

Course Description: Science 8A begins with a focus on scientific thinking and investigation. Students learn how to observe the natural world, design experiments, analyze data, and evaluate evidence. They then explore energy, including different forms of energy, thermal energy transfer, and how energy is conserved and converted in everyday systems.

The course continues with a study of the human digestive system and how the body uses food for energy, followed by a unit on human impacts on Earth's systems, including biodiversity, oceans, and climate. Finally, students investigate major body systems such as the respiratory, circulatory, lymphatic, endocrine, skeletal, and muscular systems, gaining an understanding of how these systems support life and interact to maintain health.

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: Scientific Thinking	1.1: Observation and Science	<ul style="list-style-type: none">Describe how scientists use the five senses in observing the world around them.Recognize the importance of observation skills.
	1.2: Scientific Thinking	<ul style="list-style-type: none">Distinguish between science and pseudoscience.Evaluate the relationship between empirical evidence and scientific explanation.
	1.3: Scientific Laws and Theories	<ul style="list-style-type: none">Define scientific law and scientific theory.Distinguish between scientific laws and scientific theories.
	1.4: Forming a Hypothesis	<ul style="list-style-type: none">Define the characteristics of a good hypothesis.
	1.5: Designing an Experiment	<ul style="list-style-type: none">Define what a controlled experiment is.Distinguish between the independent and dependent variables and the constants in an experiment.Identify the characteristics of a well-designed experiment.

Module	Lesson Title	Objectives
	1.6: Data Collection in Science	<ul style="list-style-type: none">• Distinguish between qualitative and quantitative data.• Describe different measurement systems used to measure and record object's properties.• List examples of measuring instruments and tools and their purpose in science.
	1.7: Analyzing Data	<ul style="list-style-type: none">• Calculate the mean, median, and mode of a set of data.
	1.8: Conclusions and Experimental Evaluation	<ul style="list-style-type: none">• Draw conclusions based on the results of an experiment.• Evaluate an experiment's procedure for errors that impact the results.• Understand the importance of peer review to the scientific process.
Module 2: Energy	2.1: Kinetic and Potential Energy	<ul style="list-style-type: none">• Describe the relationship between work and energy.• Define kinetic energy and relate it to the mass and speed of an object.• Distinguish between kinetic energy and potential energy.
	2.2: Potential Energy	<ul style="list-style-type: none">• Describe how weight and height affect the gravitational potential energy of an object.• Compare gravitational potential energy and elastic potential energy.
	2.3: Forms of Energy	<ul style="list-style-type: none">• Describe and give examples of the major forms of energy.• Explain how nuclear energy is released through nuclear fission and nuclear fusion
	2.4: Energy Conversion and Conservation	<ul style="list-style-type: none">• Describe conversions of energy from one form to another.• Explain how the law of conservation of energy applies to energy transformation.• Analyze how energy is conserved in conversions between kinetic and potential energy.
	2.5: Thermal Energy and Matter	<ul style="list-style-type: none">• Describe the characteristics of thermal energy, including its relationship to temperature and heat.• Explain thermal expansion and contraction.• Describe the characteristics of absolute zero.

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	2.6: Thermal Energy Transfer	<ul style="list-style-type: none"> Distinguish between conduction, convection, and radiation. Describe how thermal energy moves as convection currents in natural systems. Analyze a scenario to identify which method of thermal energy transfer is occurring.
	2.7: Thermal Conductors and Insulators	<ul style="list-style-type: none"> Describe the thermal properties of conductors and insulators. Classify materials as thermal conductors or thermal insulators. Describe specific heat, including how it relates to thermal conductivity.
	2.8: Using Heat	<ul style="list-style-type: none"> Describe heat engines. Explain how heat engines convert thermal energy into mechanical energy. Describe how different types of cooling and heating systems operate.
Module 3: The Digestive System	3.1: The Digestive System	<ul style="list-style-type: none"> Identify the major parts of the human digestive system. Describe the functions of the major parts of the digestive system.
	3.2: Other Digestive Organs	<ul style="list-style-type: none"> Explain the functions of the major parts of the digestive system. Describe other organs in the body that help digestion.
	3.3: Food and Oxidation	<ul style="list-style-type: none"> Distinguish between mechanical and chemical digestion. Describe the processes of oxidation and cellular respiration and explain how they are related. Describe the relationship between cellular respiration and photosynthesis.
	3.4: Carbohydrates, Fats and Proteins	<ul style="list-style-type: none"> Distinguish among carbohydrates, fats, and proteins. Describe how the body uses carbohydrates, fats, and proteins.
	3.5: Vitamins and Minerals	<ul style="list-style-type: none"> Describe the functions of vitamins and minerals. Distinguish between macronutrients and micronutrients.
	3.6: Proteins	<ul style="list-style-type: none"> Explain what proteins are made of. Explain why complete proteins are necessary to a human's diet.

