to recognize that multiplicative relationships are proportional. • Ability to identify that a proportional relationship intersects (0, 0) and (1, r) where r is the unit rate.	**M07.A-R.1: Demonstrate an understanding of proportional relationships.** **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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

UNIT OF INSTR: RPR	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	• Ability to build on prior experience with equivalent fractions to solve multi-step problems with ratio and percent. • Ability to relate "between" ratios and "within" ratios to the cross-product and factor of change algorithms.	**M07.A-R.1.1.6** • Use proportional relationships to solve multi-step ratio and percent problems.

DIFFERENTIATION ACTIVITIES:

Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

ENRICHMENT:	REMEDIATION:

• Pearson SuccessNet On-Line Teacher's Edition
• Pearson on-line resources and materials
• StudyIsland
• Ck12Math
• Web-based Math Resources
• Small group instruction
• Teacher generated/differentiated instruction enrichment and activities
• Supporting the range of learners as per teacher manual
• Encourage and support learners in explaining how they applied their skills during mathematical tasks
• http://www.artofproblemsolving.com/liz/Alcumus/index.php
• Enrichment based on student GIEP or need of student
	• Pearson Successnet On-Line Teacher's Edition
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	• Small group instruction
	• Adapted assignments
	• Additional time
	• Alternative Assessments
	• Chunking of content, assignment and/or assessments
	• One-on-one re-teaching
	• Volunteer/peer tutoring
	• Accommodations based on IEP and/or need
	• ELL student(or based on student need) additional support
	  ○ Provide specific examples
	  ○ Use of Manipulatives
	  ○ Simplified language in word problems
	  ○ Visuals
	  ○ Flashcards
	  ○ Multiple-meaning words
	  ○ Bilingual dictionary/picture dictionary
	• Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:	• StudyIsland, Ck12Math, other resources below: Ratios and Proportional Relationships
	• PDE SAS portal: http://www.pdesas.org
	• Thinking Maps
	• Graphing calculator
	• Exit Tickets
	• Adaptions checklist
	• ELL Instructional Strategies for Math
	• ESL Handbook
	  o Click on "Academic Resources" from PMSD website
	  o Click on "ESL" on left side of tool bar.
	  o Click on the link to the PMSD ESEL Handbook
	  o Scroll through to page 44 in the appendices.
	• Teacher generated/differentiated instruction resources and activities
	• Grade 7 released state sample questions
	• Grade 7 generated sample questions
	• Promethean Flipcharts/ActiVotes
	• Math flipcharts
	• Math Internet Resources from PMSD Resource Page
	• StudyIsland
	• http://www.khanacademy.org/
	• Thinkfinity website: http://www.thinkfinity.org/home
	• IXL Website: http://www.IXL.com/math/
	• United Streaming: http://streaming.discoveryeducation.com/index.cfm
	• http://edhelper.com/place_value.html
	• http://illuminations.nctm.org
	• http://insidemathematics.org
	• www.teachingchannel.org
	• http://illustrativemathematics.org/standards/k8
	• http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
	• www.teachingchannel.org
	• http://www.learnzillion.com
	• http://www.teacherspayteachers.com
	• flexmath.ck12.org/

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

MATH ENHANCEMENT: GRADE 7 90 Day Course	STATE STANDARD AREA/UNIT:	Numbers and Operations: The Number System	TIME FRAME:	Ongoing

NATIONAL COMMON CORE STANDARDS:

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- **7.NS.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. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*
    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 distanced between two rational numbers 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.
- **7.NS.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.
- **7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

MATHEMATICAL PRACTICES:

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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY	ASSESSMENT

