Physical Science	
2010 Standards	**2016 Standards**
8.1.1 Explain that all matter is composed of particular arrangements of atoms and that there are approximately one hundred types of atoms (i.e., elements).	**8.PS.1** Create models to represent the arrangement and charges of subatomic particles in an atom (protons, neutrons and electrons). Understand the significance that the currently 118 known chemical elements combine to form all the matter in the universe.
8.1.2 Understand that elements are organized on the periodic table based on atomic number.	**8.PS.3** Use basic information provided for an element (atomic mass, atomic number, symbol, and name) to determine its place on the Periodic Table. Use this information to find the number of protons, neutrons, and electrons in an atom.
8.1.3 Explain how the arrangement of atoms and molecules determines chemical properties of substances.	
8.1.4 Describe the structure of atoms and relate the arrangement of electrons to how atoms interact with other atoms.	
8.1.5 Explain that atoms join together to form molecules and compounds and illustrate with diagrams the relationship between atoms and compounds and between atoms and molecules.	**8.PS.2** Illustrate with diagrams (drawings) how atoms are arranged in simple molecules. Distinguish between atoms, elements, molecules, and compounds.
8.1.6 Explain that elements and compounds have characteristic properties such as density, boiling points and melting points that remain unchanged regardless of sample size.	**8.PS.5** Investigate the property of density and provide evidence that properties, such as density, do not change for a pure substance.
8.1.7 Explain that chemical changes occur when substances react and form one or more different products, whose physical and chemical properties are different from those of the reactants.	**8.PS.6** Compare and contrast physical change vs. chemical change. Analyze the properties of substances before and after substances interact to determine if a chemical reaction has occurred.
8.1.8 Demonstrate that in a chemical change the total numbers of each kind of atom in the product are the same as in the reactants and that the total mass of the reacting system is conserved.	**8.PS.7** Balance chemical equations to show how the total number of atoms for each element does not change in chemical reactions and as a result, mass is always conserved in a closed system. (Law of Conservation of Mass.)

	8.PS.4 Identify organizational patterns (radius, atomic number, atomic mass, properties and radioactivity) on the Periodic Table.

Earth and Space Science	
2010 Standards	**2016 Standards**
8.2.1 Recognize and demonstrate how the sun's energy drives convection in the atmosphere and in bodies of water, which results in ocean currents and weather patterns.	**8.ESS.2** Create a diagram or carry out a simulation to describe how water is cycled through the earth's crust, atmosphere and oceans. Explain how the water cycle is driven by energy from the sun and the force of gravity.
8.2.2 Describe and model how water moves through the earth's crust, atmosphere and oceans in a cyclic way as a liquid vapor and solid.	**8.ESS.2** Create a diagram or carry out a simulation to describe how water is cycled through the earth's crust, atmosphere and oceans. Explain how the water cycle is driven by energy from the sun and the force of gravity.
8.2.3 Describe the characteristics of ocean currents and identify their effects on weather patterns.	**8.ESS.2** Create a diagram or carry out a simulation to describe how water is cycled through the earth's crust, atmosphere and oceans. Explain how the water cycle is driven by energy from the sun and the force of gravity.
8.2.4 Describe the physical and chemical composition of the atmosphere at different elevations.	
8.2.5 Describe the conditions that cause Indiana weather and weather-related events such as tornadoes, lake effect snow, blizzards, thunderstorms and flooding.	
8.2.6 Identify, explain and discuss some effects human activities (e.g., air, soil, light, noise and water pollution) have on the biosphere.	**8.ESS.3** Research how human consumption of finite natural resources (i.e. coal, oil, natural gas, and clean water) and human activities have had an impact on the environment (i.e. causes of air, water, soil, light, and noise pollution).
8.2.7 Recognize that some of Earth's resources are finite and describe how recycling, reducing consumption and the development of alternatives can reduce the rate of their depletion.	**8.ESS.3** Research how human consumption of finite natural resources (i.e. coal, oil, natural gas, and clean water) and human activities have had an impact on the environment (i.e. causes of air, water, soil, light, and noise pollution).

