Stockton Unified School District

EDISON HIGH SCHOOL

Home of the Vikings

SUSD

Essential Outcomes Chart: What is it we expect students to learn?

Grade:	9-12	Subject:	POE	Semester	1 & 2	Team Members:	Hill

Standard Description	Example Rigor	Prerequisite Skills	Common Assessment	When Taught?	Extension Standards
What is the essential standard to be learned? Describe in student-friendly vocabulary.	**What does proficient student work look like? Provide an example and/or description.**	**What prior knowledge, skills, and/or vocabulary is/are needed for a student to master this standard?**	**What assessment(s) will be used to measure student mastery?**	**When will this standard be taught?**	**What will we do when students have learned the essential standard(s)?**
Mechanisms **Essential Outcome #1** **B5.3 Compare and explore the six simple machines and their applications.** **B5.5 Formulate and solve problems by using the appropriate units applied in mechanical,** ~~electrical, fluid, and thermal~~ **engineering systems.**	Correct calculations of mechanical advantage, gear ratios, work, power and efficiency of various simple and complex machines, properly labeled sketches of mechanisms, with correctly documented measure forces and distances.	Strong algebra skills, able to solve multi-step equations, can apply the engineering design process, know proper notetaking strategies.	Quiz on each simple machine.	August/ September/ October	Project applying the design process to design, build and test a simple machine.
Electric Circuits **Essential Outcome #2** **B3.2 Analyze relationships between voltage, current, resistance, and power related to direct DC circuits.** **B3.3 Calculate, construct, measure, and interpret** ~~both AC and~~ **DC circuits**. **B5.5 Formulate and solve problems by using the appropriate units applied in** ~~mechanical,~~ **electrical,** ~~fluid, and thermal~~ **engineering systems.**	Correctly applies Ohm's and Kirchoff's Laws to solve series and parallel circuits, including resistance, current and voltage. Correctly creates a circuit from a given schematic and uses a multimeter to measure resistance, current and voltage.	Strong algebra skills, must be able to solve a system of equations.	Quiz on series and parallel circuits.	October/ November	Design a system to convert solar power to mechanical power.

Control Systems **Essential Outcome #3** **B8.1 Identify the elements and processes necessary to develop a controlled system that performs a task.** **B8.2 Demonstrate the use of sensors for data collection and process correction in controlled systems.** **B8.3 Perform tests, collect data, analyze relationships, and display data in a simulated or modeled system using appropriate tools and technology.** **B8.4 Program a computing device to control systems or process.** **B8.5 Use motors, ~~solenoids,~~ and similar devices as output mechanisms in controlled systems.** **B8.6 Assemble input, processing, and output devices to create controlled systems capable of accurately completing a preprogrammed task.** **B6.6 Construct a prototype from plans and test it.** **B6.7 Evaluate and redesign a prototype on the basis of collected test data.**	Record, analyze and interpret data from digital and analog devices. Compare and contrast open and closed loop systems. Create a flowchart, pseudocode, and computer program to implement an algorithm.	Be able to apply the engineering design process, know proper notetaking strategies.	Programming Quiz. Apply the design process to design, build, and test a control system using input and output devices.	December/ January/ February	Apply the design process to redesign, a control system into a closed loop.
Energy **Essential Outcome #4** **B5.5 Formulate and solve problems by using the appropriate units applied in ~~mechanical, electrical,~~ fluid, and thermal engineering systems.** **B4.3 Compare the effects and applications of heat transfer and thermal dynamic processes.**	Differentiates among conduction, convection and radiation in the transfer of thermal energy and calculates the rate of energy transfer between two systems. Distinguish between hydraulic and pneumatic power.	Strong algebra skills, must be able to solve a system of equations.	Quizzes on thermodynamics and fluid power.	February/ March	Incorporate a fluid power component into a system.

	Calculates flow rate, flow velocity, power and mechanical advantage in a fluid power system. Correctly applies ideal gas laws to calculate values in a pneumatic system.				
Statics **B4.1 Describe Newton's laws and how they affect and define the movement of objects.** **B4.2 Explain how the laws of conservation of energy and momentum provide a way to predict and describe the movement of objects.**	Accurate sketches of free body diagrams, with external and internal forces labeled and calcuated, calculations of centroids, moment of inertia, beam deflection, moments and torque.	Strong algebra skills, must be able to solve a system of equations.	Quizzes on centroids and moment of inertia/beam deflection	April/May	Design a bridge that will withstand a predetermined load at the least cost.