Indiana Course-Aligned Assessment
Integrated Chemistry and Physics – Blueprint

Standard	Description	Percent Range *
1 – Motion and Energy of Macroscopic Objects	Students will be able to understand the relationships among distance, velocity, acceleration and be able to graphically analyze those variables with regards to time dependence. Students can apply Newton's three laws of motion and how they relate to mass, acceleration and force which build to momentum and energy. Students can use Newton's Law of Universal Gravitation and the laws of motion to explain the movement of objects in space. Students will describe kinetic and potential energy.	20-30%
2 – Mechanical Energy and Propagation of Energy by Waves	Using Newton's laws, students will be able to identify properties of objects that vibrate and give rise to mechanical waves. Students will identify properties of waves and then apply that to wave phenomena like reflection, refraction, transmission of energy and loss of energy	5-15%
3 – Properties of Matter: Macroscopic as a Model for Microscopic	Students will understand how macroscopic properties of matter are used to model microscopic processes; they will study the characteristics of solid, liquids, and gasses as well as their change of state using the molecular model, energy and motions. Students will understand how thermal energy relates to temperature; determine specific heat capacity; and how the kinetic molecular theory explains behavior of gas.	0-10%
4 – Energy Transport	Students will use the conservation of energy to calculate thermal energy and distinguish exothermic and endothermic changes. They differentiate among conduction, convection, and radiation. Students will explain electron energies, describe the relationships among velocity, frequency, wavelength, and energy in electromagnetic waves and light is an electromagnetic wave.	0-10%
5 – Chemical Energy, Reactions, and Bonding	Students will recognize and describe physical properties of matter and understand the patterns of the periodic table and how they relate to properties of the elements. Students should understand the atomic number and the concept of the mole. Students can balance chemical equations, identify indicators of chemical changes, and explain exothermic chemical reactions.	20-30%
6 – Electrical Energy Propagation and Magnetism	Students will explain that objects that carry a net charge will exert an electric force, when that charge is transferred the energy lost equals the energy gained as a result of the conservation of energy. Students will understand the electrolysis in batteries; explain the relationship between voltage, resistance, and power in closed and open circuits. Students can describe current in parallel and series; explain magnets, and how electrical energy can be transformed into mechanical energy and vice versa.	0-10%
7 – Nuclear Energy (Fission and Fusion)	Students will understand the history of the atomic model, differentiate subatomic particles, understand nuclei stability, fission, and fusion, and where the sun's energy comes from. Students can describe radioactive decay.	10-20%
8 – Society (Energy production, environment, economics)	Students can describe the change in energy needs throughout history; define the benefits and risks of using non-renewable and renewable forms of energy and the efficiency of both to maintain the environment. Students can contrast the dependence on energy and natural resources throughout the world and the energy needs of a modern urban city with rural cities.	0-10%

* This range represents the approximate emphasis for each reporting category on the assessment.