

Physical Science/Block – High School

COURSE DESCRIPTION: This course provides students with instruction in the nature of science, including scientific processes, the scientific method, and scientific inquiry. It covers safety in the lab and the field, principles for conducting experiments, and the need for scientific communication. The course then covers the atomic nature of matter, classification of the elements, the periodic table, acids, and bases. Next, students are introduced to energy. They learn what energy is and the various forms of energy. They explore energy transformations and specifically discuss the production of electricity. The course discusses energy in motion, with emphasis on defining work, power, velocity, acceleration, forces, and gravity. Students learn about Newton's laws of motion and simple machines and have the opportunity to design their own machine using the basic principles of physics. Finally, the course discusses the composition and structure of the universe, the life cycles of stars, and space exploration.

COURSE OBJECTIVES:

- Describe the nature of science and apply knowledge of the nature of science.
- Conduct scientific experiments and communicate the results in appropriate ways.
- Describe and apply the processes of science, such as making observations, asking questions, formulating hypotheses, analyzing data, and making inferences.
- Describe the atomic nature of matter and explain how elements are classified.
- Define and give examples of acids, bases, solutions, mixtures, and compounds.
- Define energy and differentiate various forms of energy.
- Explain energy in motion and describe forces, velocity, acceleration, work, power, and the use of simple machines.
- Describe how energy travels in waves and describe wave phenomena.
- Describe chemical reactions and discuss them in terms of conservation of mass and energy.
- Describe nuclear reactions, forms of energy transformation, and the energy crisis.
- Explain the generation of electricity and magnetism.
- Describe the composition and structure of the universe.
- Describe the life cycle of a star.
- Explain past achievements and future goals for space exploration.

PREREQUISITES: None

COURSE LENGTH: Two Semesters

REQUIRED TEXT: No required text for this course.

MATERIALS LIST: [Physics Materials List](#) (Click to download)

COURSE OUTLINE:

Unit 1: Scientific Nature

- Section A: Scientific Nature
- Section B: Scientific Process
- Section C: The Scientific Method
- Section D: Characteristics of Science
- Section E: Scientific Belief, Laws, and Theories

Unit 2: Scientific Inquiry

- Section A: Experimental Design
- Section B: Technological Design
- Section C: Organizing Data
- Section D: Evaluating Experiments and Communicating Results

Unit 3: Matter, Energy, and Change

- Section A: The Properties of Matter
- Section B: Changes in Matter
- Section C: What Is Energy?
- Section D: Energy Transformations and Conservation

Unit 4: Elements, Compounds, and Mixtures

- Section A: Atomic Theory
- Section B: Classification of Elements
- Section C: Compounds and Bonds
- Section D: Acids and Bases
- Section E: Solutions and Mixtures

Unit 5: Energy in Motion

- Section A: Motion
- Section B: Forces and the Force of Gravity
- Section C: Newton's Laws of Motion
- Section D: Fluids

Semester 1 Exam

Unit 6: Machines

- Work and Power
- Simple Machines
- Compound Machines

Unit 7: Electricity and Magnetism

- Electricity
- Electric Current and Circuits
- Magnets and Electromagnets
- Electromagnetic Induction

Unit 8: Waves

- Modeling Waves
- Behavior of Waves
- Sound
- Light and The Electromagnetic Spectrum

Unit 9: Chemical Reactions

- Types of Reactions
- Conservation of Matter and Energy

- Nuclear Reactions

Unit 10: The Universe

- Composition and Structure
- Life Cycle of Stars
- Measuring Distance
- Space Exploration

Semester 2 Exam