PHYSICS

UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
ALL	**Strand 1**: Inquiry Process **Concept 1**: Observations, Questions & Hypotheses	PO 1. Evaluate scientific information for relevance to a given problem. PO 2. Develop questions from observations that transition into testable hypotheses. PO 3. Formulate a testable hypothesis. PO 4. Predict the probable outcome of an investigation based on the hypothesis using statistical evidence, probability, and modeling (not guessing or inferring).		Vocabulary Labs		Biology Earth Science Physics

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
ALL	**Strand 1**: Inquiry Process **Concept 2**: Scientific Testing (Investigating and Modeling)	PO 1. Demonstrate safe and ethical procedures (e.g., use and care of technology, materials, organisms) and behavior in all science inquiry. PO 2. Identify the resources needed to conduct an investigation. PO 3. Design an appropriate protocol (written plan of action) for testing a hypothesis. • Identify dependent and independent variables in a controlled investigation. • Determine an appropriate method for data collection (e.g., using balances, thermometers, microscopes, spectrophotometer, using qualitative changes). • Determine an appropriate method for recording data (e.g., notes, sketches, photographs, videos, journals (logs), charts, computers/ calculators). PO 4. Conduct a scientific investigation that is based on a research design. PO 5. Record observations, notes, sketches, questions, and ideas using tools such as journals, charts, graphs, and computers.		Lab Safety Labs		Biology Earth Science Physics

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
ALL	**Strand 1**: Inquiry Process **Concept 3**: Analysis, Conclusions, and Refinement	PO 1. Interpret data that show a variety of possible relationships between variables, including: • positive relationship • negative relationship • no relationship PO 2. Evaluate whether investigational data support or do not support the proposed hypothesis. PO 3. Critique reports of scientific studies (e.g. published papers, student reports). PO 4. Evaluate the design of an investigation to identify possible sources of procedural error, including: • sample size • trials • controls • analyses PO 5. Design models (conceptualor physical) of the following to represent "real world" scenarios: • carbon cycle • water cycle • phase change • collisions PO 7. Propose further investigations based on the findings of a conducted investigation.		Labs		Biology Earth Science Physics

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
ALL	**Strand 1**: Inquiry Process **Concept 4**: Communication	PO 1. For a specific investigation, choose an appropriate method for communicating the results. PO 2. Produce graphs of data that communicate data. PO 3. Communicate results clearly and logically. PO 4. Support conclusions with logical scientific arguments.				Biology Earth Science Physics
ALL	**Strand 2**: History and Nature of Science **Concept 1**: History of Science as a Human Endeavor	PO 1. Describe how human curiosity and needs have influenced science, impacting the quality of life worldwide. PO 2. Describe how diverse people and/or cultures, past and present, have made important contributions to scientific innovations. PO 3. Evaluate the contributions of early cultures to scientific knowledge and technological inventions. PO 4. Analyze how specific changes in science have affected society. PO 5. Analyze how specific cultural and/or societal issues promote or hinder scientific advancements.	*Connections* videos (James Burke) *To Engineer Is Human* video *NOVA* videos Miscellaneous videos			Biology Earth Science Physics Humanities

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
ALL	**Strand 2**: History and Nature of Science **Concept 2**: Nature of Scientific Knowledge	PO 1. Specify the requirements of a valid, scientific explanation (theory), including that it be: • logical • subject to peer review • public • respectful of rules of evidence PO 2. Explain the process by which accepted ideas are challenged or extended by scientific innovation. PO 3. Distinguish between pure and applied science. PO 4. Describe how scientists continue to investigate and critically analyze aspects of theories.		Lessons: • Newton's Laws • Conservation of Energy • Conservation of Momentum Labs Project: • Ping-Pong Launcher		Biology Earth Science Physics Humanities

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
MECHANICS: Motion (Weeks 1-3)	**Strand 5**: Physical Science **Concept 2**: Motions and Forces	PO 1 Determine the rate of change of a quantity (e.g., rate of erosion, rate of reactions, rate of growth, velocity). PO 2. Analyze the relationships among position, velocity, acceleration, and time: • graphically • mathematically PO 6. Analyze the two-dimensional motion of objects by using vectors and their components. PO 7. Give an example that shows the independence of the horizontal and vertical components of projectile motion.		Lessons • Vectors • Motion Labs Project: • Ping-Pong Launcher		Math Humanities: Space Program Cold War P.E. Anatomy & Physiology Auto Tech Sports

