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Science Level 5A - Physics

Skills
Analytical
Contextual

Energy can be transformed, transferred, and conserved

SC.EN.A.01.02	Demonstrates energy (nuclear, electromagnetic, chemical, mechanical, thermal) transfers and transformations by comparing useful energy to total energy (entropy)			
SC.EN.A.02.02	Researches applications of nuclear reactions in which a small amount of matter is converted directly into a huge amount of energy (i.e. $E=MC^2$)			
SC.EN.A.03.02	Researches environmental problems associated with energy and suggests ways to solve the problems			
SC.EN.A.04.02	Researches the motion and energy of waves, including sound, light and seismic waves, and waves on water			
SC.EN.A.05.02	Explains reflection, refraction, absorption and transmission of light			
SC.EN.A.06.02	Experiments with and illustrates how concave and convex lenses and mirrors affect light			

Force, motion, their characteristics, relationships, and effects

SC.FM.A.01.02	Explains the relationship of motion to an object's mass, and the applied force (i.e. usefulness of machines based on mechanical advantage)			
SC.FM.A.02.02	Conducts an experiment to explore the relationship between magnetic forces and electric forces to show they can be thought of as different aspects of a single electromagnetic force (e.g. generators and motors)			
SC.FM.A.03.02	Explains different kinds of materials respond to electric and magnetic forces (i.e. conductors, insulators, magnetic and non-magnetic materials) and the interactions between magnetism and electricity (i.e. generators, motors, doorbells, etc.)			
SC.FM.A.04.02	Conducts an experiment to demonstrate when one thing exerts a force on another, an equal amount of force is exerted back on it			

Electricity, Magnetism, and Heat

SC.EM.A.01.02	Explore how electricity works and analyze simple arrangements of electrical components in series and parallel circuits including finding the current, resistance, voltage, and power.			
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Kinematics and Newton's Laws

SC.KN.A.01.02	Solve kinematics and dynamics problems in one and two dimensions (including projectile motion) using appropriate vector and scalar quantities.			
SC.KN.A.02.02	Graph relations between displacement and time, and velocity and time, representing one and two-dimensional motion			

Scientific Process

SC.SP.A.01.02	Develops testable questions independently and as a group, based on predictions, observations, and inferences from past experiences and research. Hypothesizes about the outcome of the experiment using information gathered from relevant sources.			
SC.SP.A.02.02	Designs and conducts an experiment, and gathers relevant data with the intent of solving or answering the proposed question			
SC.SP.A.03.02	Analyzes data, makes inferences and develops models to represent the data collected			
SC.SP.A.04.02	Communicates entire process used in experiment, as well as results and models to depict data and conclusions			
SC.SP.A.05.02	Recognizes and analyzes multiple explanations and models, using this information to revise own explanation or model if necessary			
SC.SP.A.06.02	Evaluates the credibility of cited sources when conducting own scientific investigation			
SC.SP.A.07.02	Conducts research and communicates results to solve a problem within the local environment (e.g. fish and game management, building permits, mineral rights, land use policies)			
SC.SP.A.08.02	Researches how social, economic, and political forces strongly influence which technology will be developed and used			

SC.SP.A.09.02	Investigates the influences of societal and/or cultural beliefs on science			
SC.SP.A.10.02	Describes the importance of logical arguments in the advancement of scientific knowledge (i.e. thought experiments by Einstein, Hawking, Newton)			
SC.SP.A.11.02	Investigates instances when scientists' observations were not in accord with prevailing ideas of the time			

Back to Index	Science Level 5B - Adv Biology	Skills	Analytical	Contextual
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Ecology: organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy

SC.EC.B.01.02	Relates the carbon cycle to global climate change and recognizes all organisms are linked to each other and their physical environments through the transfer and transformation of matter and energy			
SC.EC.B.02.02	Explores ecological relationships in aquatic and terrestrial ecosystems (e.g. competition, niche, predator/prey, symbiosis) and analyzes the energy transfer within these ecosystems.			
SC.EC.B.03.02	Analyzes the potential impacts of changes (e.g. climate change, habitat loss/gain, cataclysms, human activities) within an ecosystem			
SC.EC.B.04.02	Examines population growth (density, growth rate, carrying capacity). Identifies the impact on energy requirements.			

Genetics and Evolution

SC.GE.B.01.02	Relates the structure of DNA to characteristics of an organism			
SC.GE.B.02.02	Researches how the processes of natural selection cause changes in species over time			
SC.GE.B.03.02	Researches and explains practical applications of genetic engineering.			
SC.GE.B.04.02	Compare and contrast the stages of mitosis and meiosis			
SC.GE.B.05.02	Explains how DNA replication and RNA transcription relate to inheritance.			