• **How do you apply and extend previous understandings of operations with fractions to add and subtract rational numbers?**
• **How do you apply and extend previous understandings of operations with fractions to multiply and divide rational numbers?**
• **How can you convert a rational number to a decimal using long division?**
• **How can you solve real-world and mathematical problems involving the four operations with rational numbers?**
	• rational numbers
	• number line
	• opposite quantities
	• additive inverses
	• absolute value
	• distributive property
	• signed numbers
	• quotient/divisor integers
	• associative property
	• commutative property
	• identity property
	• terminating decimals
	• repeating decimals
		Formative:
		• Journals/logs
		• KWL chart
		• At the bell activities
		• Question and answer
		• Thumbs up/thumbs down
		• Individual white boards/Promethean Board ActiVotes
		• Homework
		• Quizzes
		• Constructed response/open-ended problem solving
		• Performance tasks
		• Exit slips
		
		Summative:
		• Benchmark assessments
		• Performance based assessments
		  o Quizzes
		  o Tests
		  o Constructed response/open-ended problem solving
		  o Performance tasks
		  o Project
		  o Spiral Review
		  o Study Island Practice

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

UNIT OF INSTRUCTION: THE NUMBER SYSTEM	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES

	CC.2.1.7.E.1: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
	
	Essential Skills and Understanding
	• Ability to build on prior experience with positive and negative rational numbers.
	• Ability to identify additive inverses using rational numbers.
	• Knowledge of positive or negative values for fractions and decimals.
	• Ability to build on prior experience with absolute value.
	• Knowledge of absolute value to add and subtract rational numbers using a horizontal or a vertical number line.
	• Ability to understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q).
	• Ability to identify and apply the following properties:
	  o Commutative Property of Addition
	  o Associative Property of Addition
	  o Identity Property of Addition
	• Ability to identify and apply the following properties:
	  o Multiplicative Inverse
	  o Commutative Property of Multiplication
	  o Associative Property of Multiplication
	  o Identity Property of Multiplication
	• Recognize that rules for multiplying signed numbers remain the same for all rational numbers.
	• Ability to explore and justify the result of division by 0 (zero).
	• Ability to apply and extend knowledge of addition and subtraction of integers (i.e., two color counters, arrows on a number line) to extend to multiplication and division.
	• Ability to use patterns and concrete models to devise a general rule for diving integers: $-\left(\frac{p}{q}\right) = \frac{-p}{q} = \frac{p}{-q}$.
	• Ability to identify and apply the following properties:
	  o Distributive Property
	  o Associative Properties
	  o Commutative Properties
	  o Identity Properties
	• Ability to recognize that when rational numbers in fractional form are converted to decimals, they either terminate or repeat.
	• Ability to describe and identify complex fractions.
	• Ability to apply knowledge of Order of Operations.
		M07.A-N.1: Apply and extend previous understandings of operations to add, subtract, multiply, and divide rational numbers.
		
		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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES:

Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

ENRICHMENT:

- Pearson SuccessNet On-Line Teacher's Edition
- Pearson on-line resources and materials
- StudyIsland
- Ck12Math
- Web-based Math Resources
- Small group instruction
- Teacher generated/differentiated instruction enrichment and activities
- Supporting the range of learners as per teacher manual
- Encourage and support learners in explaining how they applied their skills during mathematical tasks
- http://www.artofproblemsolving.com/liz/Alcumus/index.php
- Enrichment based on student GIEP or need of student

REMEDIATION:

- Pearson Successnet On-Line Teacher's Edition
- Pearson on-line resources and materials
- StudyIsland
- Ck12Math
- Web-based Math Resources
- Supporting the range of learners as per teacher manual
- Teacher generated/differentiated instruction activities
- Small group instruction
- Adapted assignments
- Additional time
- Alternative Assessments
- Chunking of content, assignment and/or assessments
- One-on-one re-teaching
- Volunteer/peer tutoring
- Accommodations based on IEP and/or need
- ELL student(or based on student need) additional support
    - Provide specific examples
    - Use of Manipulatives
    - Simplified language in word problems
    - Visuals
    - Flashcards
    - Multiple-meaning words
    - Bilingual dictionary/picture dictionary
- Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:

