

Williamsville C.U.S.D. #15 Mathematics Curriculum

Program Title: Eighth Grade Pre-Algebra

Program Description: Pre-algebra contains some of the topics of algebra but also covers various junior high state standards. Students will work with concepts such as writing and solving equations, the Pythagorean Theorem, perimeter and circumference, area, volume, graphing linear equations, ratio and proportion, and polynomials.

Program Content: Pre-algebra covers concepts necessary to prepare students for high school algebra.

Program Guide

Month	Content	Skills	Learning Standards
August and September	Simplifying variable expressions, evaluating expressions, introduction to equations and inequalities	Find the values of expressions with variables	8.A.3b 6.B.3c
		Simplify variable expressions, including expressions involving the distributive property	8.A.3a 6.B.3c
		Find the value of expressions with exponents	8.A.3b 8.D.3c 6.B.3c
		Check whether a given number is a solution of an equation or inequality	8.A.3b 6.B.3c

Month	Content	Skills	Learning Standards
October	Writing and solving equations	Solve one-step equations	8.A.3b
		Solve two-step equations	8.A.3b
		Simplify and solve equations	8.A.3b
		Write algebraic expressions for real-world situations	8.C.3 8.D.3a
		Write and solve equations for real-world situations	8.A.3b 8.C.3 8.D.3a
November	Writing and solving equations	Solve equations with variables on both sides of the equal sign	8.A.3b
		Simplify and solve equations with variables on both sides of the equal sign	8.A.3b
		Write and solve real-world equations with variables on both sides	8.A.3b 8.C.3 8.D.3a
	Compare integers	Compare integers using inequality symbols	8.D.3a
		Graph the solution of a simple inequality	8.D.3a
	Operations involving integers	Add and subtract integers	6.B.3a 6.B.3c

Month	Content	Skills	Learning Standards
December	Operations involving integers	Multiply and divide integers	6.B.3a 6.B.3c
	Simplify expressions	Simplify algebraic expressions, including expressions with exponents, involving both positive and negative numbers	6.B.3c
	Solving equations	Solving equations involving positive and negative numbers	8.A.3b
	Absolute value	Determine absolute value of a number	6.B.3c
		Solve simple equations involving absolute value	6.B.3c 8.A.3b

Month	Content	Skills	Learning Standards
January	Pythagorean Theorem	Compute distances using the Pythagorean Theorem	8.D.3b 8.D.3c 6.B.3c 9.D.3
		Solve real-world problems by using the Pythagorean Theorem	8.D.3b 8.D.3c 6.B.3c 9.D.3 8.C.3
	Perimeter & circumference	Find the perimeter of various 2-dimensional shapes and apply the concepts to real-world situations	6.B.3c 7.A.3b 7.C.3b 9.A.3a 9.B.3
	Area	Find the area of various shapes such as parallelograms, triangles, trapezoids, and circles, and apply the concepts to real-world situations	6.B.3c 7.A.3b 7.C.3b 8.D.3c 9.A.3a 9.B.3

Month	Content	Skills	Learning Standards
February	3-dimensional geometry	Identify, describe, compare, and construct pyramids, prisms, cones, and cylinders, and their parts	9.A.3a 9.B.3
		Find the surface area of prisms, cylinders, pyramids, and cones, and apply the concepts in practical situations	6.B.3c 7.C.3b 8.D.3c 9.C.3b
		Find the volume of prisms, cylinders, pyramids, and cones, and apply the concepts in practical situations	6.B.3c 7.C.3b 8.D.3c 9.C.3b
	Data displays & analysis	Organize and display data in many different forms, with and without the use of technology	10.A.3a
		Read graphs critically	10.A.3a
		Make predictions based on data displays	10.A.3c 8.B.3
Compute measures of central tendency (mean, median, mode, and range)	10.A.3b		

Month	Content	Skills	Learning Standards
<p>March</p>	<p>Coordinate graphing</p>	<p>Read and graph ordered pairs of numbers on a coordinate plane</p>	<p>8.D.3a</p>
		<p>Graph linear equations with and without the use of technology</p>	<p>8.B.3 8.D.3a</p>
		<p>Find the slope of a line</p>	<p>8.C.4a</p>
	<p>Ratios & Proportions</p>	<p>Write ratios and express them in simplest form</p>	<p>6.C.3a 6.D.3</p>
		<p>Solve practical problems involving ratios</p>	<p>6.C.3a 6.D.3</p>
		<p>Solve practical problems involving proportions</p>	<p>6.D.3 8.D.3b</p>
		<p>Use proportions to find side lengths of similar polygons</p>	<p>6.D.3 9.C.3b 9.D.3</p>
<p>Use proportions to create scale drawings</p>	<p>6.D.3 7.C.3a</p>		