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	3.7: Fiber	<ul style="list-style-type: none"> Explain why fiber is important in human nutrition. Distinguish between soluble and insoluble fiber. Explain the benefits and sources of the seven types of fiber.
Module 4: Human Impact on Earth	4.1: Human Impact on Biodiversity	<ul style="list-style-type: none"> Explain the term biodiversity. Explain why biodiversity is important to the health of life on Earth. Describe how energy cycles through Earth's spheres.
	4.2: Human Impact on Earth's Oceans	<ul style="list-style-type: none"> Identify how humans are changing the ocean environment. Describe the impacts humans are having on coral reefs.
	4.3: Habitat Loss	<ul style="list-style-type: none"> Describe how humans are impacting ecosystems. Identify how habitat loss affects species.
	4.4: Species Survival	<ul style="list-style-type: none"> Distinguish between when species become threatened, endangered, and extinct. Describe how humans are impacting other species on Earth.
	4.5: Human Impact on Humans	<ul style="list-style-type: none"> Describe how climate change is impacting human life. Describe how spreading disease impacts human
	4.6: The Living Earth	<ul style="list-style-type: none"> Identify and describe the interrelated systems of Earth. Use a model to explain the components, interactions, and outcomes of systems.
Module 5: Respiratory and Circulatory Systems	5.1: The Respiratory System	<ul style="list-style-type: none"> Identify the parts of the respiratory system. Describe the function of each part of the respiratory system.
	5.2: Sinuses	<ul style="list-style-type: none"> Identify functions of the sinuses.
	5.3: The Trachea	<ul style="list-style-type: none"> Identify the anatomy of the trachea. Define the functions of the trachea.

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	5.4: Bronchi and Alveoli	<ul style="list-style-type: none"> Identify the bronchi and alveoli. Define the functions of the bronchi and alveoli.
	5.5: The Diaphragm	<ul style="list-style-type: none"> Describe the function of the diaphragm.
	5.6: The Circulatory System	<ul style="list-style-type: none"> Identify the parts of the circulatory system. Describe the functions of the circulatory system.
	5.7: The Heart	<ul style="list-style-type: none"> Identify the parts of the heart. Describe the path blood takes through the heart. Define the purpose of the atria and ventricles in the heart. Differentiate between the left and right sides of the heart.
	5.8: Blood	<ul style="list-style-type: none"> Identify the components of blood. Identify the functions of the components of blood.
Module 6: Lymphatic, Endocrine, Skeletal and Muscular Systems	6.1: The Lymphatic System	<ul style="list-style-type: none"> Describe the basic components and functions of the lymphatic system. Compare and contrast the lymphatic system to other body systems.
	6.2: The Endocrine System	<ul style="list-style-type: none"> Identify the location and functions of the endocrine glands in the human body. List the functions of hormones in the human body.
	6.3: The Skeletal System	<ul style="list-style-type: none"> Identify and describe the major parts of the skeletal system and their functions.
	6.4: Bones	<ul style="list-style-type: none"> Identify the structure and functions of bones. Compare and contrast cartilage and bone. Describe the three layers of bone.
	6.5: Ligaments and Joints	<ul style="list-style-type: none"> Describe the different types of joints in the human body. Explain the function of ligaments.

Module	Lesson Title	Objectives
	6.6: The Muscular System	<ul style="list-style-type: none">• Define and describe the types of muscles in the human body.• Identify some of the major muscle pairs of the body.
	6.7: Exercise	<ul style="list-style-type: none">• Describe the importance of exercise.• Explain the guidelines to stay safe during exercise.• Identify ways to stay active and exercise in groups or alone.