Course Description: Science 7A begins by introducing students to scientific thinking, the life sciences, and the characteristics that define living things. Students explore how living organisms interact with each other and their environments, as well as the role of observation and empirical evidence in science. They then examine the properties of matter, including mixtures, density, states of matter, and changes in physical state.

Students deepen their understanding of chemistry through the study of atomic structure, the periodic table, and the types of elements—metals, nonmetals, and metalloids. They investigate how atoms bond to form compounds and explore the properties of water, carbon compounds, and polymers. The course concludes with a broad survey of living organisms, including animals, protists, bacteria, fungi, plants, and viruses, followed by an in-depth look at green plants and how they grow, function, and reproduce.

The course assignments are designed to engage students in applying science and engineering practices (SEPs) to build understanding of disciplinary core ideas (DCIs) through crosscutting concepts (CCs). Capstone assignments encourage students to explain real-world phenomena and design solutions to problems using science and engineering practices.

Module	Lesson Title	Objectives
Module 1: The Basics of Life	1.1: Observation and Science	• Explain the importance of science and observation. • Define the scientific process. • Analyze empirical evidence to draw scientific conclusions.
	1.2: Scientific Thinking	• Identify the steps of the scientific method. • Differentiate between science and pseudoscience.
	1.3: Life Sciences	• Define biology. • Identify careers in biology. • Differentiate between the life sciences and physical science.
	1.4: Ecology and the Environment	• Define ecology. • Identify the relationship between biotic and abiotic factors within an environment. • Describe how animals are connected through the flow of energy in the food chain.

Module	Lesson Title	Objectives
	1.5: Life and Living Things	• Identify the five characteristics of life. • Differentiate between living and nonliving things.
Module 2: Characteristics of Matter	2.1: Classifying Matter	• Define matter. • Classify pure substances as elements or compounds. • Identify the elements and the ratio in which they are present in the chemical formula of a compound.
	2.2: Mixtures	• Differentiate between pure substances and mixtures. • Differentiate between heterogeneous and homogeneous mixtures. • Describe the characteristics of a solution.
	2.3: Physical Properties	• List and describe physical properties. • Describe how physical properties are used to identify and choose materials. • Analyze a mixture to describe methods that can be used to separate it.
	2.4: Density	• Identify derived units for volume and density. • Describe the relationship between mass, volume, and density. • Describe how density can be used to identify and test the purity of a substance.
	2.5: States of Matter	• Describe the three main states of matter in terms of their shape, volume, particle motion, and compressibility. • Classify materials as solids, liquids, or gases. • Explain the behavior of solids, liquids, and gases using the kinetic theory.
	2.6: Gas Pressure	• Define pressure and gas pressure. • Predict changes in gas pressure due to changes in temperature and volume

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	2.7: Changes of State	• Describe what happens to the arrangement and energy of particles of matter during changes of state. • Describe the role that pressure plays in changes of state.
	2.8: Physical Changes	• List and describe common physical changes. • Analyze scenarios involving physical change in terms of conservation of mass.
Module 3: Atomic Structure and Periodicity	3.1: Development of Atomic Theory	• Compare the atomic theories of Democritus and Dalton. • Describe the atomic models of Thomson and Rutherford.
	3.2: Atomic Structure	• Distinguish among protons, neutrons, and electrons in terms of relative charge, mass, and location in the atom. • Describe how the isotopes of a given element are the same and how they are different. • Distinguish the atomic number of an atom from its mass number.
	3.3: Modern Atomic Theory	• Describe Bohr's model of the atom. • Explain how the electron cloud model represents the behavior and locations of electrons in atoms. • Describe the modern atomic model.
	3.4: Organizing the Elements	• Describe the contributions of Lavoisier and Newlands to the development of the periodic table of elements. • Describe how Mendeleev arranged the elements in his periodic table of elements. • Explain how the predictions Mendeleev made and the discovery of new elements demonstrated the usefulness of his periodic table of elements.
	3.5: The Modern Periodic Table	• Describe how Mendeleev's periodic table differs from the periodic table used today. • Describe how the modern periodic table is organized.

