

Warren County School District

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Pre-Algebra – Eighth grade

Course Number: 00201

Course Description and Prerequisites: Completion of Mathematics – Grade 7, 60% year average and basic operations w/o calculator usage

This course builds upon computational, problem solving, graphing, and algebraic concepts previously learned in mathematics. Pre-algebra provides learning experiences required for algebra I such as functioning, graphing, absolute value, permutations and combinations, and systems of equations and inequalities. It will provide students with problem-solving, reasoning skills and mathematical concepts necessary to be successful learners in advanced mathematics courses.

Suggested Grade Level: Eighth grade

Length of Course: ____ One Semester X Two Semesters ____ Other

Units of Credit: 1

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certification(s) Middle Level Mathematics, Mathematics (7-12)

Certification verified by WCSD Human Resources Department:

X Yes ____ No

Board Approved Textbooks, Software, Materials:

Title:

Publisher:

ISBN #:

Copyright Date:

Date of WCSD Board Approval:

BOARD APPROVAL:**Date Written:** Spring 2006**Date Approved:** June 12, 2006**Implementation Year:** 2006-2007

Suggested Supplemental Materials: Geoboard, tangram pieces, pentonimoes, attribute blocks, probability dice, spinner, calculator, ruler and PSSA formula sheet.

Course Standards**PA Academic Standards:**

- 2.1 Numbers, Number Systems and Number Relationships
- 2.2 Computation and Estimation
- 2.3 Measurement and Estimation
- 2.4 Mathematical Reasoning and Connections
- 2.5 Mathematical Problem Solving and Communication
- 2.6 Statistics and Data Analysis
- 2.7 Probability and Predictions
- 2.8 Algebra and Functions
- 2.9 Geometry
- 2.10 Trigonometry
- 2.11 Concepts of Calculus

WCSD Academic Standards: None

Industry or Other Standards: Common Core Standards

WCSD EXPECTATIONS

WCSD K-12 Expectations for instruction in writing, reading, mathematics and, technology have been developed and revised annually. The teacher will integrate all WCSD Expectations into this planned instruction

SPECIAL EDUCATION AND GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (I.E.P.) or Gifted Individual Education Plan (G.I.E.P.).

REQUIRED COURSE SEQUENCE AND TIMELINE

Content Sequence	Dates
Problem-solving strategies throughout year	
Review of basic skills (order of operations, ratios, rationals, percents and proportion.	August/September
Solving and graphing one- and two-step equations & inequalities	October
Probability, permutations & combinations	November
Algebra applies to geometry	December/January
Perimeter, area & volume of two- and three-dimensional figures	February
Right triangles, Pythagorean Theory and radicals	March/April
Polynomials	May

WRITING TEAM: Kathleen Bertolini
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A yearly review will be done following the PDE release of the annual Eligible Content. Our goal is to keep the math planned instruction updated and effective.

WCSD STUDENT DATA SYSTEM INFORMATION

1. Is there a required final examination? ☒ Yes ☐ No
2. Does this course issue a mark/grade for the report card? ☒ Yes ☐ No
3. Does this course issue a Pass/Fail mark? ☐ Yes ☒ No
4. Is the course mark/grade part of the GPA calculation?
☒ Yes ☐ No
5. Is the course eligible for Honor Roll calculation? ☒ Yes ☐ No
6. What is the academic weight of the course?
☐ No weight/Non credit ☒ Standard weight
☐ Enhanced weight

**SPECIFIC EDUCATIONAL OBJECTIVES/CORRESPONDING STANDARDS
AND ELIGIBLE CONTENT WHERE APPLICABLE**

The Eligible Content is not in sequence. It is a checklist to be used to comply with state standards.

2.1 Numbers, Number Systems and Number Relationships
Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.1.8A	M8.A.1.1.1 M8.A.1.1.2	<ul style="list-style-type: none"> • Represent numbers using scientific notation and/or exponential form. • Find the square or cube of a whole number and/or the square root of a perfect square. • Interchange fractions, decimals and percents. • Use percents, ratios, and proportions to solve problems. • Apply number theory concepts such as divisibility rules, GCF & LCM. 	Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment • Tests/quizzes • Evaluate oral response • Self-evaluation • 4Sight • Venn diagram • Homework Summative Assessments: <ul style="list-style-type: none"> • Portfolio • Test • Cooperative project • PSSA
2.1.8B			
2.1.8C		Distinguish between a rational and irrational number.	
2.1.8D	M8.1.2.2.1	Solve problems involving percents.	
2.1.8E		<ul style="list-style-type: none"> • Evaluate and simplify expressions. • Evaluate powers of monomials. 	
2.1.8F			
2.1.8G			

2.2 Computation and Estimation

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.2.8A	M8.A.2.1.1	Simplify numeric expressions involving integers, using the order of operations.	Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment • Tests/quizzes • Problem-solving journal/activity • Evaluate oral response • Homework • Interview • 4Sight Summative Assessments: <ul style="list-style-type: none"> • Test • Final Exam
2.2.8B	M8.A.3.3.1	Add, subtract, multiply and divide integers, fractions and/or decimals with and without a calculator.	
2.2.8C		Approximate square roots	
2.2.8D	M8.A.3.2.1	<ul style="list-style-type: none"> • Evaluate proportions. • Estimate answers to problems involving percents. 	
2.2.8E			
2.2.8F	M8.A.3.1.1 M8.A.3.1.2	<ul style="list-style-type: none"> • Identify, use and/or explain when it is appropriate to round up or round down. • Identify, apply and/or explain when an exact answer is needed or when estimation is appropriate. 	

