

# Saint Patrick High School

## Curriculum Guide

<b>Department:</b>	Mathematics	<b>Grade and Level:</b>	Freshmen Phoenix
<b>Class:</b>	Pre-algebra	<b>Term (Semester or Year):</b>	Year

<b>Required Text:</b>	• None
<b>Additional Resources (i.e. texts, materials, apps, etc.):</b>	<u>iPad Apps</u> Nearpod Showbie GoodReader Educreations Geogebra  <u>Other</u> TI-84 Graphing Calculator Notebook and Looseleaf Paper Pencil iPad

### Course Description

This course will enable the Phoenix student to learn and understand the essential topics of algebra, and their applications to the world outside of the classroom. We will begin with a review of arithmetic operations and topics covered in Pre-Algebra courses, including GCF and LCM, fraction and decimal operations, and percents. Integer operations, exponents, and the order of operations will be emphasized. Solving single and multi-step equations and inequalities, as well as slope and writing the equations of lines will be covered. Students will also further develop their skills of graphing linear equations and inequalities. We will work with formulas and word problems. Logical thinking will be practiced in formulating basic mathematical skills in problem solving and applying basic algebraic concepts. There will be an emphasis on ACT Exam Preparation.

### Unit Themes

<b>Theme 1:</b>	Whole Number Operations
<b>Theme 2:</b>	Fractions, Decimals and Percents
<b>Theme 3:</b>	Integers
<b>Theme 4:</b>	Exponents
<b>Theme 5:</b>	Expressions and Equations
<b>Theme 6:</b>	Inequalities

## **Agreed Upon Assessments**

Forms of assessments may include but are not limited to....

- Mid Chapter Quizzes
- Unit Exams
- Lectures/Discussions
- Group Projects
- Presentations
- Homework Assignments
- Homework Quizzes

## **Research and Writing Expectations**

- Students are required to write detailed solutions to the exercises that they solve
- Analysis questions are also presented, where students are required to explain why a given statement or solution is true or false

## Unit 1 Whole Number Operations

### Essential Questions:

- What are efficient methods for finding sums and differences?
- What are efficient methods for finding products and quotients?
- How are the four operations related to one another?

### Learning Targets:

Students will be able to...:

- add, subtract, multiply and divide single digit numbers
- add, subtract, multiply and divide double digit numbers
- add, subtract, multiply and divide triple digit numbers

### Academic Standards Addressed (CCSS):

- *CCSS.MATH.CONTENT.4.NBT.B.4*  
Fluently add and subtract multi-digit whole numbers using the standard algorithm.
- *CCSS.MATH.CONTENT.5.NBT.B.5*  
Fluently multiply multi-digit whole numbers using the standard algorithm.
- *CCSS.MATH.CONTENT.6.NS.B.2*  
Fluently divide multi-digit numbers using the standard algorithm.

### Common Assessments:

- Assignments
- Quizzes
- MCQ 1
- Unit Test 1

## Unit 2: Fractions, Decimals and Percents

### Essential Questions:

- How can fractions be modeled, compared and ordered?
- How does computation with rational numbers compare to whole numbers?
- How are common fractions, decimals and percents alike and different?

### Learning Targets:

Students will be able to...:

- Add and subtract fractions with like denominators, and simplify
- Add and subtract fractions with unlike denominators, and simplify

- Multiply and divide fractions and simplify
- Add, subtract, multiply and divide decimals up to the thousandths place
- Convert between fractions, decimals and percents
- Find GCF and LCM of a set of numbers

## Academic Standards Addressed (CCSS):

- *CCSS.MATH.CONTENT.4.NF.B.3.A*  
Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
- *CCSS.MATH.CONTENT.4.NF.B.3.C*  
Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
- *CCSS.MATH.CONTENT.5.NF.A.1*  
Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
- *CCSS.MATH.CONTENT.5.NF.B.6*  
Solve real world problems involving multiplication of fractions and mixed numbers,
- *CCSS.MATH.CONTENT.6.NS.A.1*  
Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions
- *CCSS.MATH.CONTENT.5.NBT.B.7*  
Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- *CCSS.MATH.CONTENT.6.RP.A.3.C*  
Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
- *CCSS.MATH.CONTENT.6.NS.B.4*  
Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.

## Common Assessments:

- Assignments
- Quizzes
- MCQ 2
- Unit Test 2

## Unit 3: Integers

## Essential Questions:

- How do negative numbers relate to positive numbers?
- In what cases will a sum or difference of integers be positive or negative?
- In what cases will a product or quotient of integers be positive or negative?

