

**Alabama Science Grades 9-12
Curriculum Standards**

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PHYSICAL SCIENCE	Boardworks High School Chemistry Presentation
1 Recognize periodic trends of elements, including the number of valence electrons, atomic size, and reactivity.	Electron Structure and the Periodic Table Patterns of Behavior
- Categorizing elements as metals, nonmetals, metalloids, and noble gases	Electron Structure and the Periodic Table Patterns of Behavior
- Differentiating between families and periods	The Periodic Table
- Using atomic number and mass number to identify isotopes	Isotopes Relative Atomic Mass
2 Identify solutions in terms of components, solubility, concentration, and conductivity.	Solutions Solubility
- Comparing saturated, unsaturated, and supersaturated solutions	
- Comparing characteristics of electrolytes and nonelectrolytes	
- Describing factors that affect solubility and rate of solution, including nature of solute and solvent, temperature, agitation, surface area, and pressure on gases	Rates of Reaction Solutions Solubility
3 Contrast the formation of ionic and covalent bonds based on the transfer or sharing of valence electrons.	Covalent Bonding Giant Covalent Compounds Ionic Bonding Ionic Compounds
- Demonstrating the formation of positive and negative monatomic ions by using electron dot diagrams	Formation of Ions
4 Use nomenclature and chemical formulas to write balanced chemical equations.	Reacting Masses
- Explaining the law of conservation of matter	Conservation of Mass
- Identifying chemical reactions as composition, decomposition, single replacement, or double replacement	-
- Defining the role of electrons in chemical reactions	Covalent Bonding Giant Covalent Compounds Ionic Bonding Ionic Compounds Redox Reactions
5 Describe physical and chemical changes in terms of endothermic and exothermic processes	Endothermic Reactions Exothermic Reactions

6 Identify characteristics of gravitational, electromagnetic, and nuclear forces.
7 Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.
- Interpreting graphic representations of velocity versus time and distance versus time
- Solving problems for velocity, acceleration, force, work, and power
- Describing action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion
- Determining the resultant of collinear forces acting on a body
Example: solving problems involving the effect of a tailwind or headwind on an airplane
- Solving problems for efficiency and mechanical advantage of simple machines
8 Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy.
- Identifying the relationship between thermal energy and the temperature of a sample of matter
- Describing the flow of thermal energy between two samples of matter
- Explaining how thermal energy is transferred by radiation, conduction, and convection
- Relating simple formulas to the calculation of potential energy, kinetic energy, and work
9 Compare methods of energy transfer by mechanical and electromagnetic waves.
- Distinguishing between transverse and longitudinal mechanical waves
- Relating physical properties of sound and light to wave characteristics
Examples: loudness to amplitude, pitch to frequency, color to wavelength and frequency
10 Explain the relationship between electricity and magnetism.
Example: using a moving charge to create a magnetic field and using a moving magnetic field to induce a current in a closed wire loop
- Differentiating between induction and conduction
- Identifying mechanical, magnetic, and chemical methods used to create an electrical charge
Examples: mechanical—rubbing materials together, magnetic—moving a closed loop of wire across a magnetic field, chemical—using batteries
- Describing electrical circuits in terms of Ohm's law
11 Describe the nuclear composition of unstable isotopes and the resulting changes to their nuclear composition.
- Identifying types of nuclear emissions, including alpha particles, beta particles, and gamma radiation
- Differentiating between fission and fusion
- Identifying uses and possible negative side effects of nuclear technology
Examples: uses—nuclear power generation, medical applications, space travel; negative effects—radioactive contamination, nuclear fuel waste and waste storage

See Boardworks High School Physics for relevant presentations.

12 Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.

