Content:	**Grade or Course:**	**Date Developed:**
Physical Science	Foundations of Physics	6/26/2018

Overview:

Foundations of Physics is a one-semester, project-based introduction to physics intended to cover all of the physics proficiency standards required for graduation from CHRHS. This course provides a conceptual introduction to the most important physics concepts. Content is learned and practiced through hands-on activities, with an emphasis on how physics concepts relate to the "real-world." The focus of the course will be energy, including studies of topics related to electrical energy, solar energy, kinetic energy, and elastic energy. This course does not meet the requirements of a "lab science credit" as defined by colleges and universities.

Essential Questions:

How can scientific models be used to describe and quantify the nature and interactions of matter and energy?

What are the similarities and differences between the various modes of energy?

How do the modes of energy interact and affect each other?

How are physics principles relevant to everyday life?

EO's addressed to proficiency level:

Students will understand, demonstrate, and be evaluated on the following Scientific Practices:

- Asking Questions and Defining Problems
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Using Math and Computational Thinking
- Obtaining, Evaluating, and Communicating Information

Standards:

Students will understand and use the following additional Scientific Practices:

- Developing and Using Models
- Constructing Explanations and Designing Solutions
- Engaging in Argument over Evidence

Students will understand and use the following Cross-Cutting Concepts:

- Patterns
- Cause and effect: Mechanism and explanation
- Scale, proportion, and quantity
- Systems and system models
- Energy and matter
- Stability and change

Students will understand, use, and be evaluated on the following Disciplinary Core Ideas:

- Students will understand that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. (*HS-PS2-1)*)
- Students will design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. (HS-PS2-3)
- Students will understand that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). (*HS-PS3-2*)
- Students will design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (*HS-PS3-3*)
- Students will understand that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. (*HS-PS4-3*)
- Students will understand the effects that different frequencies of electromagnetic radiation have when absorbed by matter. (*HS-PS4-4*)
- Students will understand that some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information or energy. (*HS-PS4-5*)

Units:

Unit 1	**Introduction - Energy**
Unit 2	**Electrical Energy**
Unit 3	**Solar Energy**
Unit 4	**Kinetic Energy: Motion**
Unit 5	**Kinetic Energy: Newton's Laws of Motion**
Unit 6	**Elastic Energy and Impulse**
Unit 7	**Final Project: Solar Boat**

EO Assessments:

- Buoyancy Activity
- Solar Boat Project