All standards for grades 9-12 from the Physical Science strand are listed, as well as two from the Earth Science strand.

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
Physical Science			
Matter (Physical Science Unifying Concept A) **Matter has various states with unique properties that can be used as a basis for organization. The relationship between the properties of matter and its structure is an essential component of study in the physical sciences. The understanding of matter and its properties leads to practical applications, such as the capability to liberate elements from ore, create new drugs, manipulate the structure of genes and synthesize polymers.**			
P.12.A Students understand that atomic structure explains the properties and behavior of matter.			
Properties of Matter			
P.12.A.1 Students know different molecular arrangements and motions account for the different physical properties of solids, liquids, and gases. E/S	19.21	19.18	18.14
P.12.A.2 Students know elements in the periodic table are arranged into groups and periods by repeating patterns and relationships. E/S			
Mixtures and Compounds			
P.12.A.3 Students know identifiable properties can be used to separate mixtures. E/S			
P.12.A.4 Students know atoms bond with one another by transferring or sharing electrons. E/S			
P.12.A.5 Students know chemical reactions can take place at different rates, depending on a variety of factors (i.e. temperature, concentration, surface area, and agitation). E/S			

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
P.12.A.6 Students know chemical reactions either release or absorb energy. E/S			
P.12.A.7 Students know that, in chemical reactions, elements combine in predictable ratios, and the numbers of atoms of each element do not change. I/S			
Atomic Structure			
P.12.A.8 Students know most elements have two or more isotopes, some of which have practical applications. I/S	44.3, 44.8, 44.13, 44.19 - 44.20	43.3, 43.8, 43.13, 43.19 - 43.20	38.3, 38.8, 38.13
P.12.A.9 Students know the number of electrons in an atom determines whether the atom is electrically neutral or an ion. I/S			
Forces and Motion (Physical Science Unifying Concept B) **The laws of motion are used to describe the effects of forces on the movement of objects.**			
P.12.B Students understand the interactions between force and motion.			
Motion			
P.12.B.1 Students know laws of motion can be used to determine the effects of forces on the motion of objects. E/S	Chapters 5 & 6	Chapters 5 & 6	Chapter 5
Forces			
P.12.B.2 Students know magnetic forces and electric forces can be thought of as different aspects of electromagnetic force. I/S	Chapters 31, 32, 34 & 35	Chapters 31, 32 & 34	Chapters 29 & 30
P.12.B.3 Students know the strength of the electric force between two objects increases with charge and decreases with distance. I/S	23.9	23.9	22.8
P.12.B.4 Students know the strength of the gravitational force between two objects increases with mass and decreases rapidly with distance. I/S	13.1	13.1	12.1

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
Energy (Physical Science Unifying Concept C) **The total energy of the universe is constant. All events involve the transfer of energy in one form or another. In all energy transfers, the overall effect is that the energy is spread out uniformly.**			
P.12.C Students understand that there are interactions between matter and energy.			
Waves			
P.12.C.1 Students know waves (I.e. sound, seismic, electromagnetic) have energy that can be transferred when the waves interact with matter. E/S	16.1, 16.19, 17.10, 35.1, 35.9, 35.17, 35.20	16.1, 17.8, 34.1, 34.6, 34.13, 34.16	15.1, 16.4, 30.1, 30.7
Forms and Uses of Energy			
P.12.C.2 Students know energy forms can be converted. E/S	7.7	7.5	6.3
P.12.C.3 Students know nuclear reactions convert a relatively small amount of material into a large amount of energy. I/S	44.9, 44.13 - 44.14	43.9, 43.13 - 43.14	38.9, 38.13 - 38.14
P.12.C.4 Students know characteristics, applications and impacts of radioactivity. E/S	44.15 - 44.21	43.15 - 43.21	38.15 - 38.18
P.12.C.5 Students know the relationship between **heat** and **temperature.** I/S	19.7	19.5	18.5
Electricity			
P.12.C.6 Students know electricity is transferred from generating sources for consumption and practical uses. I/S	27.14 - 27.18, 32.17 - 32.20, 32.23 - 32.25, Chapters 29 & 33	27.9 - 27.13, 32.14 - 32.17, 32.20 - 32.22, Chapters 29 & 33	25.8 - 25.11, 29.10, 29.15 - 29.17, Chapter 27
Earth Science			
Atmospheric Processes and the Water Cycle (Earth and Space Science Unifying Concept A)			

	Physics for Scientists and Engineers	Principles of Physics	Conceptual Physics
Earth systems have internal and external sources of energy, both of which create heat. Driven by sunlight and Earth's internal heat, a variety of cycles connect and continually circulate energy and material through the components of the earth systems.			
E.12.A Students understand heat and energy transfer in and out of the atmosphere and influence weather and climate.			
Weather			
E.12.A.3 Students understand the role of the atmosphere in Earth's greenhouse effect. E/S	19.31	19.28	
Solar System and Universe (Earth and Space Science Unifying Concept B)			
The universe is a dynamic system of matter and energy. The universe is extremely large and massive with its components separated by vast distances. Tools of technology will continue to aid in the investigation of the components, origins, processes and age of the universe. Earth is one part in our solar system, which is within the Milky Way galaxy. The Sun is the energy-producing star for our solar system. Most objects in our solar system are in predictable motion, resulting in phenomena such as day/night, year, phases of the moon, tides, and eclipses.			
E.12.B Students know scientific theories of origins and evolution of the universe.			
Components of the Universe			
E.12.B.2 Students know stars are powered by nuclear fusion of lighter elements into heavier elements, which results in the release of large amounts of energy. I/S	44.14	43.14	38.14