

Phy Sci 14 Atoms (Chemistry)

Main Idea: Electron patterns and outermost energy levels.

Standard: HS-PS1-1 Matter and Its Interactions.

Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Phy Sci 15 The Periodic Table (Chemistry)

Main Idea: Chemical reaction explanations.

Standard: HS-PS1-2 Matter and Its Interactions.

Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, knowledge of the patterns of chemical properties, and formation of compounds.

Phy Sci 17 Chemical Reactions (Chemistry)

Main Idea: Conservation of atoms and mass during chemical reaction.

Standard: HS-PS1-7 Matter and Its Interactions.

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Phy Sci 21 Nuclear Changes (Chemistry)

Main Idea: Fission, fusion, and radioactive decay.

Standard: HS-PS1-8 Matter and Its Interactions.

Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

Phy Sci 22 Motion (Physics)

Main Idea: Second Law of Motion.

Standard: HS-PS2-1 Motion and Stability: Forces and Interactions.

Analyze data and use it to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

Phy Sci 23 Forces (Physics)

Main Idea: Force on macroscopic object.

Standard: HS-PS2-3 Motion and Stability: Forces and Interactions.

Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

Phy Sci 24 Work and Energy I (Physics)

Main Idea: Total System Momentum.

Standard: HS-PS2-2 Motion and Stability: Forces and Interactions.

Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

Phy Sci 25 Work and Energy II (Chemistry)

Main Idea: Energy conversion.

Standard: HS-PS3-3 Energy.

Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

Phy Sci 27 Waves (Physics)

Main Idea: Frequency, Length, and Speed of Waves.

Standard: HS-PS4-1 Waves and Their Applications in Technologies for Information Transfer.

Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

Phy Sci 31 Sound and Light I (Physics)

Main Idea: Electromagnetic radiation.

Standard: HS-PS4-3 Waves and Their Applications in Technologies for Information Transfer.

Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

Phy Sci 32 Sound and Light II (Physics)

Main Idea: Electromagnetic Radiation Absorbtion.

Standard: HS-PS4-4 Waves and Their Applications in Technologies for Information Transfer.

Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.

Phy Sci 34 Electricity (Physics)

Main Idea: Electric current and magnetism.

Standard: HS-PS2-5 Motion and Stability: Forces and Interactions.

Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

Phy Sci 35 Magnetism (Physics)

Main Idea: Forces due to electric and magnetic fields.

Standard: HS-PS3-5 Energy.

Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.

Phy Sci 38 Using Nat Res I (Earth & Space Science)

Main Idea: Properties of water and its effects on Earth.

Standard: HS-ES2-5 Earth's Systems.

Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

Phy Sci 42 Planet Earth I (Earth & Space Science)

Main Idea: Earth's formation and early history.

Standard: HS-ES1-6 Earth's Place in the Universe.

Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.

Phy Sci 44 The Solar System I (Earth & Space Science)

Main Idea: Motion of orbiting objects in the solar system.

Standard: HS-ES1-4 Earth's Place in the Universe.

Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

Phy Sci 46 The Universe I (Earth & Space Science)

Main Idea: The sun's place in relation to the Milky Way galaxy.

Standard: HS-ES1-2 Earth's Place in the Universe.

Develop models to describe the sun's place in relation to the Milky Way galaxy and the distribution of galaxies and galaxy clusters in the Universe.

Phy Sci 99 AP Physics (Physics)

Main Idea: Newton's Law of Gravitation and Coulomb's Law.

Standard: HS-PS2-4 Motion and Stability: Forces and Interactions.

Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.

Phy Sci 99 AP Physics (Physics)

Main Idea: Change in energy calculations.

Standard: HS-PS3-1 Energy.

Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.

Phy Sci 99 AP Physics (Physics)

Main Idea: Stored energy and motions of particles.

Standard: HS-PS3-2 Energy.

Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.

Phy Sci 99 AP Physics (Physics)

Main Idea: Frequency, wavelength, and speed of waves.

Standard: HS-PS4-1 Waves and Their Applications in Technologies for Information Transfer.

