

Physical Science – MS/Part A

COURSE DESCRIPTION: The Physical Science program introduces students to many aspects of the physical world, focusing first on chemistry and then on physics. The course provides an overview of the physical world and gives students tools and concepts to think clearly about matter, atoms, molecules, chemical reactions, motion, force, momentum, work and machines, energy, waves, electricity, light, and other aspects of chemistry and physics. Among other subjects, students study the structure of atoms; the elements and the Periodic Table; chemical reactions; forces, including gravitational, motion, acceleration, and mass; and energy, including light, thermal, electricity, and magnetism.

COURSE OBJECTIVES:

- Describe through hands-on and virtual exploration the many aspects of the physical world, focusing on chemistry and physics.
- Utilize tools and concepts to think critically about matter, atoms, molecules, chemical reactions, motion, force, momentum, work and machines, energy, waves, electricity, magnetism and light.
- Explain the structure of atoms, the elements and the Periodic Table, and the basis of what makes chemical reactions.
- Experiment with forces, including gravitational force, motion, acceleration, and mass.
- Research and apply key ideas about energy, including light, thermal energy, electricity, and magnetism.

PREREQUISITES: None

COURSE LENGTH: One Semester

REQUIRED TEXT: No required textbook for this course.

REQUIRED MATERIALS LIST

COURSE OUTLINE:

Module 1: Intro to Physical Science

- Lesson 1: Intro to Physical Science
- Lesson 2: Physical Systems
- Lesson 3: Measurement and the SI
- Lesson 4: Investigation 1
- Lesson 5: Making a Kilodollar

- Lesson 6: Investigation 2
- Lesson 7: Investigation 3
- Lesson 8: Model Problems
- Lesson 9: Scientific Methods
- Lesson 10: Experimental Design
- Lesson 11: Scientific Sources
- Lesson 12: Data Collection
- Lesson 13: Data Analysis
- Lesson 14: Reporting Conclusions
- Lesson 15: Create a Display
- Lesson 16: Oral Presentation
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 2: Matter

- Lesson 1: Matter
- Lesson 2: Atoms
- Lesson 3: A Model of an Atom
- Lesson 4: Atomic and Mass Numbers
- Lesson 5: Labeling an Atom
- Lesson 6: Periodic Table and Elements
- Lesson 7: Design of the Periodic Table
- Lesson 8: Boiling and Melting Points
- Lesson 9: Molecules
- Lesson 10: Molecules for Good Health
- Lesson 11: Properties of Matter
- Lesson 12: Investigation 4
- Lesson 13: States of Matter
- Lesson 14: Investigation 5
- Lesson 15: Physical and Chemical Changes
- Lesson 16: Investigation 6
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 3: Chemistry

- Lesson 1: Chemistry
- Lesson 2: Chemical Reactions
- Lesson 3: Chemical Formulas
- Lesson 4: Rates of Chemical Reactions
- Lesson 5: Investigation 7
- Lesson 6: Chemical Equations
- Lesson 7: A Balancing Act
- Lesson 8: Investigation 8
- Lesson 9: Investigation 9
- Lesson 10: Solutions
- Lesson 11: Investigation 10
- Lesson 12: Substances
- Lesson 13: Investigation 11
- Lesson 14: Investigation 12
- Lesson 15: Acids and Bases
- Lesson 16: Investigation 13
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 4: Motion and Newton's Laws

- Lesson 1: Motion and Newton's Laws
- Lesson 2: Motion
- Lesson 3: Calculating Speed
- Lesson 4: Speed and Velocity
- Lesson 5: Measuring Speed and Velocity
- Lesson 6: Changing Velocity Math
- Lesson 7: Investigation 14
- Lesson 8: Investigation 15
- Lesson 9: Newton's Second Law of Motion
- Lesson 10: Investigation 16
- Lesson 11: Acceleration
- Lesson 12: Investigation 17
- Lesson 13: Balanced and Unbalanced Forces
- Lesson 14: Newton's Math

- Lesson 15: Investigation 18
- Lesson 16: Investigation 19
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 5: Force and Momentum

- Lesson 1: Motion and Newton's Laws Lesson 1: Force and Momentum
- Lesson 2: Force
- Lesson 3: Gravitational Force
- Lesson 4: Friction
- Lesson 5: Investigation 20
- Lesson 6: Free Body Diagrams
- Lesson 7: Investigation 21
- Lesson 8: Buoyant Forces
- Lesson 9: Investigation 22
- Lesson 10: Spring Force
- Lesson 11: Investigation 23
- Lesson 12: Momentum
- Lesson 13: Momentum and Newton's Laws
- Lesson 14: Momentum and Collisions
- Lesson 15: Momentum and Collision Math
- Lesson 16: Module Review
- Lesson 17: Module Exam
- Lesson 18: Portfolio

[Course Asset Credits](#)

Physical Science – MS/Part B

COURSE DESCRIPTION: The Physical Science program introduces students to many aspects of the physical world, focusing first on chemistry and then on physics. The course provides an overview of the physical world and gives students tools and concepts to think clearly about matter, atoms, molecules, chemical reactions, motion, force, momentum, work and machines, energy, waves, electricity, light, and other aspects of chemistry and physics. Among other subjects, students study the structure of atoms; the elements and the Periodic Table; chemical reactions; forces, including gravitational, motion, acceleration, and mass; and energy, including light, thermal, electricity, and magnetism.

