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Alabama Course of Study: Science
Grade 8

Standards and Objectives	Page References
Students will:	
1. Identify steps within the scientific process.	14, 18, 33, 37, 55, 57-59, 60-61, 66, 93, 115, 124-125, 129, 150-151, 207, 208-209, 213, 222, 270, 286, 292, 300-301. 305, 329, 330-331, 355, 411, 424-425, 450-451, 472, 480-481, 510-511, 540-541
• Applying process skills to interpret data from graphs, tables, and charts	
• Identifying controls and variables in a scientific investigation	
• Measuring dimension, volume, and mass using *Système International d'Unités* (SI units)	
• Identifying examples of hypotheses	
• Identifying appropriate laboratory glassware, balances, time measuring equipment, and optical instruments used to conduct an investigation	
2. Identify the atomic structure of atoms, including the location of protons, neutrons, and electrons.	77, 162–163, 584
• Identifying the charge of each subatomic particle	76–79, 96
• Identifying Democritus and Dalton as contributors to the atomic theory	73, 75
3. Determine the number of protons, neutrons, and electrons, and the mass of an element using the periodic table.	86, 164–165, 166–167
• Locating metals, nonmetals, metalloids, and noble gases on the periodic table	84–85, 99, 164–166, 645, 712–713
• Using data about the number of electrons in the outer shell of an atom to determine its reactivity	163–165, 183, 185, 186–187
4. State the law of conservation of matter.	74, 79
• Balancing chemical equations by adjusting coefficients	195–196, 211, 212–213, 214–215
5. Differentiate between ionic and covalent bonding.	170–172, 173–175, 183, 184–185, 186–187, 224–225
• Illustrating transfer or sharing of electrons using electron dot diagrams	168-177
6. Define solution in terms of solute and solvent.	220-223
• Defining diffusion and osmosis	585–586 al.ips.msscience.com
• Defining isotonic, hypertonic, and hypotonic solutions	al.ips.msscience.com
• Describing acids and bases based on their hydrogen ion concentration	232–237, 239, 243, 244–245, 247

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7. Describe states of matter based on kinetic energy of particles in matter.	108–111, 112–113
• Explaining effects of temperature, concentration, surface area, and catalysts on the rate of chemical reactions	202–206, 211, 212–213, 214–215
8. Identify Newton's three laws of motion, including inertia, acceleration, momentum, friction, and action or reaction.	312–315, 316–322, 323–328, 333, 334–335
• Defining terminology such as *action and reaction forces, inertia, acceleration, momentum*, and *friction*	310-315, 316-319, 323-325
• Interpreting distance-time graphs	286
9. Describe how mechanical advantages of simple machines reduce the amount of force needed for work.	417–423, 424–425, 427, 428–429, 430–431
• Describing the effect of force on pressure in fluids Example: increasing force on fluid leading to increase of pressure within a hydraulic cylinder	122, 356-358
10. Differentiate between potential and kinetic energy. Examples: potential—rock resting at the top of a hill, kinetic—rock rolling down a hill	375–376, 380, 400–401, 402–403
11. Explain the law of conservation of energy and its relationship to energy transformation, including chemical to electrical, chemical to heat, electrical to light, electrical to mechanical, and electrical to sound.	378–379, 380–383, 387, 395, 399, 400–401, 402–403, 445, 592–593, 624, 632–633, 635, 636, 638–639
12. Classify waves as mechanical or electromagnetic. Examples: mechanical—earthquake waves; electromagnetic—ultraviolet light waves, visible light waves	463–465, 466, 472, 484–485
• Describing how earthquake waves, sound waves, water waves, and electromagnetic	467-468, 479, 493, 499, 509, 526-531
• Describing longitudinal and transverse waves	464-465
• Describing how waves travel through different media	471, 474-475, 492, 562
• Relating wavelength, frequency, and amplitude to energy	467-468, 493, 524
• Describing the electromagnetic spectrum in terms of varying frequencies Examples: electromagnetic spectrum in increasing frequencies—infrared light, visible light, ultraviolet light, microwaves, X rays	468–469, 523, 525–529, 543, 544–545