

Physical Science- Part A

COURSE DESCRIPTION: Students explore the relationship between matter and energy by investigating force and motion, the structure of atoms, the structure and properties of matter, chemical reactions, and the interactions of energy and matter. Students develop skill in measuring, solving problems, using laboratory apparatuses, following safety procedures, and adhering to experimental procedures. Students focus on inquiry-based learning, with hands-on laboratory investigations and virtual laboratory experiences.

PREREQUISITES: Middle school Physical Science, or equivalent

COURSE LENGTH: One Semester

REQUIRED TEXT: Physical Science: A Laboratory Guide

MATERIALS LIST: No required materials for this course

COURSE OUTLINE:

Unit 1: Matter and Energy

- Semester Introduction
- Dimensions: Distance, Time, and Mass
- Matter, Energy, and the Scientific Method
- Creating and Analyzing Graphs
- Laboratory: Drop and Bounce 1
- Laboratory: Drop and Bounce 2

Unit 2: Forces and Motion

- Describing and Measuring Motion
- Acceleration
- Forces
- Laboratory: Drop and Bounce Revisited
- Newton's First Law of Motion
- Newton's Second Law of Motion
- Newton's Third Law of Motion

- Laboratory: Mass in Motion 1
- Laboratory: Mass in Motion 2

Unit 3: Application of Forces

- Friction
- Gravity
- Gravity and Motion
- Forces and Vectors
- Laboratory: Net Force 1
- Laboratory: Net Force 2

Unit 4: Fluid Forces

- Pressure
- Buoyancy
- Laboratory: Density and Buoyancy 1
- Laboratory: Density and Buoyancy 2
- Pascal's Principle
- Bernoulli's Principle
- Laboratory: Shapes and Fluid Forces 1
- Laboratory: Shapes and Fluid Forces 2

Unit 5: Energy

- Energy
- Energy Change
- Potential and Kinetic Energy
- Laboratory: Pendulum 1
- Laboratory: Pendulum 2
- Laboratory: Elasticity 1
- Laboratory: Elasticity 2
- Heat Energy
- How Energy Moves
- Laboratory: Heat Transfer 1
- Laboratory: Heat Transfer 2
- Laboratory: Design a Thermos 1

- Laboratory: Design a Thermos 2

Unit 6: Work

- Work
- Simple Machines and Mechanical Advantage
- Power
- Laboratory: Levers 1
- Laboratory: Levers 2
- Laboratory: Pulleys 1
- Laboratory: Pulleys 2

Unit 7: Waves

- Introduction to Waves
- Properties of Waves
- Wave Energy
- Transverse and Longitudinal Waves
- Laboratory: Waves 1
- Laboratory: Waves 2
- Sound
- Frequency, Wavelength, and Pitch
- Laboratory: Doppler Effect 1
- Laboratory: Doppler Effect 2

Unit 8: Light

- Light
- Speed of Light
- Reflection and Refraction
- Electromagnetic Spectrum
- Color

Unit 9: Electricity

- Electricity and Magnetism
- Laboratory: Electric Motor 1
- Laboratory: Electric Motor 2

- Circuits

Unit 10: Semester Review and Test

- Semester Review
- Semester Test