Use mathematical representations to describe relationships among the frequency, wavelength, and speed of waves.

Phy Sci 99 AP Physics (Physics)

Main Idea: Digital transmission pros and cons.

Standard: HS-PS4-2 Waves and Their Applications in Technologies for Information Transfer.

Evaluate questions about the advantages and disadvantages of using a digital transmission and storage of information.

Phy Sci 99 AP Physics (Physics)

Main Idea: Technological devices measuring wave behavior and interactions with matter.

Standard: HS-PS4-5 Waves and Their Applications in Technologies for Information Transfer.

*Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.**

Bio 14 Cell Organization (Life Science)

Main Idea: Organizational hierarchy within multicellular organisms.

Standard: HS-LS1-2 From Molecules to Organisms: Structure and Processes.

Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Bio 15 Plant Cells (Life Science)

Main Idea: Photosynthesis and light energy.

Standard: HS-LS1-5 From Molecules to Organisms: Structure and Processes.

Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy

Bio 16 Prokaryotic and Eukaryotic Cells (Life Science)

Main Idea: Cycling of matter and flow of energy.

Standard: HS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics.

Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

Bio 17 Mitosis and Cytokinesis (Life Science)

Main Idea: Cellular division (mitosis) and differentiation in complex organisms.

Standard: HS-LS1-4 From Molecules to Organisms: Structure and Processes.

Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

Bio 18 DNA and Heredity (Life Science)

Main Idea: Relationship of DNA and specialized cells.

Standard: HS-LS1-1 From Molecules to Organisms: Structure and Processes.

Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

Bio 19 Genes Genetics and Chromosomes (Life Science)

Main Idea: DNA and chromosomes trait instructions.

Standard: HS-LS3-1 Heredity: Inheritance and Variation of Traits.

Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

Bio 22 Animal Classification (Life Science)

Main Idea: Variation and distribution of expressed traits in a population.

Standard: HS-LS3-3 Heredity: Inheritance and Variation of Traits.

Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

Bio 23 Interdependence of Living Things (Life Science)

Main Idea: Cycling of carbon.

Standard: HS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics.

Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

Bio 24 Theory of Evolution (Life Science)

Main Idea: Inheritable genetic variations.

Standard: HS-LS3-2 Heredity: Inheritance and Variation of Traits.

Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.

Bio 26 Adaptation (Life Science)

Main Idea: Complex interactions in ecosystems.

Standard: HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics.

Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

Bio 27 Populations and Genetics (Life Science)

Main Idea: Factors affecting biodiversity and populations in ecosystems.

Standard: HS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics.

Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

Bio 31 Darwin, Evolution and Fossils (Life Science)

Main Idea: Increases in organisms with advantageous heritable traits.

Standard: HS-LS4-3 Biological Unity and Diversity.

Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

Bio 32 Animal Characteristics (Life Science)

Main Idea: Natural selection and adaptation.

Standard: HS-LS4-4 Biological Unity and Diversity.

Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

Bio 33 Animal Behaviors (Life Science)

Main Idea: Group & individual survival behavior.

Standard: HS-LS2-8 Ecosystems: Interactions, Energy, and Dynamics.

Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.

Bio 34 Science Observation and Measure (Life Science)

Main Idea: Carrying capacity of ecosystems at different scales.

Standard: HS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics.

Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

Bio 35 Science Models (Life Science)

Main Idea: Cellular respiration.

Standard: HS-LS1-7 From Molecules to Organisms: Structure and Processes.

Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Bio 36 Interpretation and (Life Science)

Main Idea: Combining C, H, & O with other elements.

Standard: HS-LS1-6 From Molecules to Organisms: Structure and Processes.

Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Bio 38 Dissection in Lab (Life Science)

Main Idea: Maintaining homeostasis in living organisms.

Standard: HS-LS1-3 From Molecules to Organisms: Structure and Processes.

Plan and conduct an investigation to provide evidence of the importance of maintaining homeostasis in living organisms.

Bio 42 Physiology (Life Science)

Main Idea: Embryological development.

Standard: HS-LS4-1 Biological Unity and Diversity.