2.3 Measurement and Estimation

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.3.8A	M8.B.2.3.1 M8.B.2.3.2	<ul style="list-style-type: none"> • Calculate the surface area of prisms, cylinders, pyramids, cones. • Calculate the volume of cubes and rectangular prisms. • Determine areas of parallelograms, triangles, trapezoids, circles. • Determine precision and significant digits. 	Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment • Tests/quizzes • Problem-solving journal/activity • Create an illustration • Develop a model using manipulatives • Evaluate oral response • Homework • Interview • 4Sight Summative Assessments: <ul style="list-style-type: none"> • Portfolio • Test • Performance assessment • Cooperative Project • PSSA • Final Exam
2.3.8A	M8.B.2.3.1 M8.B.2.3.2	<ul style="list-style-type: none"> • Calculate the surface area of prisms, cylinders, pyramids, cones. • Calculate the volume of cubes and rectangular prisms. • Determine areas of parallelograms, triangles, trapezoids, circles. • Determine precision and significant digits. 	
2.3.8B	M8.A.2.2.2	Represent or solve rate problems (e.g., unit rates, simple interest, distance, etc).	
2.3.8C	M8.B.2.1.1 M8.B.2.1.2	<ul style="list-style-type: none"> • Determine the total number of degrees in the interior angles of a polygon in 3-9 sided figures. • Determine the measurement of one interior angle of a regular polygon. • Measure angles in degrees. • Determine relations of angles formed by parallel lines. 	
2.3.8D	M8.B.1.1.1 M8.B.1.1.2 M8.B.1.1.3 M8.B.1.1.4 M8.B.2.3.3	<ul style="list-style-type: none"> • Convert among metric measurements. • Convert customary measurement to units above or below the give unit (e.g., inches to yards). • Convert time up units above or below given time (e.g., seconds to hours). • Convert from Fahrenheit to Celsius or Celsius to Fahrenheit. • Determine the appropriate type of measurement. 	
2.3.8E			
2.3.8F			
2.3.8G			

2.4 Mathematical Reasoning and Connection

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.4.8A		Draw conclusions based on given set of data, information and logical reasoning.	Formative Assessments: <ul style="list-style-type: none"> • Problem-solving journal/activity • Hands on representation • Evaluate oral response • Homework
2.4.8B		Solve multi-step algebraic equations and inequalities.	
2.4.8C		Draw a conclusion based on if...then statements.	
2.4.8D			
2.4.8E		Distinguish between inductive and deductive reasoning.	Summative Assessments: <ul style="list-style-type: none"> • Test

2.5 Mathematical Problem Solving and Communication

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.5.8A		Create and use a strategy (guess and check, work backwards, process of elimination, etc) to solve a problem with or without the use of materials.	Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment • Problem-solving journal/activity • Hands on representation • Evaluate oral response • 4Sight
2.5.8B		Use numerical tables and equations, simple algebraic equations and formulas, charts, graphs and diagrams to verify and interpret results.	
2.5.8C			
2.5.8D		Problem solve in practical situations.	
			Summative Assessments: <ul style="list-style-type: none"> • Test • PSSA

2.6 Statistics and Data Analysis

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.6.8A		<ul style="list-style-type: none"> Identify and calculate the measures of central tendency. Choose and/or explain the correct representation for a set of data. 	Formative Assessments: <ul style="list-style-type: none"> Observation Evaluate written work Performance assessment Problem-solving journal/activity Venn diagram Evaluate oral response Summative Assessments: <ul style="list-style-type: none"> Portfolio Test Performance assessment Cooperative project PSSA Final Exam
2.6.8B		Recognize misleading statistics.	
2.6.8C	M8.E.4.1.1	Fit a line to a scatter plot and/or describe any correlation between the two variables.	
2.6.8D			
2.6.8E		<ul style="list-style-type: none"> Analyze data and/or answer questions pertaining to data shown in multiple line graphs, circle graphs or histograms. Interpret data shown in stem-and-leaf or box-and-whisker plots. Graph stem and leaf plot. 	
2.6.8F		Gather and record data.	
2.6.8G			

2.7 Probability and Predictions

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.7.8A	M8.E.3.1.1	Calculate and show the number of permutations and combinations for an event.	Formative Assessments: <ul style="list-style-type: none"> • Evaluate written work • Problem-solving journal/activity • Create an illustration • Develop a model using manipulatives Summative Assessments: <ul style="list-style-type: none"> • Portfolio • Test • Performance assessment • Cooperative project • PSSA • Final Exam
2.7.8B		<ul style="list-style-type: none"> • Use tree diagram to count outcomes. • Use Multiplication to determine outcomes. • Find the probability of a simple event and represent as a fraction in lowest terms. 	
2.7.8C			
2.7.8D			
2.7.8E	M8.E.2.1.1 M8.E.4.1.2	<ul style="list-style-type: none"> • Find the probability of independent/dependent or mutually exclusive event. • Make predictions based on survey results or graphs. • Apply statistics to problem solving to make predictions. 	

