Pequea Valley School District
Math

Course: 8th Grade Pre-Algebra **Grade**: 8th

Unit: The Number System

Unit Essential Question: **How can mathematical ideas be represented?**

CONCEPT	CONCEPT	CONCEPT	CONCEPT
Rational / Irrational Numbers	**Laws of Exponents**	**Scientific Notation**	**Roots**
VOCABULARY	**VOCABULARY**	**VOCABULARY**	**VOCABULARY**
rational number (Lesson 1) real number (Lesson 10) repeating decimal (Lesson 1) terminating decimal (Lesson 1)	base (Lesson 2) exponent (Lesson 2) monomial (Lesson 3) power (Lesson 2)	scientific notation (Lesson 6)	cube root (Lesson 8) irrational number (Lesson 10) perfect cube (Lesson 8) perfect square (Lesson 8) radical sign (Lesson 8) square root (Lesson 8)
KNOW	**KNOW**	**KNOW**	**KNOW**
• Decimals/Fractions • Compare Real Numbers	• Powers and Exponents • Multiplying and Dividing Monomials • Powers of Monomials • Negative Exponents	• Scientific Notation • Compute with Scientific Notation	• Roots
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**	**UNDERSTAND**
• Write fractions as decimals and decimals as fractions. • Compare mathematical expressions.	• Write and evaluate expressions involving powers and exponents. • Simplify real number expressions by multiplying	• Use scientific notation to write large and small numbers. • Compute with numbers written in scientific	• Find square and cube roots. • Estimate square roots of non-perfect squares. • Estimate square and cube roots.

LEARNING OUTCOME • Learners will be able to write fractions as terminating and repeating decimals. • Learners will be able to compare and order real numbers.	and dividing monomials. • Use the Laws of Exponents to find powers of monomials. • Simplify expressions involving negative exponents. **LEARNING OUTCOME** • Learners will be able to write and evaluate expressions involving exponents. • Learners will be able to use the Laws of Exponents to multiply and divide monomials. • Learners will be able to use the Laws of Exponents to find the power of a power. • Learners will be able to use the Laws of Exponents to write and simplify expressions involving negative exponents.	notation. **LEARNING OUTCOME** • Learners will be able to use scientific notation to write very large and very small numbers. • Learners will be able to add, subtract, multiply, and divide numbers written in scientific notation.	**LEARNING OUTCOME** • Learners will be able to find square and cube roots. • Learners will be able to approximate an irrational number using number lines and perfect squares. • Learners will be able to estimate square roots and cube roots of non-perfect square and cubes.

Pa Core Standards:

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.
CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.

Assessments: Unit Assessment

Pacing: 20 days (including assessment)

Resources: Schoology, McGraw-Hill/Glencoe Math, ALEKS, Get More Math

Pequea Valley School District
Math

Course: 8th Grade Pre-Algebra **Grade**: 8th

Unit: Expressions and Equations

Unit Essential Question: How can you communicate mathematical ideas effectively?

CONCEPT	CONCEPT	CONCEPT
Solving Equations Variable on one side	Writing Equations	Solving Equations Variables on Both Sides
VOCABULARY	**VOCABULARY**	**VOCABULARY**
coefficient (Lesson 1) multiplicative inverse(Lesson1) properties (Lesson 2) two-step equation (Lesson 2)		identity (Lesson 5) null set (Lesson 5)
KNOW	**KNOW**	**KNOW**
• Equation Solving Steps • Rational Coefficients	• Write symbols that represent operations.	• Equations with variable on both sides.
UNDERSTAND	**UNDERSTAND**	**UNDERSTAND**
• The process of how to solve one and two-step equations with rational coefficients.	• How to identify words and phrases that mean different operations and situations.	• How to solve multi-step equations.
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to solve one and two-step equations with rational coefficients.	• Learners will be able to write two-step equations that represent real-world situations.	• Learners will be able to solve multi-step equations with variables on both sides.

Pa Core Standards:

CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations

CC.2.2.8.B.2 Understand the connections between proportional relationships, lines, and linear equations.

Assessments: Unit Assessment

Pacing: 35 days (including assessment)

Resources: Schoology, McGraw-Hill/Glencoe Math, ALEKS, Get More Math

Pequea Valley School District
Math

Course: 8th Grade Pre-Algebra **Grade**: 8th

Unit: Functions

Unit Essential Question: **How can you find and use patterns to solve real-world situations?**

CONCEPT
Relations
VOCABULARY
domain (Lesson 2) linear equation (Lesson 1) range (Lesson 2) relation (Lesson 2)
KNOW
• Representing Relationships • Relations

CONCEPT
Functions
VOCABULARY
continuous data (Lesson 4) dependent variable (Lesson 3) discrete data (Lesson 4) function (Lesson 3) function table (Lesson 3) independent variable (Lesson 3) linear function (Lesson 4) nonlinear function (Lesson 7) quadratic function (Lesson 8)
KNOW
• Functions • Linear Functions • Properties of Functions • Construct Functions • Linear and Nonlinear Functions • Quadratic Functions

CONCEPT
Qualitative Graphs
VOCABULARY
qualitative graph (Lesson 9)
KNOW
• Qualitative Graphs

