

SCIENCE CONTENT STANDARDS

GRADE 4

PHYSICAL: Electricity & Magnetism	Design/build circuits using wires, batteries, bulbs EM	Compass: build/use to detect magnetic fields EM	Electric fields produce magnetic fields; build electromagnet EM	Role of electromagnets in motors, generators, simple devices EM	Electrically charged objects attract/repel each other EM	Magnets have 2 poles; like poles repel, unlike poles attract EM	Electrical energy can be converted to heat, light, motion EM
LIFE: Food chains/webs	Plants are primary source of matter/energy entering most food chains	Producers and consumers are related in food chains and webs and compete	Decomposers recycle matter from dead plants and animals				
LIFE: Ecology	Ecosystems characterized by living/non-living components	Survival within environment	Plants depend on animals and vice versa	Role of microorganisms			
EARTH: Rocks and minerals	Igneous, sedimentary, metamorphic: different properties, formation	Identify common rock-forming minerals					
EARTH: Weathering and Erosion	Slow processes, rapid processes of change	Breaking down rocks through freezing, thawing, growth of roots	Weathering, transport, deposition by water				

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GRADE 5

PHYSICAL: Elements	Chemical reactions: atoms rearrange to form new products	All matter is made of atoms which can combine into molecules AG	Properties of metals; pure elements vs. alloys	Element is one kind of atom; periodic table AG	Nature of atom and arrays of atoms: imaging evidence	Properties used to separate, identify mixtures, compounds	Common substances; properties of solid, liquid, gaseous substances; AG	Living organisms, most materials made of just a few elements	Properties of salts
LIFE: Processing food and air	Specialized structures to transport materials	Circulation of blood; exchange of CO ₂ and O ₂ in lungs and tissues	Digestive system	Urinary system	Transport of sugar, water, and minerals in plants	Photosynthesis	Cells (plants & animals) obtaining energy by breaking down sugar		
EARTH: Water cycle	The ocean	Evaporation, condensation, freezing/melting	Water in the form of clouds, rain, hail, snow	Water as a resource; water quality	Origin of water used by the local community				
EARTH: Weather	Heating of Earth causes air movements	Role of ocean and water cycle	Cause and effects of different types of severe weather	Using weather maps/data to predict local weather; forecasts	Pressure within Earth's atmosphere AG				
EARTH: Solar System	Properties of Sun SOL	Planets, moons, satellites, asteroids SPN, PN, EVM, MM	Orbits due to gravitational attraction PL						

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GRADE 6

PHYSICAL: Heat	Heat as movement of energy SOL	Release of heat from fuel consumption SOL	Heat transport: conduction and convection SOL	Heat transport: radiation SOL			
LIFE: Ecology	Life using energy: sunlight into chemical energy; from organism to organism	Details of food-webs	Producers, consumers, decomposers; energy pyramid	Ecological roles	How much an ecosystem can support depends on resources and abiotic factors		
EARTH: Plate Tectonics	Evidence of plate tectonics	Layers of the Earth	Size and movement of plates	Causes of earthquakes and volcanoes	Plates as origin of major geologic events such as mountain building	How to explain major features of California geology in terms of plate tectonics	Determining epicenter of quake, looking at variables in effects of a quake
EARTH: Shaping Earth's Surface	Water running downhill is dominant process in shaping landscape	Rivers/streams are dynamic systems that erode, transport sediment, flood	Beaches are dynamic systems: movement of sand	Effect of quakes, volcanoes, landslides and floods on humans and wildlife			
EARTH: Energy in the Earth System	Sun is major source for Earth: powers weather and water cycle SOL	Sun's energy reaches Earth through radiation, mostly as visible light SOL, LL	Heat from Earth's interior reaches surface through convection	Convection currents distribute heat in the atmosphere and oceans	Differences in pressure, heat, air movement and humidity result in weather		
EARTH: Resources	Energy resources: what makes them useful, what kinds of problems occur	Different energy and material resources: renewable vs. non-renewable	Natural origin of materials used to make common objects				