2.8 Algebra and Functions

Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.8.8A			Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment • Tests/quizzes • Problem-solving journal/activity • Create an illustration • Develop a model using manipulatives • Hands on representation • Evaluate oral response • Self-evaluation • 4Sight • Portfolio • K-W-L • Venn diagram • Homework • Interview Summative Assessments: <ul style="list-style-type: none"> • Portfolio • Test • Performance assessment • Cooperative project • PSSA • Final Exam
2.8.8B	M8.D.1.1.2	<ul style="list-style-type: none"> • Find missing elements in numeric or geometric patterns and/or functions. • Identify polynomials. • Add and subtract polynomials. • Multiply polynomials by monomials. • Multiply binomials • Graph using slope & intercept. 	
2.8.8C	M8.D.2.2.1 M8.D.2.2.2	<ul style="list-style-type: none"> • Match a written situation to its numeric and/or algebraic expression, equation or inequality. • Write and/or solve an equation for a given problem situation. 	
2.8.8D			
2.8.8E		Add probabilities.	
2.8.8F		<ul style="list-style-type: none"> • Solve one-step equations/inequalities. • Solve two-step equations & inequalities and use substitution to check accuracy. • Solve multi-step equations/inequalities. • Solve equations/inequalities when variables are on either side. • Graph equations and inequalities on a number line. 	
2.8.8G	M8.C.2.1.1 M8.D.1.1.3	<ul style="list-style-type: none"> • Plot, locate or identify ordered pairs on a coordinate plane. • Determine the rule of a function. 	
2.8.8H	M8.D.3.1.1 M8.D.3.1.2 M8.D.3.1.3	<ul style="list-style-type: none"> • Graph a linear function based on an x/y table. • Match the graph of a linear function to its x/y table. • Match the linear equation ($y=mx+b$) to the x/y table. 	
2.8.8I			
2.8.8J		Identify and use the real number system.	

2.9 Geometry
Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.9.8A			Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment • Tests/quizzes • Create an illustration • Develop a model using manipulatives • Hands on representation • Evaluate oral response • Homework Summative Assessments: <ul style="list-style-type: none"> • Portfolio • Test • Performance assessment • Cooperative project • PSSA • Final Exam
2.9.8B	M8.C.1.1.2	<ul style="list-style-type: none"> • Define, identify and/or use properties of angles formed by intersecting lines. • Construct segments and angles. • Correctly use the language of geometry. 	
2.9.8C			
2.9.8D	M8.B.2.1.3 M8.C.1.1.1	<ul style="list-style-type: none"> • Determine the number of sides of a polygon given the total number of degrees in the interior angles. • Match the three-dimensional figure with its net. • Identify congruent triangles. • Classify quadrilaterals by characteristics. 	
2.9.8E	M8.C.1.1.3	Define, identify and/or use properties of angles formed when two parallel lines are cut by a transversal.	
2.9.8F		<ul style="list-style-type: none"> • Identify two similar polygons and explain why they are similar. • Identify two congruent polygons and explain why they are congruent. • Identify similar triangles and use proportions to find the missing length. 	
2.9.8G			
2.9.8H			
2.9.8I		Graph translations on a coordinate plane.	
2.9.8J			
2.9.8K			

2.10 Trigonometry
Pre Algebra – Grade 8

	Eligible Content	Performance Indicator	Assessment
2.10.8A	M8.C.1.2.1	<ul style="list-style-type: none"> • Use the Pythagorean Theorem to find the measure of a missing side of a right angle. • Identify special right triangles. • Identify and use the tangent ratio. • Identify and use the sine and cosine ratios. • Apply trig. ratios to problem solving. 	Formative Assessments: <ul style="list-style-type: none"> • Observation • Evaluate written work • Performance assessment
2.10.8B		Use indirect measurements to solve problems.	

2.11 Concepts of Calculus
Pre Algebra – Grade 8

2.11.8A			Formative Assessments: <ul style="list-style-type: none"> • Performance assessment Summative Assessments: <ul style="list-style-type: none"> • Test
2.11.8B			
2.11.8C	M8.D.1.1.1	Continue a numeric or algebraic pattern.	

ASSESSMENTS

PSSA Assessment Anchors Addressed: The teacher must be knowledgeable of the PDE Assessment Anchors and/or Eligible Content and incorporate them into this planned instruction. Current assessment anchors can be found at pde@state.pa.us.

Formative Assessments: The teacher will develop and use standards-based assessments throughout the course.

Portfolio Assessment: ____ Yes X No

District-wide Final Examination Required: X Yes ____ No

Course Challenge Assessment: To be Developed by Math Team