Options EHS Physics B-OR	Scope and Sequence
Unit Lesson	**Objectives**
Waves and Sound	
Introduction to Waves	
	Define waves and explain how they carry energy.
	Differentiate mechanical and electromagnetic waves.
	Compare and contrast transverse waves and longitudinal waves.
	Identify everyday examples of transverse and longitudinal waves.
Wave Properties	
	Identify and describe the properties of transverse and longitudinal waves.
	Analyze the relationship between wavelength, frequency, and wave speed.
	Solve problems involving wavelength, frequency, and wave speed.
	Identify factors that affect wave speed.
	Use mathematical representations to show relationships among the frequency, wavelength, and speed of waves traveling in various media.
Wave Interactions	
	Distinguish between absorption, transmission, reflection, refraction, and diffraction.
	Compare and contrast constructive and destructive interference.
	Identify everyday examples of wave interactions.
Sound Waves	
	Analyze how sounds are created and propagated.
	Identify and describe properties of sound waves.
	Examine how the Doppler effect applies to sound waves.
Radio Waves and Applications	

Options EHS Physics B-OR	Scope and Sequence
Unit Lesson	**Objectives**
	Identify and describe technological uses of radio waves.
	Analyze how radio waves are modified for use in different technologies.
	Explain why antennas are needed for technological devices that use radio waves.
Unit Test	
Waves and Light	
Electromagnetic Waves	
	Identify and compare the different regions of the electromagnetic spectrum.
	Solve problems involving frequency, wavelength, speed, and energy.
	Identify uses and applications of electromagnetic waves.
Dual Nature of Light	
	Describe and give evidence for the dual nature of light.
	Examine the photoelectric effect.
	Calculate the energy of a photon.
Reflection and Refraction	
	Differentiate between reflection and refraction.
	Use the law of reflection to make predictions.
	Apply Snell's law to solve problems.
	Analyze and interpret ray diagrams.
Mirrors	
	Distinguish between plane, concave, and convex mirrors.
	Interpret ray diagrams to predict the location, type, orientation, and size of an image formed by a mirror.
	Solve problems involving mirrors.

Options EHS Physics B-OR		Scope and Sequence
Unit	**Lesson**	**Objectives**
	Lenses	
		Distinguish between concave and convex lenses.
		Interpret ray diagrams to predict the location, type, orientation, and size of an image formed by a lens.
		Solve problems involving lenses.
	Diffraction	
		Analyze how light waves bend around objects.
		Identify everyday examples of diffraction.
		Solve problems involving diffraction.
	Lab: Waves and Diffraction	
		Demonstrate diffraction and explain why it occurs.
		Describe the relationship between wavelength, gap width, and diffraction.
		Solve problems involving diffraction.
	Unit Test	
Electricity		
	Electrostatics	
		Analyze the relationship between electric charge and electric force.
		Distinguish between conductors and insulators.
		Examine charging by friction, conduction, and induction.
	Coulomb's Law	
		Examine the factors that affect the electric force between two objects.
		Solve problems using Coulomb's law.
		Compare electric force with gravitational force.

Options EHS Physics B-OR		Scope and Sequence
Unit	**Lesson**	**Objectives**
	Electric Fields	
		Describe the electric field due to a charge.
		Analyze and interpret electric field lines.
		Solve problems involving the electric field, charge, and force on an object.
	Ohm's Law	
		Examine current, resistance, and voltage.
		Solve problems involving current, charge, and time.
		Use Ohm's law to calculate voltage, current, or resistance.
	Electric Circuits	
		Interpret circuit diagrams.
		Identify circuits as open, closed, or short.
		Compare and contrast parallel and series circuits.
		Apply Ohm's law to calculate voltage, current, or resistance in a parallel or series circuit.
	Lab: Circuit Design	
		Construct series and parallel circuits.
		Use Ohm's law to calculate current, voltage, and resistance.
		Calculate the power used by elements in a circuit.
	Unit Test	
Magnetism and Electromagnetism		
	Magnets and Magnetism	
		Distinguish between temporary and permanent magnets.
		Determine how magnetic poles interact with each other.

Options EHS Physics B-OR		Scope and Sequence
Unit	**Lesson**	**Objectives**
		Examine how magnetic domains are aligned in a magnet.
		Analyze the magnetic field around a magnet.
	Magnetic Field and Force	
		Analyze the magnetic field produced by a current-carrying wire.
		Use the right-hand rule to determine the direction of the magnetic field in a current-carrying wire.
		Apply the right-hand rule to determine the direction of the magnetic force on a charge.
		Solve problems involving magnetic force.
	Electromagnetic Induction	
		Indicate how magnetism is produced by electric currents.
		Examine how an electric current is produced by a magnet.
		Identify the characteristics of solenoids and electromagnets.
	Lab: Electromagnetic Induction	
		Recognize that a moving magnet can induce an electric field, causing current to flow in a loop of wire.
		Examine how magnetic polarity affects the direction of induced current in a loop of wire.
	Applications of Electromagnetic Induction	
		Explain how an electric motor uses a magnetic force to cause motion.
		Examine how a generator works.
		Analyze how a transformer reduces voltage.
	Unit Test	
Nuclear and Modern Physics		
	Radioactivity	
		Distinguish between alpha, beta, and gamma decay.

Options EHS Physics B-OR		Scope and Sequence
Unit	**Lesson**	**Objectives**
		Use the half-life concept to describe the rate of decay of an isotope.
		Identify technological applications of radioactive decay.
		Determine possible problems associated with radioactive decay.
	Lab: Half-Life Model	
		Use a model to investigate half-life.
		Interpret a graph showing the decay of a radioactive substance.
	Fission and Fusion	
		Compare and contrast nuclear fission and nuclear fusion.
		Explain nuclear fission and nuclear fusion in terms of mass-energy equivalence.
		Identify applications of nuclear fission and nuclear fusion.
	Special Applications of Nuclear and Wave Phenomena	
		Identify examples of applications of atomic and nuclear phenomena such as radiation therapy and diagnostics.
		Describe the role of wave characteristics and behaviors in medical and industrial applications.
	Atomic Spectra	
		Outline the historical development of the atomic theory.
		Understand the concepts of emission and absorption spectra.
		Compare and explain the emission spectra produced by various atoms.
		Define spectroscopy and its applications.
	Periodic Trends	
		Use the periodic table to predict trends in atomic radii and ionic radii.
		Use the periodic table to identify and explain periodic trends in ionization energy.
		Use the periodic table to identify trends in electronegativity and electron affinity.

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Unit	**Lesson**	**Objectives**
		Science Practice: Given two elements, make predictions that compare their radii, ionization energy, electronegativity, and/or electron affinity.
	Origin and Evolution of the Universe	
		Examine evidence for the big bang theory.
		Describe the evolution of the universe.
		Distinguish between the different types of stars and their life cycles.
		Analyze how stellar spectra are used to identify the composition and motion of a star.
	Nanotechnology	
		Define nanotechnology.
		Explain the role of quantum mechanics in nanotechnology.
		Explain the role of nanotechnology in applications such as medicine, electronics, and new biomaterials.
	Solid State Physics	
		Define the study of solid-state physics.
		Explain the relationship between solid-state physics and quantum mechanics, crystallography, electromagnetism, materials science, and metallurgy.
		Define superconductivity.
		Explain how cooled, solid mercury led to the discovery of superconductivity.
	Unit Test	
Cumulative Exam		
	Cumulative Exam Review	
	Cumulative Exam	