Month	Content	Skills	Learning Standards
April	Applications of percents	<p>Write fractions and decimals as percents</p> <p>Write percents as fractions and decimals</p> <p>Solve percent problems using proportions and equations</p> <p>Analyze data displayed as percents</p> <p>Solve problems involving percent of change</p> <p>Solve problems involving markup, discount, interest, and investment</p>	<p>6.A.3</p> <p>6.A.3</p> <p>6.C.3a 6.C.3b 6.D.3</p> <p>10.A.3a</p> <p>8.C.3</p> <p>8.C.3</p>
May	<p>Polynomials</p> <p>Probability</p>	<p>Add and subtract polynomials</p> <p>Multiply polynomials</p> <p>Square binomials</p> <p>Divide by a monomial</p> <p>Find the probability that an event will occur</p> <p>Use tree diagrams and the Fundamental Counting Principle to find the number of possible outcomes</p>	<p>6.A.4</p> <p>6.A.4</p> <p>6.A.4 6.B.3b</p> <p>6.A.4 6.B.3b</p> <p>10.C.3a</p> <p>10.C.3a</p>

Mathematics Learning Standards

State Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios, and proportions.

1. Represent fractions, decimals, percentages, and exponents in equivalent forms.
2. Solve practical computation problems involving whole numbers, integers, and rational numbers.
3. Identify and apply proportions of real numbers including pi, squares, and square roots.
4. Select computational procedures and solve problems with whole numbers, fractions, decimals, percents, and proportions.
5. Show evidence that computational results using whole numbers, fractions, decimals, percents, and proportions are correct and/or that estimates are reasonable.
6. Apply ratios and proportions to solve practical problems.

State Goal 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

1. Apply the concepts and attributes of perimeters, area, surface area, and volume in practical situations.
2. Select and apply units of measure to the degree of accuracy required.
3. Use concrete and graphic models and appropriate formulas to find perimeters, area, surface areas, and volumes of two- and three-dimensional regions.

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

1. Apply the order of operations to solve problems.
2. Solve problems using linear expressions, equations, and inequalities.
3. Use graphing technology and algebraic methods to analyze and predict linear relationships and make generalizations from linear patterns.
4. Apply the properties of numbers and operations including inverse in algebraic settings derived from economic, business, and sciences.
5. Solve problems using numeric, graphic or symbolic representations of variables, expressions, equations, and inequalities.

6. Propose and solve problems using proportions, formulas, and linear functions.
7. Apply properties of powers, perfect squares, and square roots.

State Goal 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes, and space.

1. Draw or construct three-dimensional geometric figures including prism, pyramids, cylinders, and cones.
2. Identify, describe, classify, and compare two- and three-dimensional geometric figures and models according to their properties.
3. Construct, develop, and communicate logical arguments about geometric figures and patterns.
4. Develop and solve problems using geometric relationships and models, with and without the use of technology.
5. Compute distances and lengths using proportions, the Pythagorean Theorem and its converse.

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

1. Construct, read, and interpret tables, graphs, and charts to organize and represent data.
2. Compare the mean, median, mode, and range, with and without the use of technology.
3. Test the reasonableness of an argument based on data and communicate their findings.
4. Formulate questions, devise and conduct experiments or simulations, gather data, draw conclusions, and communicate results to an audience using traditional methods and contemporary technologies.
5. Determine the probability and odds of events using fundamental counting principles.
6. Analyze problem situations and make predictions about results.

Selected References and Other Materials

Textbook:	Basic Algebra (Houghton Mifflin, 1991)
Teaching Resources:	Basic Algebra Teaching Resources (Houghton Mifflin, 1991)
Readings:	None
Films and Videotapes:	None

Audiotapes and CDS:	None
Computer Software:	None
Internet sites:	None
Equipment:	Calculators TI-73 Graphing Calculators Manipulatives
Assessment:	Homework Assignments, including writing assignments Quizzes Tests Projects & Activities