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GRADE 7

PHYSICAL: Physical Principles in Living Systems	Visible light part of EM spectrum LL	Object seen through emitted or reflected light LL	Light travels in straight light unless medium changes LL	Lenses in magnifying glass, eye, camera, tele/micro-scope LL	Light composed of many colors; varying sensitivity of retina LL, SPN	Reflection, refraction, transmission, absorption LL	Angle of reflection = angle of incidence	Comparison of bodily joints with mechanical devices	Apply levers and mechanical advantage to musculo-skeleton	Functioning of human heart
LIFE: Cell Biology	Similar functioning of cells in all living organisms	Plant and animal cell differences: cell walls, chloroplasts	Nucleus has genetic info in plant and animal cells	Sources of energy: mitochondria, chloroplasts	Mitosis: cell division	Cell differentiation in multicellular organisms				
LIFE: Genetics	Differences between sexual and asexual organisms	Sexual reproduction; gene inheritance	Inherited trait determined by one or more genes	Different genes, copies of gene, dominant copy	DNA is genetic material of living organisms					
LIFE: Evolution	Genetic variation and environment as causes of evolution	Why natural selection if mechanism of evolution	Evidence from fossils, geology, comparative anatomy	Constructing branching diagrams to classify groups						
LIFE: Structure & Function in Living Systems	Levels: cells, tissues, organs, organ systems, organism	Interdependence of organs within system	Bones and muscles giving framework for movement	Human reproduction: organs and process	Function of umbilicus and placenta during pregnancy	Plant reproduction: pollen, ovules, seeds and fruit	Structures and their functions within eye and ear			
EARTH: Earth and Life History	Cumulative effects of slow, consistent geological processes	Effects of major catastrophes: asteroids, volcanoes MM	Rock layering and age; rock cycle	Age of Earth; age of life on Earth	Fossils as source of changes in life and environment	Effect of plate movement on climate, geography and life	Major events on geologic time scale			

SCIENCE CONTENT STANDARDS

GRADE 8

PHYSICAL: Motion	Defining position	Defining average speed	Solve problems with distance, time, average speed	Velocity is both direction and speed BR	Changes in velocity BR	Interpreting graphs of d vs. t, v vs. t in a single direction	
PHYSICAL: Forces	Force has both direction and magnitude BR	When there are more than 1 force, result is cumulative BR	When forces are balanced, motion of object does not change BR	Identifying forces on a static object BR	When forces are unbalanced, object will change velocity BR	More mass of object, more force needed to accelerate BR	Role of gravity in forming planets, stars, solar system PL
PHYSICAL: Structure of Matter	Structure of atom: protons, neutrons, electrons EM	Compounds: formation and properties	Solids formed from atoms and molecules: crystals & polymers	States of matter and dependence on molecular motion AG	States of matter and movement of molecules AG	Using periodic table to identify elements AG	
PHYSICAL: Reactions	Reactant atoms and molecules form products; new properties	Idea of atoms explain conservation of matter	Chemical reactions liberate or absorb heat	Physical processes include freezing and boiling AG	How to determine whether solution is acidic, basic, or neutral		
PHYSICAL: Periodic Table	Regions corresponding to metals, nonmetals, inert gases	Atomic number (# neutrons, # protons); isotopes AG	Classify using melting point, density, hardness, conductivity				
PHYSICAL: Density & Buoyancy	Density is mass per unit volume AG	How to calculate density of substances from mass and volume	Predicting if an object will sink or float				
LIFE: Chemistry of Life	Why carbon has a central role in the chemistry of life	Living organisms made of molecules of C, H, N, O, P, & S	Different kinds of molecules: small (water, salt); large (DNA)				
EARTH: Earth in the Universe	Galaxies: clusters of billions of stars; different shapes SPN	Stars: Sun is one of many; differences in size, color SPN, PL	Measure of distances: AU and light-years PN	Stars are the source of light of all bright objects (moon, planets) PL, PN, SPN	Characteristics of objects in solar system PN, EVM		