UNDERSTAND	UNDERSTAND	UNDERSTAND
• Translate tables and graphs into linear equations. • Represent relations using tables and graphs.	• Find function values and complete function tables. • Represent linear functions using tables and graphs. • Compare properties of functions represented in different ways. • Find and interpret the rate of change and initial value of a function. • Determine whether a function is linear or nonlinear. • Graph quadratic functions.	• Sketch and describe qualitative graphs.
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to translate tables and graphs into linear equations. • Learners will be able to represent relations using tables and graphs.	• Learners will be able to use function tables to determine the domain and range of a function. • Learners will be able to represent linear functions using function tables and graphs. • Learners will be able to use different representations of two functions to compare functions. • Learners will be able to use multiple representations to construct functions, and identify linear and nonlinear functions. • Learners will be able to graph quadratic functions and analyze the graphs of quadratic functions.	• Learners will be able to analyze qualitative graphs.

Pa Core Standards:

CC.2.2.8.C.1 Define, evaluate, and compare functions.

CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.

Assessments: Unit Assessment

Pacing: 21 days (including assessment)

Resources: Schoology, McGraw-Hill/Glencoe Math, ALEKS, Get More Math

Pequea Valley School District
Math

Course: 8th Grade Pre-Algebra **Grade**: 8th

Unit: Geometry

Unit Essential Question: **How can you use different measurements to solve real-life problems?**

CONCEPT
Pythagorean Theorem
VOCABULARY
converse (Lesson 5) Distance Formula (Lesson 7) hypotenuse (Lesson 5) legs (Lesson 5) Pythagorean Theorem (Lesson 5)
KNOW
• Pythagorean Theorem • Coordinate Plane

CONCEPT
Transformations
VOCABULARY
center of rotation (Lesson 3) congruent (Lesson 1) dilation (Inquiry Lab before Lesson 4) image (Lesson 1) line of reflection (Lesson 2) preimage (Lesson 1) reflection (Lesson 2) rotation (Lesson 3) transformation (Lesson 1) translation (Lesson 1)
KNOW
• Translations • Reflections • Rotations • Dilations

CONCEPT
Volume
VOCABULARY
composite solids (Lesson 1) cone (Lesson 2) cylinder (Lesson 1) hemisphere (Lesson 3) sphere (Lesson 3) volume (Lesson 1)
KNOW
• Volume • Cylinder • Cone • Sphere

UNDERSTAND	UNDERSTAND	UNDERSTAND
• The process of how to use the Pythagorean Theorem to solve problems.	• The process of how to graph translations, reflections, rotations and dilations on the coordinate plane.	• The process of how to find the volume of cylinders, cones and spheres and composite solids.
LEARNING OUTCOME	**LEARNING OUTCOME**	**LEARNING OUTCOME**
• Learners will be able to use the Pythagorean Theorem and its converse to solve problems.	• Learners will be able to graph translations, reflections, rotations and dilations on the coordinate plane.	• Learners will be able to solve problems involving volume of cylinders, cones and spheres and composite solids.

Pa Core Standards:

CC.2.3.8.A.1 Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems.

CC.2.3.8.A.3 Understand and apply the Pythagorean Theorem to solve problems.

CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.

Assessments: Unit Assessment

Pacing: 49 days (including assessment)

Resources: Schoology, McGraw-Hill/Glencoe Math, ALEKS, Get More Math

Pequea Valley School District
Math

Course: 8th Grade Pre-Algebra **Grade**: 8th

Unit: Statistics and Probability

Unit Essential Question: **Why is learning mathematics important?**

CONCEPT
Scatter Plots
VOCABULARY
bivariate data (Lesson 1) line of best fit (Lesson 2) scatter plot (Lesson 1)
KNOW
• Scatter Plot • Line of Best Fit
UNDERSTAND
• How to construct and make conjectures about Scatter Plots. • How to draw lines of Best Fit and use them to make predictions about the data.

CONCEPT
Two-Way Tables
VOCABULARY
relative frequency (Lesson 3) two-way table (Lesson 3)
KNOW
• Two-way tables
UNDERSTAND
• How to construct and interpret two-way tables.

CONCEPT
Statistics & Data
VOCABULARY
distribution (Lesson 6) five-number summary (Lesson 4) mean absolute deviation (Lesson 5) qualitative data, quantitative data (Lesson 4) standard deviation (Lesson 5) symmetric (Lesson 6)
KNOW
• Measures of Central Tendency and Variation • Data Distributions
UNDERSTAND
• How to find the measures of central tendency and variation of a set of data and interpret any distributions.

LEARNING OUTCOME	LEARNING OUTCOME	LEARNING OUTCOME
• Learners will be able to construct a Scatter Plots and identify whether or not an association exists between the data. • Learners will be able to use a line of best fit to approximate the linear relationship between bivariate sets of data to make predictions.	• Learners will be able to use two-way tables and relative frequency to analyze bivariate data.	• Learners will be able to use the mean absolute deviation and the standard deviation to describe variation in a data set and use it to analyze the spread of the distribution in a set of data.

Pa Core Standards:

CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations.

CC.2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.

Assessments: Unit Assessment

Pacing: 20 days (including assessment)

Resources: Schoology, McGraw-Hill/Glencoe Math, ALEKS, Get More Math