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		• Explain why an element's properties can be predicted by its location on the periodic table.
	3.6: Metals	• Locate metals on the periodic table. • Identify general properties of metals. • Compare the characteristics of alkali metals, alkaline earth metals, and transition metals, and give examples of each.
	3.7: Nonmetals	• Locate nonmetals on the periodic table. • Identify general properties of nonmetals. • Compare the characteristics of different groups of nonmetals and give examples of each.
	3.8: Metalloids	• Locate metalloids on the periodic table. • Identify general properties of metalloids. • Describe how the characteristics of semiconductors make them useful in technology.
Module 4: Chemical Compounds	4.1: Chemical Bonding	• Determine the number of valence electrons for a representative element based on its location in the periodic table. • Explain ionic and covalent bond formation in terms of the octet rule. • Analyze a chemical formula to determine whether it contains ionic bonds or covalent bonds.
	4.2: Ions	• Use the octet rule to explain the formation of positive and negative ions. Identify cations and anions.
	4.3: Ionic Compounds	• Describe the structure of ionic compounds. • Identify and explain the properties of ionic compounds.

Module	Lesson Title	Objectives
	4.4: Metallic Bonding	• Describe metallic bonding. • Explain the physical properties of metals in terms of metallic bonding. • Describe how and why alloys are useful.
	4.5: Covalent Compounds	• Use electronegativity to differentiate among ionic, polar covalent, and nonpolar covalent bonds. • Identify characteristics of covalent compounds.
	4.6: Water and its Properties	• Explain the structure and polarity of a water molecule. • Identify and explain general properties of water.
	4.7: Carbon Compounds	• Relate the structures of three forms of carbon to their properties. Define organic compound. • Explain why there are millions of different organic compounds.
	4.8: Polymers	• Distinguish a monomer from a polymer. • Distinguish between natural polymers and synthetic polymers. • Describe the structure and function of three types of natural polymers. • Describe how the creation and use of plastics can have positive and negative effects.
Module 5: Classifications of Living Things	5.1: Groups of Living Things	• List and describe the way that living things are classified. • Identify the levels of classification for an organism.
	5.2: Animal Kingdom	• Identify Kingdom Animalia by their defining characteristics. • Describe the characteristics of the phyla in Kingdom Animalia. • List common organisms in each phyla in Kingdom Animalia.
	5.3: Protists	• Describe the characteristics of Protists. • Distinguish between different types of algae. • Explain how protists are beneficial to life on Earth.

Module	Lesson Title	Objectives
	5.4: Bacteria	• Describe the main characteristics of bacteria and the archaea domain. • Distinguish between the two bacteria kingdoms. • Identify common beneficial and harmful bacteria and their functions.
	5.5: Fungi	• Identify the characteristics of fungi. • Describe the good and bad functions of fungi.
	5.6: Plants	• Explain the characteristics of mosses, ferns, gymnosperms, and angiosperms. • Evaluate the advantages of plants that produce seeds.
	5.7: Viruses	• Identify viruses and recognize their main characteristics. • Give examples of different viruses.
Module 6: Green Plants	6.1: Green Plants and Seeds	• Explain the importance of green plants. • Describe the basic anatomy and biological composition of a seed. • List the basic requirements for seed germination and growth. • Explain several methods of seed dispersal common in nature.
	6.2: Seedlings	• Describe the parts of green plants. • Explain the functions and types of roots.
	6.3: Soil and Soil Nutrients	• Identify the function of soil. • Distinguish between "dirt" and living soil. • Identify the nutrients that plants need.
	6.4: Stems and Leaves	• Explain how water and nutrients are transported through specialized plant tissues. • Describe the function of leaves.
	6.5: Photosynthesis	• Explain the importance of the process of photosynthesis to all life on Earth. • Describe the process of photosynthesis. • Write a scientific equation that represents photosynthesis.

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	6.6: Transpiration	• Explain how transpiration works. • Describe the factors that affect transpiration.
	6.7: Buds and Flowers	• Identify and describe the structure and function of buds. • Identify and describe the structure and function of a flower.
	6.8: Plant Reproduction	• Describe how flowers reproduce through pollination. • Identify and describe the male and female reproductive parts of a flower.