PHYSICAL SCIENCE EXPLORED

Scope & Sequence

This Physical Science course introduces students to the fundamentals of chemistry and physics through engaging lessons and hands-on activities. Students will explore the structure of matter, chemical reactions, solutions, and nuclear changes before diving into motion, forces, energy, waves, electricity, and magnetism. They will develop problem-solving skills while learning how scientific principles apply to the world around them. By the end of the course, students will have a strong foundation in physical science, preparing them for further studies in chemistry and physics.

Lesson 1: Introduction to Physical Science

- What is Physical Science?
- Scientific Method

Lesson 2: Measurements and Unit Conversions

- SI vs. English Unit Systems
- Unit Conversions Using the Factor-Label Method

Lesson 3: Tools for Scientific Study

- Accuracy and Precision
- Scientific Notation

Lesson 4: Classification and Properties of Matter

- Matter, Mass, and Weight
- Pure Substances and Mixtures
- Physical and Chemical Properties and Changes

Lesson 5: Density & States of Matter

- Calculating Density
- States of Matter and their Properties
- Phase Changes

Lesson 6: Structure of the Atom

- Subatomic Particles
- Bohr Models

Lesson 7: Introducing the Periodic Table

- Reading the Periodic Table
- Identifying Periods, Groups, and Types of Elements

Lesson 8: Stability and Types of Bonding

- Valence Electrons and Dot Diagrams
- Ionic, Covalent, and Metallic Bonding

Lesson 9: Exam 1

Lesson 10: Reading and Writing Chemical Formulas

- Understanding Chemical Formulas
- Writing Chemical Formulas from Names

Lesson 11: Naming Ionic Compounds

- Fixed and Variable Charged Ions
- Naming Ionic Compounds

Lesson 12: Names and Formulas for Molecular Compounds

- Why Do Nonmetals Have Different Charges?
- Naming and Writing Formulas for Molecular Compounds

Lesson 13: Balancing Chemical Equations

- Law of Conservation of Mass
- Reading & Balancing Chemical Equations

Lesson 14: Types of Chemical Reactions

Identifying Types of Reactions: Synthesis, Decomposition, Single Replacement, Double Replacement, and Combustion

Lesson 15: Solutions

Categories of Matter
Solubility and Types of Solutions
Calculating Molarity

Lesson 16: Acids and Bases

Properties of Acids and Bases
Strength of Acids and Bases
Neutralization Reactions

Lesson 17: Nuclear Changes

Radioactivity
Types of Nuclear Decay
Introduction to Half-Life

Lesson 18: Exam 2

Lesson 19: Describing Motion

Velocity and Motion
Speed Calculations
Velocity Graphs

Lesson 20: Acceleration

What is Acceleration?
Acceleration Calculations
Acceleration Graphs

Lesson 21: Newton's 1st and 2nd Laws

Inertia (Newton's 1st Law)
Net Force (Newton's 2nd Law)
Force Diagrams

Lesson 22: Gravity and Projectile Motion

- Calculating Force of Gravity
- Force Diagrams
- Projectile Motion

Lesson 23: Newton's 3rd Law

- Action and Reaction Forces
- Momentum & Change in Momentum
- Momentum Calculations

Lesson 24: Work and Power

- Mechanical Work
- Calculating Power

Lesson 25: Exploring Energy, Heat, and Temperature

- Introduction to Mechanical Energy
- Potential & Kinetic Energy
- Heat & Temperature

Lesson 26: Simple Machines

- What is a Simple Machine?
- Types of Simple Machines

Lesson 27: Exam 3

Lesson 28: Introduction to Waves

- Transverse vs. Longitudinal Waves
- Parts of a Wave
- Graphing Waves

Lesson 29: Properties of Sound Wave

- Speed of Sound
- Loudness & Intensity
- Frequency & Pitch
- Human Hearing

Lesson 30: Light and Color

Properties of Light Waves
The Electromagnetic Spectrum
How We See Color

Lesson 31: Wave Behaviors

Reflection, Refraction, and Diffraction
Reflection & Refraction Diagrams

Lesson 32: Exploring Electrical Charge

Electrical Charge
Movement of Electrons: friction, conduction, & induction
Electric Force
Electric Field Line

Lesson 33: Electric Circuits

How do Circuits Work?
Circuit Diagrams
Series vs Parallel Circuits

Lesson 34: Magnetism

Properties of Magnets
Permanent vs Temporary Magnets
Magnetic Field Diagrams
Earth's Magnetic Field

Lesson 35: Exam 4