Analyze and evaluate how evidence such as similarities in DNA sequences, anatomical structures, and order of appearance of structures during embryological development contribute to the scientific explanation of biological diversity.

Bio 43 Ecology (Life Science)

Main Idea: Cycling of matter and flow of energy among organisms.

Standard: HS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics.

Use a mathematical representation to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

Bio 45 Deep Dive (Life Science)

Main Idea: Influences for biological diversity.

Standard: HS-LS4-2 Biological Unity and Diversity.

Construct an explanation based on evidence that biological diversity is influenced by (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) compe

Bio 46 Deep Dive Biological Diversity (Life Science)

Main Idea: Distribution of traits in a population.

Standard: HS-LS4-5 Biological Unity and Diversity.

Synthesize, communicate, and evaluate the information that describes how changes in environmental conditions can affect the distribution of traits in a population causing: 1) increases in the number of individuals of some species, 2) the emergence of new

Bio 47 Scientific Inquiry (Life Science)

Main Idea: Impacts of human activities on the environment biodiversity.

Standard: HS-LS2-7 Ecosystems: Interactions, Energy, and Dynamics.

Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment biodiversity.

Earth 17 Minerals of the Earth (Earth & Space Science)

Main Idea: Availability of natural resources.

Standard: HS-ES3-1 Earth and Human Activities.

Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

Earth 18 Rocks and Rock Types (Earth & Space Science)

Main Idea: Geological processes and uneven distribution of natural resources.

Standard: HS-ES3-5 Earth and Human Activities.

Construct a scientific explanation from evidence for how geological processes lead to uneven distribution of natural resources.

Earth 19 Resources and Energy (Earth & Space Science)

Main Idea: Utilizing natural resources based on cost-benefit ratios.

Standard: HS-ES3-2 Earth and Human Activities.

Evaluate competing design solutions for developing, managing, and utilizing natural resources based on cost-benefit ratios.

Earth 21 The Rock Record (Earth & Space Science)

Main Idea: Co-evolution of Earth's systems and life on Earth.

Standard: HS-ES2-7 Earth's Systems.

Construct an argument based on evidence about the simultaneous co-evolution of Earth's systems and life on Earth.

Earth 22 Earth's Past (Earth & Space Science)

Main Idea: Earth's formation and early history.

Standard: HS-ES1-6 Earth's Place in the Universe.

Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.

Earth 23 Plate Tectonics (Earth & Space Science)

Main Idea: Theory of plate tectonics.

Standard: HS-ES1-5 Earth's Place in the Universe.

Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.

Earth 24 Deformation of the Crust (Earth & Space Science)

Main Idea: Continental and ocean-floor features.

Standard: HS-ES2-1 Earth's Systems.

Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.

Earth 25 Earthquakes & Volcanoes (Environmental Science)

Main Idea: Earth's interior and cycling of matter by thermal convection.

Standard: HS-ES2-3 Earth's Systems.

Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.

Earth 26 Weathering Erosion & Rivers (Earth & Space Science)

Main Idea: Properties of water and its effects on Earth.

Standard: HS-ES2-5 Earth's Systems.

Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

Earth 28 Hydrocarbons and Energy (Environmental Science)

Main Idea: Cycling of carbon.

Standard: HS-ES2-6 Earth's Systems.

Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

Earth 32 The Atmosphere (Earth & Space Science)

Main Idea: Variations in the flow of energy into and out of Earth's systems.

Standard: HS-ES2-4 Earth's Systems.

Analyze and interpret data to explore how variations in the flow of energy into and out of Earth's systems result in changes in atmosphere and climate.

Earth 33 Erosion, Weather & Climate (Environmental Science)

Main Idea: Feedback and interactions from changes in Earth's surface.

Standard: HS-ES2-2 Earth's Systems.

Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks and interactions that cause changes to other Earth's systems.

Earth 38 Land and Life (Environmental Science)

Main Idea: Impacts of human activities on natural systems.

Standard: HS-ES3-4 Earth and Human Activities.

Evaluate or refine a technological solution that reduces the impacts of human activities on natural systems.