PHYSICS

UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
MECHANICS: Newton's Laws (Weeks 4-6)	**Strand 5**: Physical Science **Concept 2**: Motions and Forces	PO 3. Explain how Newton's 1st law applies to objects at rest or moving at constant velocity. PO 4. Using Newton's 2nd Law of Motion, analyze the relationships among the net force acting on a body, the mass of the body, and the resulting acceleration: • graphically • mathematically PO 5. Use Newton's 3rd Law to explain forces as interactions between bodies (e.g., a table pusing up on a vase that is pushing down on it; an athlete pushing on a basketball as the ball pushes back on her). PO 9. Represent the force conditions required to maintain static equilibrium. PO 10. Describe the nature and magnitude of frictional forces.		Lessons • Newton's Laws Labs Project: • Ping-Pong Launcher		Math Chemistry Humanities: Space Program Cold War P.E. Anatomy & Physiology Auto Tech Sports
MECHANICS: Momentum & Energy (Weeks 7-9)	**Strand 5**: Physical Science **Concept 2**: Motions and Forces	PO 13. Analyze the impulse required to produce a change in momentum. PO 14. Quantify interactions between objects to show that the total momentum is conserved in both collision and recoil situations.		Lessons • Energy • Momentum Labs Project: • Rockets		Math Chemistry P.E. Anatomy & Physiology Auto Tech Sports

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
MECHANICS: Momentum & Energy (Weeks 7-9)	**Strand 5**: Physical Science **Concept 3**: Conservation of Energy and Increase in Disorder	PO 1. Describe the following ways in which energy is stored in a system: • mechanical • electrical • chemical • nuclear PO 2. Describe various ways in which energy is transferred from one system to another (e.g., mechanical contact, thermal conduction, electromagnetic radiation). PO 3. Recognize that energy is conserved in a closed system. PO 4. Calculate quantitative relationships associated with the conservation of energy. PO 5. Analyze the relationship between energy transfer and disorder in the universe (2nd Law of Thermodynamics).		Lessons • Energy • Momentum Labs Project: • Rockets		Math Chemistry P.E. Anatomy & Physiology Auto Tech Sports
MECHANICS: Momentum & Energy (Weeks 7-9)	**Strand 5**: Physical Science **Concept 5**: Interactions of Energy and Matter	PO 1. Describe various ways in which matter and energy interact (e.g., photosynthesis, phase change).		Lessons • Energy Labs Project: • Rockets		Math Chemistry P.E. Anatomy & Physiology Auto Tech Sports

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
MECHANICS: Circular Motion & Gravity (Week 10)	**Strand 5**: Physical Science **Concept 2**: Motions and Forces	PO 8. Analyze the general relationships among force, acceleration, and motion for an object undergoing uniform circular motion. PO 11. Using the Law of Universal Gravitation, predict how the gravitational force will change when the distance between two masses changes or the mass of one of them changes.		Lessons • Circular Motion • Gravitation Labs		Math Humanities: Space Program
WAVE MOTION (Weeks 11-14)	**Strand 5**: Physical Science **Concept 5**: Interactions of Energy and Matter	PO 2. Describe the following characteristics of waves: • wavelength • frequency • period • amplitude PO 3. Quantify the relationships among the frequency, wavelength, and the speed of light.		Lessons • Wave Motion Labs		Math Art Photography
ELECTRICITY & MAGNETISM (Week 15)	**Strand 5**: Physical Science **Concept 5**: Interactions of Energy and Matter	PO 8. Describe the relationship among electric potential, current, and resistance in an ohmic system. PO 9. Quantify the relationships among electric potential, current, and resistance in an ohmic system.		Lessons • Electricity Labs		Math Auto Tech

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UNIT	STRAND/ CONCEPT	P.O.	RESOURCES	ACTIVITIES	MATERIALS/ SUPPLIES	LINKAGES
ELECTRICITY & MAGNETISM (Week 15)	**Strand 5**: Physical Science **Concept 2**: Motions and Forces	PO 12. Using Coulomb's Law, predict how the electrical force will change when distance or charge changes.		Lessons • Electricity		Math
ELECTRICITY & MAGNETISM (Week 15)	**Strand 5**: Physical Science **Concept 1**: Structure and Properties of Matter	PO 5. Describe the properties of electric charge and the conservation of electric charge.		Lessons • Electricity		Math
NUCLEAR (Weeks 16-18)	**Strand 5**: Physical Science **Concept 1**: Structure and Properties of Matter	PO 6. Describe the following features and components of the atom: • protons • neutrons • electrons • mass • number and type of particles • structure • organization PO 8. Explain the details of atomic structure (e.g., electron configuration, energy levels, isotopes).	Misc. Videos	Lessons • Nuclear Physics/ Chemistry Labs		Chemistry Humanities: WW II Cold War