

**COURSE DESCRIPTION  
POINT ARENA HIGH SCHOOL**

**I. DESCRIPTION**

<b>COURSE TITLE AND LEVEL:</b>	<b>ALGEBRA ENRICHMENT, SECONDARY</b>
<b>LENGTH OF COURSE:</b>	<b>ONE YEAR</b>
<b>AVAILABLE TO STUDENTS AT GRADE:</b>	<b>FRESHMAN</b>
<b>PREREQUISITES:</b>	<b>NONE</b>
<b>REQUIRED OR ELECTIVE:</b>	<b>ELECTIVE</b>

**II. GOALS AND OBJECTIVES**

Point Arena High School's Algebra Enrichment (Pre-Algebra) class will be offered to those students who need more skill building before they enter the Algebra I class. The class will touch on a variety of topics including number sense, understanding fractions, solving linear equations, intro to geometry, statistics, and business math. Algebra Enrichment is a mathematics support course for Algebra I. The course provides students with additional time to build the foundations necessary for high school math courses, while concurrently having access to rigorous, grade-level appropriate courses. The five critical areas of Algebra Enrichment align with the critical areas of Algebra I: Relationships between Quantities and Reasoning with Equations; Linear and Exponential Relationships; Descriptive Statistics; Expressions and Equations; and Quadratic Functions and Modeling. However, whereas Algebra I contains exclusively grade-level content, Algebra Enrichment combines standards from high school courses with foundational standards from the middle grades. Algebra Enrichment is designed as a support course for Algebra I.

**III. METHODS OF INSTRUCTION**

**A Review of Number Sense and Algebra Fundamentals**

- Use place value to compare whole numbers and decimals
- Fraction review
  - Find the GCF and LCM
  - Convert fractions and decimals
- Real numbers and Mathematical Operations
  - Apply basic operations with positive and negative numbers
  - Apply basic operations with fractions and decimals
  - Apply the Order of Operations
- Calculate percents
  - Markups and Discounts
  - Tips
  - Percent of Change
  - Interest
- Convert between decimal form and scientific notation

**Fundamentals of Mathematical Modeling**

- Working with Formulas
- Ratios and Proportions
- Word Problem Strategies

### **Applications of Algebraic Modeling**

- Models and Patterns in Plane Geometry
  - Perimeter and Area of:
    - Rectangles
    - Circles
    - Triangles
  - Introduction to Right Triangle relationships
- Models and Patterns in Art, Architecture, and Nature
  - symmetry
  - scale drawing
  - triangle similarity
- Models and Patterns in Music

### **Graphing**

- Plotting points on the coordinate plane
- Finding solutions to a Linear Equation
- Graphing Linear Equations
  - slope
  - intercepts
  - horizontal and vertical lines
  - parallel and perpendicular lines

### **Functions**

- Domain and Range
- Function Notation
- Linear Functions as Models
- Direct and Inverse Variation
- Introduce Quadratic Functions as Models
- Use of Graphing Calculators to represent graphs of functions

### **Mathematical Models in Science (See Appendix L of the NGSS for additional connections)**

Science is a quantitative discipline, so it is important for educators to ensure that students' science learning coheres well with their learning in mathematics. Some connections to science are listed.

#### **HS.PS1 Matter and Its Interactions**

Science examples: (1) Recognize the difference between intensive and extensive quantities (e.g., a quantity with units of Joules per kilogram is insensitive to the overall size of the sample in question, unlike a quantity with units of Joules). (2) Attend to units properly when using formulas such as density = mass/volume, etc. (3) Carefully format data displays and graphs, attending to origin, scale, units, and other essential items.

#### **HS.PS2 Motion and Instability: Forces and Interactions**

Science examples: (1) Relate the units of acceleration ( $m/s^2$ ) to the fact that acceleration refers to a change in velocity over time. (2) Reconstruct the units of the universal gravitational constant  $G$  by reference to the formula  $F = Gm_1m_2/r^2$ , instead of having to memorize the units. (2) Attend to units properly when using formulas such as momentum = mass times velocity, etc. (3) Carefully format data displays and graphs, attending to origin, scale, units, and other essential items.

#### **HS.PS3 Energy**

Science examples: (1) Analyze units in expressions like  $mgh$  and  $\frac{1}{2}mv^2$  to show that they both refer to forms energy. (2) Observe in a range of situations within science that quantities being added to one another or subtracted from one another are always quantities of the same general kind (energy, length, time, temperature, etc.); express such terms in the same units before adding or subtracting. (3) Carefully format data displays and graphs, attending to origin, scale, units, and other essential items

#### **Modeling with Systems of Equations**

- Solving Systems by Graphing
- Solving Systems Algebraically
- Applications of Linear Systems

#### **Probability Models**

- Sets and Set Theory
- What is Probability?
- Theoretical Probability
- Odd
- Tree Diagrams
- *Or* Problems
- *And* Problems

#### **Modeling with Statistics**

- Intro to Stats
- Frequency Tables and Histograms
- Reading and Interpreting Graphical Information
- Scatter Diagrams and Linear Regression

#### **IV. METHODS OF EVALUATION**

- Informal / Formal Assessments
- Benchmarks and Finals through Illuminate
- Critical Friends / Peer Review Protocol
- Knows, Need to Knows, Next Steps

#### **V. TEXTBOOKS**

- **Fundamentals of Algebraic Modeling, An Introduction to Mathematical Modeling with Algebra and Statistics**, Sixth Edition, Timmons, Johnson, McCook