High School (9-12)
Gateway High School
3000 Gateway Campus Blvd.
Monroeville, PA 15146
412-373-5744

Gateway School District
Curriculum Map

Curriculum Map: Mathematics

Course: College Algebra
Grade(s):12

Unit 1: Prerequisites

Brief Summary of Unit	
We use numbers every day. Sometimes we notice patterns in numbers. Using Algebra we can describe the patterns and solve problems. In this unit the rules of Algebra are reviewed. The process of modeling mathematical representations (formulas) that describe real world situations is also explored.	
Stage One—Desired Results	
Established Goals: (Standards of Learning, Content Standards) 1. Model real world situations; Write inequalities using interval and set notation; 2. Apply the laws of exponents; Convert numbers from decimal notation to scientific notation; 3. Simplify expressions containing rational exponents and radicals; 4. Add and subtract polynomials; Multiply algebraic expressions; Factoring algebraic expressions 5. Add, subtract, multiply, and divide rational expressions	
Understandings: 1. **Expressions and equations can be used to model real world situation** 2. **The degree of a polynomial determines the number of solutions** 3. **When is it appropriate to convert standard numbers into scientific notation and vice versa**	**Essential Questions:** **1.** How are expressions and equations used to model real world situations? **2.** How does the degree of a polynomial determine the number of solutions? **3.** When is it appropriate to convert standard numbers into scientific notation and vice versa?
Stage Two—Assessment Evidence	
Performance Tasks:	
Other Evidence: :(quizzes, tests and so on)	

Stage Three—Learning Plan

Unit 2: Functions

Brief Summary of Unit

In nearly every physical phenomenon observed one quantity depends on another. We use the term function to describe this dependence. In this unit the idea of a function is explored along with how functions are used to model real world situations.

Stage One—Desired Results

Established Goals: (Standards of Learning, Content Standards)

1. Define and evaluate functions. Find the Domain of a function, graph and interpret graphs using various methods. Interpret a family of Functions.
2. Determine average rate of change. Transform functions.
3. Find Maximums and minimums algebraically and graphically
4. Identify where functions are increasing and decreasing.
5. Add, Subtract, Multiply and Compose Functions
6. Find the Inverse of a function and determine if its one-to-one

Understandings:	**Essential Questions:**
1. **Functions can be used to model real world situations.**	**1.** Can you use key points of a graph to describe the nature of the graph? **2.** How are functions used to model real-world situations? **3.** List the ways in which functions can be represented to show the dependence of one quantity on another.

Stage Two—Assessment Evidence

Performance Tasks:

Other Evidence: :(quizzes, tests and so on)

Stage Three—Learning Plan

Unit 3: Polynomial functions

Brief Summary of Unit

Functions defined by polynomial expressions are called polynomial functions. Polynomial functions are easy to evaluate. The graphs of polynomial functions can increase and decrease several times. For this reason they are useful in modeling many real world situations. This unit will explore real applications in which polynomial functions are useful.

Stage One—Desired Results

Established Goals: (Standards of Learning, Content Standards)

1. Graph Polynomial Functions with and without calculator;
2. Divide Polynomials using long and synthetic division
3. Find all real zeros of Polynomial Function

Understandings:	**Essential Questions:**
1. **Polynomial Functions can be used to model real world situations.** 2. **There are many different methods for solving polynomials**	**1.** How does the nature of a polynomial determine the method of solving it? **2.** How are polynomial functions used to model real-world situations?

Stage Two—Assessment Evidence

Performance Tasks:

Other Evidence: :(quizzes, tests and so on)

Stage Three—Learning Plan

Unit 4: Matrices & Determinants

Brief Summary of Unit

Many real world situations have too many variables to be modeled by a single equation. These situations require many equations often referred to as a system of equations. A matrix is a rectangular array of numbers that is used to represent a linear system. Through the use of matrix multiplication it is possible to write a linear system as a single matrix equation. Matrix multiplication has many applications. Matrices provide an efficient way of solving linear systems.

Stage One—Desired Results

Established Goals: (Standards of Learning, Content Standards)

1. Solve Systems of Linear Equations
2. Find sums, differences and products of matrices;
3. Find the inverse of a matrix and solve equations; find determinants
4. Use Cramer's Rule to solve equations

Understandings:	**Essential Questions:**
1. **Matrices can be used to model real world situations**	**1.** How are matrices used to model real world data and to solve real world problems?

Stage Two—Assessment Evidence

Performance Tasks:
Other Evidence: :(quizzes, tests and so on)
Stage Three—Learning Plan

Unit 5: Sequences and Series

Brief Summary of Unit
A sequence is a list of numbers written in a specific order. Sequences arise in many real world situations. Two important categories of sequences are arithmetic sequences, and geometric sequences. Both are examples of a recursive sequence--a sequence in which each term (besides the first) depends on the previous term. When the terms of a sequence are summed, the result is called a series. In this unit real world uses of sequences and series are explored.
Stage One—Desired Results
Established Goals: (Standards of Learning, Content Standards) 1. Solve Systems of Linear Equations 2. Find sums, differences and products of matrices; 3. Find the inverse of a matrix and solve equations; find determinants 4. Use Cramer's Rule to solve equations

Understandings:	**Essential Questions:**
1. **Sequences and series can be used to model real world situations**	**1.** How are series and sequences used to model real world situations?

Stage Two—Assessment Evidence
Performance Tasks:
Other Evidence: :(quizzes, tests and so on)
Stage Three—Learning Plan

Unit 6: Counting and Probability

Brief Summary of Unit
Many of our everyday activities are not governed by precise rules rater they involve randomness and uncertainty. How can we model such situations? How can we find reliable patterns in random events? In this unit how the ideas of probability provide answers to these questions are presented. Today, probability is an indispensable tool for decision making in business, industry, government and

scientific research.

Stage One—Desired Results

Established Goals: (Standards of Learning, Content Standards)

1. Apply Fundamental Counting Principle
2. Use Permutations and Combinations to solve Real world problems
3. Compute Probability of an Independent Event

Understandings:	**Essential Questions:**
1. **Probability can be used to predict real world situations and describe real world outcomes**	**1.** How is probability used to predict real world outcomes?

Stage Two—Assessment Evidence

Performance Tasks:

Other Evidence: :(quizzes, tests and so on)

Stage Three—Learning Plan

Unit 7:

Brief Summary of Unit

Stage One—Desired Results

Established Goals: (Standards of Learning, Content Standards)

4.

Understandings:	**Essential Questions:**
2.	**2.**

Stage Two—Assessment Evidence

Performance Tasks:

Other Evidence: :(quizzes, tests and so on)

Stage Three—Learning Plan

Unit 8:

Brief Summary of Unit
Stage One—Desired Results
Established Goals: (Standards of Learning, Content Standards) 5.

Understandings: 3.	**Essential Questions:** **3.**

Stage Two—Assessment Evidence
Performance Tasks:
Other Evidence: :(quizzes, tests and so on)
Stage Three—Learning Plan

Unit 9:

Brief Summary of Unit
Stage One—Desired Results
Established Goals: (Standards of Learning, Content Standards) 6.

Understandings: 4.	**Essential Questions:** **4.**

Stage Two—Assessment Evidence
Performance Tasks:
Other Evidence: :(quizzes, tests and so on)

Stage Three—Learning Plan