# Integrated Physics & Chemistry

## Scope and Sequence

### Chapter 1

Key topics: *Periodic Table of the Elements*, money metals, nonmetals, compounds, formulas, atomic weights, heat, measuring temperatures, Robert Boyle, Democritus, Lavoisier, Proust, Dalton, Rumford

### Chapter 2

Key topics: pendulum, Galileo, motion, speed, acceleration, light, Brahe, Kepler, Copernicus, Roemer, motion in heavens, velocity, mass, force, gravity, stars, three laws of motion, Newton, momentum, impulse, simple machines, kinetic and potential energy, mechanical and heat energy

### Chapter 3

Key topics: Chemical nomenclature, Lavoiser's list of elements, sulfur, diamonds, graphite, coal, medieval metals, platinum, zinc, cobalt, nickel, manganese molybdenum, tungsten, gases in the atmosphere, air pressure and humidity, Henry Cavendish, hydrogen, nitrogen, fertilizers and explosives, dynamite, laughing gas

### Chapter 4

Key topics: properties of solids, elasticity, cohesion and adhesion, density and pressure, hydrostatics, buoyancy, gases and diffusion, fluid flow, Bernoulli's principle, changes of state, heat, waves in fluid, transverse and longitudinal waves, sound waves: amplitude and pitch, properties and sounds

### Chapter 5

Key topics: static electricity, electric charge, lightning, electric potential, electric current, Ohm's Law, Humphry Davy, sodium metals, lithium, sodium, beryllium, magnesium, calcium, strontium, barium, radium, periodic laws

### Chapter 6

Key topics: chromium, electrolysis, magnets, Mars, force fields, electric transformers, electromagnetism, light, color vision, light in straight lines, mirrors and telescopes, bending light, cameras and eyeglasses, microscopes, telescopes, rainbows

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### Chapter 7

Key topics: exploring the *Periodic Table*, elements, fingerprints, noble gases, argon, chemical bonds, atom, electron, chemical bonding, fluorine, chlorine, bromine, iodine, astatine, halogens, acids, bases, salts, covalent compounds, water, ice, solutions, aquifers

### Chapter 8

Key topics: organic chemistry, hydrocarbons, black gold, benzene, organic acids, ethers, plastics, alcohol, changing molecules, carbohydrates, nitrogen compounds, fibers, vitamins, protein, colloids, Pasteur, Baekeland, Eijkman

### Chapter 9

Key topics: keeping time, calendar, sundials, hourglasses, clocks, navigation, sound, frequency, pitch, sound recording, Doppler shift, earthquake waves, radio, amplifying signals, semiconductors, transistors, parallel circuits

### Chapter 10

Key topics: x-rays, radioactivity, electrons, protons, neutrons, isotopes, subatomic particles, halflife, radiation sickness, artificial radioactivity, fission, nuclear reactor, Albert Einstein, nuclear weapons, particle accelerators, detectors, conservation laws, nuclear energy, Rutherford, Becquerel, Marie Currie, Chadwick, Klaproth, Newton, Bohr

### Chapter 11

Key topics: the Earth, minerals; sedimentary, igneous and metamorphic rock, volcanoes, weathering, erosion, rock cycle, silicon, gems, boron, aluminum, energy, oxidizers, physical equilibrium, chemical equilibrium, careers

### Chapter 12

Key topics: speed, energy, force, simple machines, Laws of Motion, heat, pressure, density, wave motion, light, electricity, circuits, current, power, safety with electricity, discovery by design