- StudyIsland, Ck12Math, other resources below: The Number System
- PDE SAS portal: http://www.pdesas.org
- Thinking Maps
- Graphing calculator
- Exit Tickets
- Adaptions checklist
- ELL Instructional Strategies for Math
- ESL Handbook
  - Click on "Academic Resources" from PMSD website
  - Click on "ESL" on left side of tool bar.
  - Click on the link to the PMSD ESEL Handbook
  - Scroll through to page 44 in the appendices.
- Teacher generated/differentiated instruction resources and activities
- Grade 7 released state sample questions
- Grade 7 generated sample questions
- Promethean Flipcharts/ActiVotes
- Math flipcharts
- Math Internet Resources from PMSD Resource Page
- StudyIsland
- http://www.khanacademy.org/
- Thinkfinity website: http://www.thinkfinity.org/home
- IXL Website: http://www.IXL.com/math/
- United Streaming: http://streaming.discoveryeducation.com/index.cfm
- http://edhelper.com/place_value.html
- http://illuminations.nctm.org
- http://insidemathematics.org
- www.teachingchannel.org
- http://illustrativemathematics.org/standards/k8
- http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
- www.teachingchannel.org
- http://www.learnzillion.com
- http://www.teacherspayteachers.com
- flexmath.ck12.org/

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

MATH ENHANCEMENT: GRADE 7 90 Day Course	STATE STANDARD AREA/UNIT:	Algebraic Concepts: Expressions and Equations	TIME FRAME:	Ongoing

NATIONAL COMMON CORE STANDARDS:

Use properties of operations to generate equivalent expressions.

- **7.EE.1** Apply properties of operations as strategies to add, subtract, factor and expand linear expressions with rational coefficients.
- **7.EE.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. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*

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

- **7.EE.3** Solve multi-step real-life and mathematical problems posted 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. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional $1/10$ of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9¾ inches long in the center of a door that is 27½ wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*
- ***7.EE.4*** Use variable 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 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. *For example, the perimeter of a rectangle is 54cm. Its length is 6 cm. What is its width?*
    b. 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. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make and describe the solutions.*

MATHEMATICAL PRACTICES:

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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT

• **How do you use properties of operations to generate equivalent expressions?**
• **How can variable help solve real-world or mathematical problems?**
• **How can rewriting an expression in different forms in a problem context help solve the problem?**
• **How are equations and inequalities used to solve real-world or mathematical problems?**
• **How can you solve real-life and mathematical problems using numerical and algebraic expressions and equations?**
	• equivalent
	• coefficient
	• linear
	• expression
	• equation
	• inequalities
	• algebraic expressions
		• variable
		• constant
		• solution vs. solutions (Solution set)
		• reasonableness of answer
			<u>Formative:</u>
			• Journals/logs
			• KWL chart
			• At the bell activities
			• Question and answer
			• Thumbs up/thumbs down
			• Individual white boards/Promethean Board ActiVotes
			• Homework
			• Quizzes
			• Constructed response/open-ended problem solving
			• Performance tasks
			• Exit slips
			
			<u>Summative:</u>
			• Benchmark assessments
			• Performance based assessments
			  o Quizzes
			  o Tests
			  o Constructed response/open-ended problem solving
			  o Performance tasks
			  o Project
			  o Spiral Review
			  o Study Island Practice