COURSE OBJECTIVES:

- Describe through hands-on and virtual exploration the many aspects of the physical world, focusing on chemistry and physics.
- Utilize tools and concepts to think critically about matter, atoms, molecules, chemical reactions, motion, force, momentum, work and machines, energy, waves, electricity, magnetism and light.
- Explain the structure of atoms, the elements and the Periodic Table, and the basis of what makes chemical reactions.
- Experiment with forces, including gravitational force, motion, acceleration, and mass.
- Research and apply key ideas about energy, including light, thermal energy, electricity, and magnetism.

PREREQUISITES: None

COURSE LENGTH: Two Semesters

REQUIRED TEXT: No required textbook for this course.

[REQUIRED MATERIALS LIST](#)

COURSE OUTLINE:

Module 6: Work and Machines

- Lesson 1: Work and Machines
- Lesson 2: Investigation 1
- Lesson 3: Work and Power Math
- Lesson 4: Simple Machines
- Lesson 5: Investigation 2

- Lesson 6: Compound Machines
- Lesson 7: Work and Changes in Energy
- Lesson 8: Kinetic Energy
- Lesson 9: Investigation 3
- Lesson 10: Potential Energy
- Lesson 11: Investigation 4
- Lesson 12: KE and PE Math
- Lesson 13: Mechanical Energy Conservation
- Lesson 14: Investigation 5
- Lesson 15: Investigation 6
- Lesson 16: Conservation of Energy Math
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 7: Energy

- Lesson 1: Energy
- Lesson 2: Thermal Energy
- Lesson 3: Investigation 7
- Lesson 4: Investigation 8
- Lesson 5: Temperature and Heat
- Lesson 6: Investigation 9
- Lesson 7: Investigation 10
- Lesson 8: First Law of Thermodynamics
- Lesson 9: Steam and Engines
- Lesson 10: Fossil Fuels
- Lesson 11: Hybrid Vehicles
- Lesson 12: Solar and Wind Energy
- Lesson 13: Nuclear Energy
- Lesson 14: Plants and Photosynthesis
- Lesson 15: Chemical Energy in Food
- Lesson 16: The Body and its Energy
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 8: Mechanical Waves

- Lesson 1: Mechanical Waves
- Lesson 2: Investigation 11
- Lesson 3: Search for Mechanical Waves
- Lesson 4: Transverse and Longitudinal
- Lesson 5: Waves Math
- Lesson 6: Seismic Waves
- Lesson 7: Interference and Diffraction
- Lesson 8: Investigation 12
- Lesson 9: Investigation 13
- Lesson 10: How Your Ear Works
- Lesson 11: Natural Frequency and Resonance
- Lesson 12: Sound Waves Math
- Lesson 13: What is Frequency
- Lesson 14: Ultrasound and Infrasound
- Lesson 15: Doppler Effect
- Lesson 16: Supersonic and Sonic Booms
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 9: Light

- Lesson 1: Light
- Lesson 2: Electromagnetic Waves and Fields
- Lesson 3: Interference of Light
- Lesson 4: Electromagnetic Spectrum
- Lesson 5: Radio and Microwaves
- Lesson 6: Infrared
- Lesson 7: X-rays and UV and Gamma Rays
- Lesson 8: Investigation 14
- Lesson 9: Index of Refraction
- Lesson 10: Investigation 15
- Lesson 11: How Light Moves
- Lesson 12: Investigation 16
- Lesson 13: Convex and Concave Mirrors

- Lesson 14: Lenses
- Lesson 15: Investigation 17
- Lesson 16: Your Eye
- Lesson 17: Module Review
- Lesson 18: Module Exam

Module 10: Electricity and Magnetism

- Lesson 1: Electricity and Magnetism
- Lesson 2: Electric Charge
- Lesson 3: Investigation 18
- Lesson 4: Electric Currents
- Lesson 5: Investigation 19
- Lesson 6: Electric Circuits
- Lesson 7: Investigation 20
- Lesson 8: Investigation 21
- Lesson 9: Magnetism
- Lesson 10: Investigation 22
- Lesson 11: Electricity and Magnets
- Lesson 12: Investigation 23
- Lesson 13: Investigation 24
- Lesson 14: Motors and Generators
- Lesson 15: The World's Energy
- Lesson 16: Module Review
- Lesson 17: Module Exam
- Lesson 18: Portfolio

[Course Asset Credits](#)