

Options EHS Physical Science B Scope and Sequence
2020

Unit Lesson Objectives

Atoms, Elements, and the Periodic Table

Atoms

Describe the parts of an atom.

Identify the masses, locations, and charges of protons, neutrons, and electrons.

Elements

Examine the properties of an element.

Describe what an isotope is and explain how isotopes of the same element are different.

Explain how ions form.

Periodic Table

Examine the history of the periodic table.

Describe the organization of the periodic table.

Determine an element's symbol, atomic number, and mass number from the periodic table.

Metals

Describe the characteristic properties of metals.

Identify the location of metals in the periodic table.

Explain how and why the reactivity of metals changes in the periodic table.

Nonmetals

Describe the characteristic properties of nonmetals.

Identify the location of nonmetals in the periodic table.

Explain how and why the reactivity of nonmetals changes in the periodic table.

Metalloids

Unit Lesson

Objectives

Describe the characteristic properties of metalloids.

Identify the location of metalloids in the periodic table.

Explain why most metalloids are used as semiconductors.

Unit Test

Bonding

Compounds

Describe the defining characteristics of a compound.

Explain how chemical formulas represent compounds.

Determine the number of atoms of each element in a chemical formula.

Use models to visualize the chemical structure of a compound.

Chemical Bonding

Explain why atoms bond.

Identify the three types of bonds.

Complete electron dot diagrams.

Ionic Bonds

Describe characteristics of ionic bonds.

Explain how ionic bonds form.

Identify the properties of ionic compounds.

Unit Lesson

Objectives

Give examples of ionic compounds.

Covalent Bonds

Describe characteristics of covalent bonds.

Explain how covalent bonds form.

Identify the properties of covalent compounds.

Give examples of covalent compounds.

Polymers

Explain the formation of polymers.

Describe the uses of natural and synthetic polymers.

Examine the benefits and limitations of using synthetic polymers.

Unit Test

Solutions and Other Mixtures

Solubility

Define solubility and recognize that substances have different solubilities.

Describe types of solutions.

Identify factors that affect the solubility of a substance.

Describe factors that affect the rate of dissolving.

Mixtures

Distinguish between substances and mixtures.

Unit Lesson

Objectives

Identify the properties of a mixture.

Compare and contrast types of mixtures.

water

Water and Wind Erosion

Identify features that are formed by water erosion and deposition.

Identify causes of groundwater erosion.

Explain how glaciers and waves cause erosion and deposition.

Describe the effects of wind erosion and deposition.

Properties of Water

Describe how the structure of water accounts for its polarity.

Explain why water has unique properties including high surface tension and a high boiling point.

Describe the unique role of water in chemical and biological systems.

Science Practice: Explain how the chemistry of water is important to biological systems.

pH

Describe the self-ionization of water.

Define pH and pOH.

Convert between pH and hydrogen ion concentration, and between pOH and hydroxide ion concentration.

Convert between pH and pOH, and between hydrogen ion concentration and hydroxide ion concentration.

Use the pH scale to characterize the acidity and basicity of solutions.

Science Practice: Solve scientific problems involving pH using logarithmic functions.

pH

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Unit Lesson

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The Water Cycle

Describe the steps of the water cycle.

Explain the relationship between living organisms and the water cycle.

Identify possible sources of water contamination.

Test

Electricity and Magnetism

Electric Charge

Determine how electric charges interact.

Explain how electrons cause objects to become electrically charged.

Analyze the factors that affect the strength of an electric force.

Describe the electric field due to a charge.

Electric Current

Explain how an electric current is produced.

Explain the relationship between voltage and an electric current.

Describe resistance and how it affects current.

Distinguish between conductors, superconductors, semiconductors, and insulators.

Ohm's Law

Unit Lesson

Objectives

Explain the relationship between current, voltage, and resistance (Ohm's law).

Calculate the voltage, current, or resistance given the other two quantities.

Electric Circuits

Explain how a circuit functions.

Interpret the electric symbols for the parts of a circuit.

Identify open and closed circuits.

Contrast series and parallel circuits.

Magnets and Magnetism

Describe the properties of magnets.

Determine how magnetic poles interact with each other.

Illustrate the magnetic field around a magnet.

Describe Earth's magnetic field.

Electromagnetism

Indicate how magnetism is produced by electric currents.

Explain how an electric current is produced by a magnet.

Describe the characteristics of solenoids and electromagnets.

Applications of
Electromagnetism

Identify uses of electromagnets.

Explain how an electric motor uses a magnetic force to cause motion.

Describe how a generator works.

Contrast direct current with alternating current.

Unit	Lesson	Objectives
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Lab: Magnetic and Electric Fields

Demonstrate and describe magnetic fields.

Demonstrate and describe electric fields.

Show how magnetic and electric fields are related.

Unit Test

Waves and Sound

Introduction to Waves

Define waves and explain how they carry energy.

Distinguish between mechanical waves and electromagnetic waves.

Compare and contrast transverse waves and longitudinal waves.

Properties of Waves

Describe how a wave's amplitude is related to the energy the wave carries.

Describe the relationship between the frequency and wavelength of a wave.

Calculate the speed of a transverse wave.

Explain why waves travel at different speeds.

Use mathematical representations to show relationships among the frequency, wavelength, and speed of waves traveling in various media.

Wave Interactions

Explain what happens when waves interact.

Describe how a wave's direction is changed by reflection, refraction, and diffraction.

Differentiate between constructive and destructive interference.

Sound Waves

Unit Lesson

Objectives

Describe how sound waves are produced and how they travel.

Identify the features of a sound wave.

Explain how different materials and different temperatures affect the speed of sound waves.

Unit Test

Light

The Electromagnetic Spectrum

Describe the different parts of the electromagnetic spectrum.

Distinguish how electromagnetic waves differ from one another.

Identify how different types of electromagnetic waves are used.

Properties of Light

Describe the wave and particle models of light.

Explain what happens when light interacts with objects.

Recognize what determines the color of an object.

Reflection and Mirrors

Explain how light is reflected from a surface.

Describe the law of reflection.

Describe how a mirror forms an image.

Identify the types of images formed by different kinds of mirrors.

Refraction and Lenses

Explain how light is refracted when it passes from one medium to another.

Describe how a lens forms an image.

Unit Lesson

Objectives

Analyze ray diagrams for a lens.

Identify the types of images formed by different kinds of lenses.

Unit Test

Cumulative Exam

Cumulative Exam Review

Cumulative Exam