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

UNIT OF INSTRUCTION: EXPRESSIONS AND EQUATIONS	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	CC.2.2.7.B.1: Apply properties of operations to generate equivalent expressions. **Essential Skills and Understanding** • Ability to understand linear expression terminology; sum, difference, term, product, factor, quotient, coefficient. • Ability to factor by using division to express a linear expression by its factors; i.e., 2x – 6 = 2(x-3). • Ability to expand by using multiplication to rewrite the factors in a linear expression as a product; i.e., 5(x = 12) = 5x + 60. • Ability to utilize Properties of Operations in order to rewrite expressions in different forms. • Ability to develop understanding of equivalent forms of numbers, their various uses and relationships, and how they apply to a problem. **CC.2.2.7.B.3:** Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representation. **Essential Skills and Understanding** • Ability to solve multi-step real-life and mathematical problems posted 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. • Ability to 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. • Ability to differentiate between an algebraic solution and an arithmetic solution. • Ability to develop correct usage of all four inequality symbols and related terminology (at least, no more than, etc.). • Ability to solve inequalities to determine the solution set.	**M07.B-E.1: Represent expressions in equivalent forms.** **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: Solve real-world and mathematical problems using numerical algebraic expressions, equations, and inequalities.** **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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES:

Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

ENRICHMENT:

- Pearson SuccessNet On-Line Teacher's Edition
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REMEDIATION:

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- Volunteer/peer tutoring
- Accommodations based on IEP and/or need
- ELL student(or based on student need) additional support
    - Provide specific examples
    - Use of Manipulatives
    - Simplified language in word problems
    - Visuals
    - Flashcards
    - Multiple-meaning words
    - Bilingual dictionary/picture dictionary
- Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:	• StudyIsland, Ck12Math, other resources below: Expressions and Equations
	• PDE SAS portal: http://www.pdesas.org
	• Thinking Maps
	• Graphing calculator
	• Exit Tickets
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	• ELL Instructional Strategies for Math
	• ESL Handbook
	  o Click on "Academic Resources" from PMSD website
	  o Click on "ESL" on left side of tool bar.
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	• Teacher generated/differentiated instruction resources and activities
	• Grade 7 released state sample questions
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	• StudyIsland
	• http://www.khanacademy.org/
	• Thinkfinity website: http://www.thinkfinity.org/home
	• IXL Website: http://www.IXL.com/math/
	• United Streaming: http://streaming.discoveryeducation.com/index.cfm
	• http://edhelper.com/place_value.html
	• http://illuminations.nctm.org
	• http://insidemathematics.org
	• www.teachingchannel.org
	• http://illustrativemathematics.org/standards/k8
	• http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
	• www.teachingchannel.org
	• http://www.learnzillion.com
	• http://www.teacherspayteachers.com
	• flexmath.ck12.org/

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

MATH ENHANCEMENT: GRADE 7 90 Day Course	STATE STANDARD AREA/UNIT:	Geometry: Geometry	TIME FRAME:	Ongoing

NATIONAL COMMON CORE STANDARDS:

Draw, construct, and describe geometrical figures and describe the relationships between them.

- **7.G.1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
- **7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- **7.G.3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

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

- **7.G.4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- **7.G.5** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- **7.G.6** Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

MATHEMATICAL PRACTICES:

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.

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT
• **How do you draw, construct and describe geometrical figures?** • **How do you describe the relationships between geometrical figures?** • **How do you use facts about supplementary, complementary, vertical, and adjacent angles to write and solve simple equations for an unknown angle in a figure?** • **How do you solve real-life and mathematical problems involving angle measure, area, surface area, and volume?**	• scale drawings • scale • geometric figures • protractor • plane • area • right rectangular prisms • right rectangular pyramid • supplementary • complementary • vertical • adjacent	• polygon • surface area • volume • circumference • radius • diameter • quadrilateral • formula • Triangle Inequality Theorem • plane sections • transversal • alternate interior angles • alternate exterior angles • corresponding angles	**Formative:** • Journals/logs • KWL chart • At the bell activities • Question and answer • Thumbs up/thumbs down • Individual white boards/Promethean Board ActiVotes • Homework • Quizzes • Constructed response/open-ended problem solving • Performance tasks • Exit slips

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT
			Summative: • Benchmark assessments • Performance based assessments o Quizzes o Tests o Constructed response/open-ended problem solving o Performance tasks o Project o Spiral Review o Study Island Practice