Living Organisms: structure, function, behavior, development, life cycles, and diversity

SC.LO.B.01.02	Describes the learned behaviors (e.g. classical conditioning, imprinting, trial and error) that are utilized by living organisms to meet the requirements of life			
SC.LO.B.02.02	Compares and contrasts the structure-function relationship of structures within the body (such as joints, muscles, and lungs) between different living organisms			
SC.LO.B.03.02	Identifies and explains the function of cell organelles in plants and animals, and explains why some organelles are different between plants and animals			
SC.LO.B.04.02	Describes the functions and interdependencies of the organs within the immune system and within the endocrine system			

Viruses and Bacteria

SC.VB.B.01.02	Identifies and researches common diseases and beneficial effects of viruses and bacteria			
SC.VB.B.02.02	Describe the replication of viruses and bacteria, and explain ways to combat their proliferation			

Scientific Process

SC.SP.B.01.02	Develops testable questions independently and as a group, based on predictions, observations, and inferences from past experiences and research. Hypothesizes about the outcome of the experiment using information gathered from relevant sources.			
SC.SP.B.02.02	Designs and conducts an experiment, and gathers relevant data with the intent of solving or answering the proposed question			
SC.SP.B.03.02	Analyzes data, makes inferences and develops models to represent the data collected			
SC.SP.B.04.02	Communicates entire process used in experiment, as well as results and models to depict data and conclusions			
SC.SP.B.05.02	Recognizes and analyzes multiple explanations and models, using this information to revise own explanation or model if necessary			
SC.SP.B.06.02	Evaluates the credibility of cited sources when conducting own scientific investigation			
SC.SP.B.07.02	Conducts research and communicates results to solve a problem within the local environment (e.g. fish and game management, building permits, mineral rights, land use policies)			
SC.SP.B.08.02	Researches how social, economic, and political forces strongly influence which technology will be developed and used			
SC.SP.B.09.02	Investigates the influences of societal and/or cultural beliefs on science			

SC.SP.B.10.02	Describes the importance of logical arguments in the advancement of scientific knowledge (i.e. thought experiments by Einstein, Hawking, Newton)			
SC.SP.B.11.02	Investigates instances when scientists' observations were not in accord with prevailing ideas of the time			

Back to Index	Science Level 5C - Chemistry		Skills	Analytical	Contextual
Acids and Bases					
SC.PH.C.01.02	Identifies properties and examples of acids and bases, and illustrates a pH scale with examples of common chemicals				
Structure and Properties of Matter					
SC.PM.C.01.02	Describes the process for filling electrons shells. Explains valence and determines what makes an element inert.				
SC.PM.C.02.02	Predicts the properties of an element (i.e. reactivity, metal, non-metal) using the periodic table and verifies the predictions through experimentation				
SC.PM.C.03.02	Describes and provides examples of physical and chemical properties and changes. Compares and contrasts element, mixture, compound, solutions, and solubility.				
SC.PM.C.04.02	Describes the kinetic molecular theory of solids, liquids, and gases				
SC.PM.C.05.02	Measures mass and volume of a liquid (identify meniscus and displacement).				
Energy can be transformed, transferred, and conserved					
SC.EN.C.01.02	Describe, contrast, model, sketch, and identify the types of chemical bonding: covalent, ionic, hydrogen, and Vanderwaals forces.				
SC.EN.C.02.02	Determines names and formulas for ions and ionic compounds and uses them in proper chemical equations written with appropriate symbols				
SC.EN.C.03.02	Explores stoichiometry, moles, molar concentrations and Avogadro's number, and performs stoichiometric calculations				
systems					
SC.ME.C.01.02	Describes reaction rates and the purpose of a catalyst, give examples, and incorporate into equations using appropriate symbols.				
SC.ME.C.02.02	Explains in chemical and nuclear reactions, energy (e.g. heat, light, mechanical, and electrical) is transferred into and out of a system				
SC.ME.C.03.02	Describes oxidation/reduction reactions and acid/base reactions, and chemical equilibrium				
SC.ME.C.04.02	Predicts how an atom can interact with other atoms based on its electron configuration and verifies the results				
SC.ME.C.05.02	Researches Boyle's law, Charles's law and Avogadro's law as they relate to volume, pressure, temperature, and moles. Performs calculations using the ideal gas law ($PV = nRT$).				
SC.ME.C.06.02	Describes and give examples of exothermic and endothermic processes. Defines thermodynamic vocabulary and explain their uses. (i.e. specific heat capacity, enthalpy, the use of a calorimeter).				
Scientific Process					
SC.SP.C.01.02	Develops testable questions independently and as a group, based on predictions, observations, and inferences from past experiences and research. Hypothesizes about the outcome of the experiment using information gathered from relevant sources.				
SC.SP.C.02.02	Designs and conducts an experiment, and gathers relevant data with the intent of solving or answering the proposed question				
SC.SP.C.03.02	Analyzes data, makes inferences and develops models to represent the data collected				
SC.SP.C.04.02	Communicates entire process used in experiment, as well as results and models to depict data and conclusions				
SC.SP.C.05.02	Recognizes and analyzes multiple explanations and models, using this information to revise own explanation or model if necessary				
SC.SP.C.06.02	Evaluates the credibility of cited sources when conducting own scientific investigation				
SC.SP.C.07.02	Conducts research and communicates results to solve a problem within the local environment (e.g. fish and game management, building permits, mineral rights, land use policies)				
SC.SP.C.08.02	Researches how social, economic, and political forces strongly influence which technology will be developed and used				
SC.SP.C.09.02	Investigates the influences of societal and/or cultural beliefs on science				
SC.SP.C.10.02	Describes the importance of logical arguments in the advancement of scientific knowledge (i.e. thought experiments by Einstein, Hawking, Newton)				
SC.SP.C.11.02	Investigates instances when scientists' observations were not in accord with prevailing ideas of the time				