

Options EHS Physical Science B-OR		Scope and Sequence
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		
		Describe the characteristic properties of metalloids.

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		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.
		Give examples of ionic compounds.
	Covalent Bonds	

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		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	
Chemical Reactions		
	Introduction to Chemical Reactions	
		Recognize that a chemical reaction is a chemical change.
		Describe the evidence that shows that a chemical reaction has occurred.
		Explain the difference between an endothermic and an exothermic reaction.
	Describing Chemical Reactions	
		Identify the parts of a chemical equation.
		Describe the law of conservation of mass.
		Explain how mass is conserved in chemical equations.
	Balancing Chemical Equations	
		Explain what it means for a chemical equation to be balanced.

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		Demonstrate how to balance a chemical equation.
		Relate balanced chemical equations to the law of conservation of mass.
	Types of Chemical Reactions	
		Distinguish among the types of chemical reactions.
		Predict the product of each type of chemical reaction.
	Lab: Rate of Chemical Reactions	
		Describe the signs of a chemical reaction.
		Identify how temperature and surface area affect the rate of a chemical reaction.
		Science Practice: Conduct several controlled tests of multiple variables using repeated trials during an investigation about chemical reaction rate.
	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.
		Identify the properties of a mixture.
		Compare and contrast types of mixtures.
	Properties of Acids and Bases	
		Compare the properties of acids and bases.

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		Describe common uses for acids and bases.
	Acids and Bases in Solution	
		Describe what happens when acids and bases are put in water.
		Classify acids and bases based on strength.
		Explain how pH can be used to identify an acid or base.
		Summarize what happens during a neutralization reaction.
	Lab: Acids and Bases	
		Show how pH is based on the concentration of H ⁺ and OH ⁻ in solution.
		Determine the pH of various solutions using a multi-use indicator.
	Unit Test	
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	

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		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.
	Water Resources	
		Describe the importance of water.
		Explain how Earth's water is distributed and used.
		Explain how water resources are managed.
	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.
	Lab: Absorption and Radiation by Land and Water	
		Examine how the angle of sunlight affects heat absorption in the different climate regions.
		Compare and contrast the absorption of heat by land and water surfaces.
	Test	
	Electricity and Magnetism	
	Electric Charge	
		Determine how electric charges interact.
		Explain how electrons cause objects to become electrically charged.

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Electric Current		Analyze the factors that affect the strength of an electric force.
		Describe the electric field due to a charge.
		Explain how an electric current is produced.
		Explain the relationship between voltage and an electric current.
		Describe resistance and how it affects current.
Ohm's Law		Distinguish between conductors, superconductors, semiconductors, and insulators.
		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.

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		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.
	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.

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		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	
		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.
	Using Sound	
		Explain how and why animals use echolocation.
		Describe the uses of ultrasound technology.
		Summarize the ways in which sound waves are used for communication.
	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	

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		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.
		Analyze ray diagrams for a lens.
		Identify the types of images formed by different kinds of lenses.
	Using Light	
		Describe how magnifying glasses, microscopes, telescopes, and cameras work.
		Differentiate laser light from regular light and identify uses of lasers.
		Identify uses of fiber optics.
	Unit Test	
	Cumulative Exam	
	Cumulative Exam Review	
	Cumulative Exam	