Earth 39 The Impact of Humans (Environmental Science)

Main Idea: Sustainability of human populations, and biodiversity.

Standard: HS-ES3-3 Earth and Human Activities.

Create a computational simulation to illustrate the relationship among management of natural resources, the sustainability of human populations, and biodiversity.

Earth 42 Our Solar System (Earth & Space Science)

Main Idea: Life span of the sun.

Standard: HS-ES1-1 Earth's Place in the Universe.

Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.

Earth 42 Our Solar System (Earth & Space Science)

Main Idea: Motion of orbiting objects in the solar system.

Standard: HS-ES1-4 Earth's Place in the Universe.

Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

Earth 43 Deep Space (Earth & Space Science)

Main Idea: The sun's place in relation to the Milky Way galaxy.

Standard: HS-ES1-2 Earth's Place in the Universe.

Develop models to describe the sun's place in relation to the Milky Way galaxy and the distribution of galaxies and galaxy clusters in the Universe.

Earth 43 Deep Space (Earth & Space Science)

Main Idea: Production of elements during a star's life-cycle.

Standard: HS-ES1-3 Earth's Place in the Universe.

Communicate scientific ideas about the way stars, over their life cycle, produce elements.

Chemistry 12 Nature of Matter (Chemistry)

Main Idea: Conservation of atoms and mass during chemical reaction.

Standard: HS-PS1-7 Matter and Its Interactions.

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Chemistry 13 Properties of Matter (Chemistry)

Main Idea: Electron patterns and outermost energy levels.

Standard: HS-PS1-1 Matter and Its Interactions.

Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

Chemistry 22 Evidence for Chemical Reaction (Life Science)

Main Idea: Photosynthesis and light energy.

Standard: HS-LS1-5 From Molecules to Organisms: Structure and Processes.

Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy

Chemistry 22 Evidence for Chemical Reaction (Life Science)

Main Idea: Cellular respiration.

Standard: HS-LS1-7 From Molecules to Organisms: Structure and Processes.

Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Chemistry 24 Classifying Reactions (Chemistry)

Main Idea: Chemical reaction explanations.

Standard: HS-PS1-2 Matter and Its Interactions.

Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, knowledge of the patterns of chemical properties, and formation of compounds.

Chemistry 26 Limiting Reactants and Percent Yield (Chemistry)

Main Idea: Chemical systems.

Standard: HS-PS1-6 Matter and Its Interactions.

Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.

Chemistry 27 Energy Temperature and Heat (Chemistry)

Main Idea: Absorption of energy from a chemical reaction system.

Standard: HS-PS1-4 Matter and Its Interactions.

Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.

Chemistry 28 Using Energy in the Real World (Chemistry)

Main Idea: Principles of temperature changes.

Standard: HS-PS1-5 Matter and Its Interactions.

Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

Chemistry 28 Using Energy in the Real World (Chemistry)

Main Idea: Fission, fusion, and radioactive decay.

Standard: HS-PS1-8 Matter and Its Interactions.

Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

Chemistry 28 Using Energy in the Real World (Chemistry)

Main Idea: Energy conversion.

Standard: HS-PS3-3 Energy.

Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

Chemistry 33 Characteristics of Chemical Bonds (Chemistry)

Main Idea: Electrical forces between particles.

Standard: HS-PS1-3 Matter and Its Interactions.

Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

Chemistry 38 Inter-molecular Forces and Phase Changes (Chemistry)

Main Idea: Molecular structure in the functioning of materials.

Standard: HS-PS2-6 Motion and Stability: Forces and Interactions.

Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials.

Chemistry 46 Equilibrium (Chemistry)

Main Idea: Second law of Thermodynamics.

Standard: HS-PS3-4 Energy.

Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (se

Chemistry 48 Organic Chemistry (Life Science)

Main Idea: Organizational hierarchy within multicellular organisms.

Standard: HS-LS1-2 From Molecules to Organisms: Structure and Processes.

Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Chemistry 48 Organic Chemistry (Life Science)

Main Idea: Combining C, H, & O with other elements.

Standard: HS-LS1-6 From Molecules to Organisms: Structure and Processes.

Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

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