UNIT OF INSTRUCTION: GEOMETRY	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	CC.2.3.7.A.2: Visualize and represent geometric figures and describe the relationships between them. **Essential Skills and Understanding** • Ability to describe and identify ratios and proportions. • Ability to reproduce scale drawing at a different scale. • Ability to draw, construct and describe geometrical figures. • Ability to build on prior knowledge with 2-dimensional figures and 3-dimensional figures. • Ability to differentiate between the characteristics of right rectangular prisms and right rectangular pyramids. • Ability to compare the attributes of right rectangular prisms and right rectangular pyramids. **CC.2.3.7.A.1:** Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.	**M07.C-G.1: Demonstrate an understanding of geometric figures and their properties.** **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. **M07.C-G.2: Solve real-world and mathematical problems involving angle measure, circumference, area, surface area, and volume.** **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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

UNIT OF INSTRUCTION: GEOMETRY	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	Essential Skills and Understanding • Ability to identify and apply the vocabulary for a circle – radius, diameter, chord, circumference, center pi (π) $\approx$ 3.14159 and $^{22}/_{7}$. • Ability to use a near-parallelogram to discover the formula for area of a circle. • Ability to explore the relationship between the angles of intersecting lines and figures. • Ability to 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.	**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 to two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES:

Teacher directed differentiated instructional projects and activities are ongoing and based on student need.

ENRICHMENT:

- Pearson SuccessNet On-Line Teacher's Edition
- Pearson on-line resources and materials
- StudyIsland
- Ck12Math
- Web-based Math Resources
- Small group instruction
- Teacher generated/differentiated instruction enrichment and activities
- Supporting the range of learners as per teacher manual
- Encourage and support learners in explaining how they applied their skills during mathematical tasks
- http://www.artofproblemsolving.com/liz/Alcumus/index.php
- Enrichment based on student GIEP or need of student

REMEDIATION:

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- Supporting the range of learners as per teacher manual
- Teacher generated/differentiated instruction activities
- Small group instruction
- Adapted assignments
- Additional time
- Alternative Assessments
- Chunking of content, assignment and/or assessments
- One-on-one re-teaching
- Volunteer/peer tutoring
- Accommodations based on IEP and/or need
- ELL student(or based on student need) additional support
  - Provide specific examples
  - Use of Manipulatives
  - Simplified language in word problems
  - Visuals
  - Flashcards
  - Multiple-meaning words
  - Bilingual dictionary/picture dictionary
- Math Support, Learning Support, or ELL Teachers as appropriate and based on need

RESOURCES:	• StudyIsland, Ck12Math, other resources below: Geometry
	• PDE SAS portal: http://www.pdesas.org
	• Thinking Maps
	• Graphing calculator
	• Exit Tickets
	• Adaptions checklist
	• ELL Instructional Strategies for Math
	• ESL Handbook
	  o Click on "Academic Resources" from PMSD website
	  o Click on "ESL" on left side of tool bar.
	  o Click on the link to the PMSD ESEL Handbook
	  o Scroll through to page 44 in the appendices.
	• Teacher generated/differentiated instruction resources and activities
	• Grade 7 released state sample questions
	• Grade 7 generated sample questions
	• Promethean Flipcharts/ActiVotes
	• Math flipcharts
	• Math Internet Resources from PMSD Resource Page
	• StudyIsland
	• http://www.khanacademy.org/
	• Thinkfinity website: http://www.thinkfinity.org/home
	• IXL Website: http://www.IXL.com/math/
	• United Streaming: http://streaming.discoveryeducation.com/index.cfm
	• http://edhelper.com/place_value.html
	• http://illuminations.nctm.org
	• http://insidemathematics.org
	• www.teachingchannel.org
	• http://illustrativemathematics.org/standards/k8
	• http://wiki.warren.kyschools.us/groups/wcpscommoncorestandards/
	• www.teachingchannel.org
	• http://www.learnzillion.com
	• http://www.teacherspayteachers.com
	• flexmath.ck12.org/

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

MATH ENHANCEMENT: GRADE 7 90 Day Course	STATE STANDARD AREA/UNIT:	Measurement, Data, and Probability: Statistics and Probability	TIME FRAME:	Ongoing

NATIONAL COMMON CORE STANDARDS:

Use random sampling to draw inferences about a population.