## Learning Targets:

Students will be able to...:

- plot positive and negative numbers on a number line
- add, subtract, multiply and divide integers up to three digits
- add, subtract, multiply and divide negative fractions and decimals

## Academic Standards Addressed (CCSS):

- *CCSS.MATH.CONTENT.6.NS.C.5*  
Understand that positive and negative numbers are used together to describe quantities having opposite directions or values
- *CCSS.MATH.CONTENT.6.NS.C.6.C*  
Find and position integers and other rational numbers on a horizontal or vertical number line diagram
- *CCSS.MATH.CONTENT.7.NS.A.1.D*  
Apply properties of operations as strategies to add and subtract rational numbers.
- *CCSS.MATH.CONTENT.7.NS.A.2.C*  
Apply properties of operations as strategies to multiply and divide rational numbers.

## Common Assessments:

- Assignments
- Quizzes
- MCQ 3
- Unit Test 3

## Unit 4: Exponents

### Essential Questions:

- How can I represent repeated multiplication efficiently?
- How can I use the rules of exponents to simplify expressions?
- How does a negative exponent affect an expression?

## Learning Targets:

Students will be able to...:

- convert between exponent and expanded form
- efficiently list the first 20 perfect squares
- efficiently list the first 10 powers of 2
- efficiently list the first 5 powers of 3
- efficiently list any power of 10
- use the product property, power property and quotient property to simplify expressions
- simplify expressions with negative or zero exponents

## Academic Standards Addressed (CCSS):

- *CCSS.MATH.CONTENT.6.EE.A.1*  
Write and evaluate numerical expressions involving whole-number exponents.
- *CCSS.MATH.CONTENT.8.EE.A.1*  
Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- *CCSS.MATH.CONTENT.8.EE.A.3*  
Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities

## Common Assessments:

- Assignments
- Quizzes
- MCQ 4
- Unit Test 4

## Unit 5: Expressions and Equations

### Essential Questions:

- What is the correct order for performing mathematical operations?
- How can expressions be written to indicate an order for operations?
- How does changing the order of operations affect the outcome when simplifying an expression?
- How do I determine the best numerical representation (pictorial, symbolic, objects) for a given situation?
- How is thinking algebraically different from thinking arithmetically?
- How do I use algebraic expressions to analyze or solve problems?
- How do the properties contribute to algebraic understanding?
- What is meant by equality?
- How do I know when a result is reasonable?
- What is the relationship between solving problems and computation?

### Learning Targets:

Students will be able to...:

- represent situations using variables
- solve one step equations
- solve two step equations
- solve multi-step equations
- solve equations with variables on both sides of the equal sign
- check their solutions to an equation
- solve equations with no or infinitely many solutions
- simplify expressions using the order of operations that require 2, 3, 4 or 5 steps
- use the distributive property to simplify numerical expressions involving grouping symbols

## Academic Standards Addressed (CCSS):

- *CCSS.MATH.CONTENT.6.EE.A.3*  
Apply the properties of operations to generate equivalent expressions.
- *CCSS.MATH.CONTENT.7.EE.A.1*  
Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- *CCSS.MATH.CONTENT.7.EE.B.4*  
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.
- *CCSS.MATH.CONTENT.8.EE.C.7*  
Solve linear equations in one variable.
- *CCSS.MATH.CONTENT.HSA.CED.A.1*  
Create equations and inequalities in one variable and use them to solve problems.
- *CCSS.MATH.CONTENT.HSA.CED.A.4*  
Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- *CCSS.MATH.CONTENT.HSA.REI.A.1*  
Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- *CCSS.MATH.CONTENT.8.EE.C.7*  
Solve equations and inequalities in one variable.
- *CCSS.MATH.CONTENT.HSA.REI.B.3*  
Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- *CCSS.MATH.CONTENT.HSA.SSE.A.1*  
Interpret expressions that represent a quantity in terms of its context.

## Common Assessments:

- Assignments
- Quizzes
- MCQ 5
- Unit Test 5

## Unit 6: Inequalities

## Essential Questions:

- How does solving an inequality compare with solving an equation?
- What are the different types of inequalities?
- How do I represent the solution to an inequality on the number line?

## Learning Targets:

Students will be able to...:

- solve one step inequalities
- solve two step inequalities
- solve multi step inequalities
- solve inequalities with variables on both sides of the inequality
- solve inequalities with no or infinitely many solutions
- graph the solutions to inequalities on a number line

## Academic Standards Addressed (CCSS):

- *CCSS.MATH.CONTENT.HSA.CED.A.1*  
Create equations and inequalities in one variable and use them to solve problems.
- *CCSS.MATH.CONTENT.8.EE.C.7*  
Solve equations and inequalities in one variable.
- *CCSS.MATH.CONTENT.HSA.REI.B.3*  
Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

## Common Assessments:

- Assignments
- Quizzes
- MCQ 6
- Unit Test 6