8.2.8 Explain that human activities, beginning with the earliest herding and agricultural activities, have drastically changed the environment and have affected the capacity of the environment to support native species. Explain current efforts to reduce and eliminate these impacts and encourage sustainability.	**8.ESS.3** Research how human consumption of finite natural resources (i.e. coal, oil, natural gas, and clean water) and human activities have had an impact on the environment (i.e. causes of air, water, soil, light, and noise pollution).
	8.ESS.1 Research global temperatures over the past century. Compare and contrast data in relation to the theory of climate change.

Life Science	
2010 Standards	**2016 Standards**
8.3.1 Explain that reproduction is essential for the continuation of every species and is the mechanism by which all organisms transmit genetic information.	**8.LS.1** Compare and contrast the transmission of genetic information in sexual and asexual reproduction. Research organisms that undergo these two types of reproduction.
8.3.2 Compare and contrast the transmission of genetic information in sexual and asexual reproduction.	**8.LS.1** Compare and contrast the transmission of genetic information in sexual and asexual reproduction. Research organisms that undergo these two types of reproduction.
8.3.3 Explain that genetic information is transmitted from parents to offspring mostly by chromosomes.	**8.LS.2** Demonstrate how genetic information is transmitted from parent to offspring through chromosomes via the process of meiosis. Explain how living things grow and develop. **8.LS.3** Create and analyze Punnett squares to calculate the probability of specific traits being passed from parents to offspring using different patterns of inheritance.
8.3.4 Understand the relationship between deoxyribonucleic acid (DNA), genes and chromosomes.	**8.LS.6** Create models to show how the structures of chromatin, chromosomes, chromatids, genes, alleles and deoxyribonucleic acid (DNA) molecules are related and differ.
8.3.5 Identify and describe the difference between inherited traits and the physical and behavioral traits that are acquired or learned.	**8.LS.4** Differentiate between and provide examples of acquired and genetically inherited traits.

8.3.6 Observe anatomical structures of a variety of organisms and describe their similarities and differences. Use the data collected to organize the organisms into groups and predict their relatedness.	**8.LS.8** Explore and predict the evolutionary relationships between species looking at the anatomical differences among modern organisms and fossil organisms.
8.3.7 Recognize and explain that small genetic differences between parents and offspring can accumulate in successive generations so that descendants may be different from their ancestors.	
8.3.8 Examine traits of individuals within a population of organisms that may give them an advantage in survival and reproduction in given environments or when the environments change.	**8.LS.9** Examine traits of individuals within a species that may give them an advantage or disadvantage to survive and reproduce in stable or changing environment.
8.3.9 Describe the effect of environmental changes on populations of organisms when their adaptive characteristics put them at a disadvantage for survival. Describe how extinction of a species can ultimately result from a disadvantage.	
8.3.10 Recognize and describe how new varieties of organisms have come about from selective breeding.	**8.LS.10** Gather and synthesize information about how humans alter organisms genetically through a variety of methods.
	8.LS.5 Explain how factors affecting natural selection (competition, genetic variations, environmental changes, and overproduction) increase or decrease a species' ability to survive and reproduce.
	8.LS.7 Recognize organisms are classified into taxonomic levels according to shared characteristics. Explain how an organism's scientific name correlates to these shared characteristics.
	8.LS.11 Investigate how viruses and bacteria affect the human body.

Science, Engineering, and Technology	
2010 Standards	**2016 Standards**
8.4.1 Understand how the strength of attractive forces among particles in a material helps to explain many physical properties of the material, such as why different materials exist as gases, liquids or solids at a given temperature.	
8.4.2 Rank the strength of attractions among the particles of room-temperature materials.	
8.4.3 Investigate the properties (i.e., mechanical, chemical, electrical, thermal, magnetic and optical) of natural and engineered materials.	

Engineering	
2010 Standards	**2016 Standards**
	6-8.E.1 Identify the criteria and constraints of a design to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
	6-8.E.2 Evaluate competing design solutions using a systematic process to identify how well they meet the criteria and constraints of the problem.
	6-8.E.3 Analyze data from investigations to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
	6-8.E.4 Develop a prototype to generate data for repeated investigations and modify a proposed object, tool, or process such that an optimal design can be achieved.