- **7.SP.1** Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- **7.SP.2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

Draw informal comparative inferences about two populations.

- **7.SP.3** Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.
- **7.SP.4** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*

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

- **7.SP.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 ½ indicates and event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- **7.SP.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its ling-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*
- **7.SP.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. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*

MATHEMATICAL PRACTICES:

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.
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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.

b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*

- **7.SP.8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
  a. 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.
  b. Represent sample spaces for compound events using methods such as organized list, 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.
  c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one the type A blood?*

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT
• **How do you use random sampling to draw inferences about a population?** • **How do you draw informal comparative inferences about two populations?** • **How do you investigate chance processes and develop, use, and evaluate probability models?**	• random sampling • inferences • population • statistics • probability • predicting • data • estimation • measures of central tendency • absolute deviation • simulation	• experimental probability • theoretical probability • data distribution • compound events • frequency • likelihood • chance • tree diagram • sample spaces • variability	**<u>Formative:</u>** • Journals/logs • KWL chart • At the bell activities • Question and answer • Thumbs up/thumbs down • Individual white boards/Promethean Board ActiVotes • Homework • Quizzes • Constructed response/open-ended problem solving • Performance tasks • Exit slips

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

ESSENTIAL QUESTIONS	VOCABULARY		ASSESSMENT
			Summative: • Benchmark assessments • Performance based assessments o Quizzes o Tests o Constructed response/open-ended problem solving o Performance tasks o Project o Spiral Review o Study Island Practice

UNIT OF INSTRUCTION: STATISTICS AND PROBABILITY	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	CC.2.4.7.B.1: Draw inferences about populations based on random sampling concepts. **Essential Skills and Understanding** • Ability to describe and identify population, samples of a population, random sampling, validity, reliability, invalid, inferences. • Ability to use data from a random sample to draw inferences about a population with an unknown characteristic of interest. **CC.2.4.7.B.2:** Draw informal comparative inferences about two populations. **Essential Skills and Understanding** • Ability to describe and identify deviation, standard deviation, absolute deviation, measures of central tendency, measures of variability. • Ability to build on prior experience with dot plots and to make inferences from the data. • Ability to determine which measure of central tendency is most appropriate for a given situation. • Ability to use statistical findings to draw inference about populations.	**M07.D-S.1.: Use random sampling to draw inferences about a population.** **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: Draw comparative inferences about populations.** **M07.D-S.2.1.1** • Compare two numerical data distributions using measures of center and variability. **M07.D-S.3: Investigate chance processes and develop, use, and evaluate probability models.** **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

UNIT OF INSTRUCTION: STATISTICS AND PROBABILITY	PA COMMON CORE ASSESSMENT ANCHORS	PA ELIGIBLE CONTENT STANDARDS/ESSENTIAL CONTENT LEARNING ACTIVITIES
	CC.2.4.7.B.3: Investigate chance processes and develop, use, and evaluate probability models. **Essential Skills and Understanding** • Ability to devise models where outcomes are equally likely versus not equally likely. • Ability to determine the probability of a chance event given relative frequency. • Ability to describe and identify possibility versus probability. • Ability to compare simple events with compound events. • Ability to find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation. • Ability to use models and simulate a variety of events.	Around ½ 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.

POCONO MOUNTIAN SCHOOL DISTRICT CURRICULUM

DIFFERENTIATION ACTIVITIES:

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    - Use of Manipulatives
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RESOURCES:

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- Graphing calculator
- Exit Tickets
- Adaptions checklist
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  - Click on "Academic Resources" from PMSD website
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