Unit 1: From Exploring Molecules to Organisms: Structures and Processes

Content Area: **Science**
Course(s):
Time Period: **Trimester 1**
Length: **13-14 weeks**
Status: **Published**

Summary

This unit provides students with a comprehensive investigation into the fundamental characteristics, needs, and origins of living organisms. Beginning with a strong emphasis on lab safety and the proper use of scientific instruments like the compound light microscope, students will apply the scientific method to a variety of hands-on activities. The curriculum progresses from the microscopic world of cells—comparing prokaryotic and eukaryotic organisms and modeling organelles—to core cellular processes like diffusion, osmosis, mitosis, photosynthesis, and cellular respiration. Students will also investigate disease transmission and the importance of hygiene through engaging simulations and labs. The unit culminates in an exploration of major human body systems, including the digestive, respiratory, and cardiovascular systems. Through hands-on dissections, nutrient identification labs, and physiological experiments, students will gain a deeper understanding of how these systems work together to support life and connect these concepts to real-world applications and emergency preparedness.

Revised July 2025

Essential Questions / Enduring Understandings

Essential Questions

- What characteristics and basic needs are required for an organism to be considered living?
- In single-celled and multicellular organisms, how do organelles and systems work together to maintain life and homeostasis?
- How does the relationship between photosynthesis and cellular respiration support energy flow in living organisms?
- In what ways do bacteria and viruses impact human life both positively and negatively?

Enduring Understandings

- All living organisms share specific characteristics and needs that distinguish them from nonliving things.
- Organelles and organ systems work together to carry out the functions necessary for life and to

maintain homeostasis.

Objectives

Students Will Know:

- The essential questions guiding the unit and how they connect to key life science concepts.
- Lab safety rules, procedures, and the correct use of safety equipment.
- The parts of a microscope, their functions, and how to properly handle and care for the instrument.
- The structural differences and similarities between plant and animal cells, and the function of each organelle.
- That bacteria, mold, and viruses exist in everyday environments, and how they grow and spread.
- The concepts of diffusion and osmosis including how substances move across selectively permeable membranes.
- How infectious diseases spread in populations and how variables affect infection rates.
- The stages of mitosis and how the surface area-to-volume ratio impacts cell efficiency.
- The processes and chemical equations of photosynthesis, cellular respiration, and fermentation.
- The path and function of the human digestive system, and how nutrients are broken down and absorbed.
- How oxygen and carbon dioxide are exchanged in the lungs and throughout the body.
- The components and functions of the circulatory system and the key parts of blood.
- The short- and long-term effects of smoking and vaping on the respiratory and cardiovascular systems.
- Why is matching blood types essential before transfusions?
- The purpose and pathways of pulmonary, systemic, and coronary circulation.

Students Will Be Skilled At:

- Following lab safety procedures and demonstrating safe practices during hands-on and virtual labs.

- Using both virtual and physical microscopes to observe cells and create accurate scientific drawings.
- Creating visual and written projects, such as cell travel brochures or organelle storybooks, to explain cell structures.
- Growing bacterial cultures, measuring mold growth, and evaluating the effectiveness of antibacterial agents.
- Navigating interactive simulations like the zombie college and GIZMO labs to model disease transmission.
- Modeling membrane behavior through balloon diffusion, bubble membrane, and osmosis labs using everyday materials.
- Conducting guided internet research on bacteria, viruses, vaccines, and immunity, and synthesizing findings.
- Building physical models of the digestive system to represent mechanical and chemical digestion.
- Performing virtual and hands-on frog dissections to identify and compare major internal organs.
- Tracing the reactants and products of photosynthesis and cellular respiration through hands-on models and equations.
- Measuring carbon dioxide output before and after exercise using bromothymol blue in a lung function lab.
- Comparing the structure and function of arteries, veins, and capillaries through diagrams and discussions.
- Typing simulated blood samples, analyzing compatibility, and dissecting sheep or pig hearts to observe heart anatomy.
- Testing foods for macronutrients such as proteins, starches, and sugars through chemical identification labs.

Learning Plan

Preview the essential questions and connect to the learning throughout the unit.

Lab Safety

Review lab safety procedures and equipment.

Lab Safety Contract

ncbionetwrok.org/iet/zombie-college simulation. Students will navigate their way through a simulation and obtain a certificate.

Microscope

View video microscope demonstrations - ncbionetwork.org/iet/microscope (virtual microscope lab) - Students will learn how to operate a digital microscope, develop familiarity with key microscopy vocabulary, and observe the structure and differences between animal and plant cells by examining cheek cells and onion cells.

Perform Microscope Lab activities - Students will learn the parts of the microscope and their functions. Students will learn how to properly handle, use, and care for a microscope as they view various specimens and create appropriate microscope drawings.

Create a cell travel brochure and/or cell storybook - Students will design a brochure or storybook that teaches others about organelles and their function.

View video "The Secret Life of 118 Green Street" - Students will view this video to recognize the microscopic organisms found on us and around us.

View video "The Invisible Cell" - Students will visually understand cell organelles and their functions.

Conduct Bacterial/Mold growth and/or Bacterial Culture Lab and/or Antibacterial Lab - Students will investigate the presence and growth patterns of bacteria and mold in everyday environments. Students will also test the effectiveness of antibacterial soap by comparing bacterial growth before and after handwashing.

Conduct Virus Hunters Lab (science kit)- Students will explore and understand viruses and relate them to the context of disease outbreaks and potential pandemics.

Conduct the Glow-Germ Lab activity to visually simulate the spread of germs. Students will understand the importance of handwashing, disinfection, and proper hygiene.

Participate in the "Who's the Source of the Infection" activity. GIZMO Disease Spread - Students will investigate how diseases spread through populations by manipulating variables such as transmission method and probability. Students will use data to understand how infection patterns change based on different conditions.

Diffusion / Osmosis

Diffusion Balloon Activity - Several scented balloons (e.g., filled with vanilla or peppermint extract) are inflated, tied off, and gently tossed or placed around the classroom, allowing students to observe how scent molecules escape through the balloon membrane and diffuse through the air to reach their noses. Students will

explain the function of a selectively permeable membrane.

Bubble Lab - students will use bubble solution to model how cell membranes are fluid and flexible, observing how bubbles can change shape, self-repair, and maintain structure, just like biological membranes; through guided exploration, students will also connect these properties to eukaryotic cells, which have membrane-bound organelles, and discuss how membrane proteins carry out specialized functions such as transport, signaling, and structural support. Perform Research projects inducing but not limited to: Fields of Science pizza box project, women in science, black history month scientist research,

Computer use:www.edtech.clas.pdy.edu/osmosis_tutorial:

Conduct Osmosis and Diffusion activity - Dialysis tubing (representing a selectively permeable membrane) is filled with a glucose and water solution, sealed, and placed into a beaker containing iodine, starch, and water, with water present on both sides to serve as the solvent; over time, students observe color changes as iodine diffuses into the tubing and reacts with starch (turning it dark purple/black if present), and they test the surrounding water with Benedict's solution to determine if glucose has diffused out of the tubing. Osmosis - students will investigate osmosis by placing gummy bears in different solutions (such as water and saltwater) and observing changes in size and mass over time, helping them understand how water moves across a selectively permeable membrane from areas of higher to lower concentration, modeling how osmosis affects the movement of water into and out of cells. Students will describe the processes of diffusion and osmosis and be able to compare and contrast active and passive transport.

Carrot diffusion lab - Students will understand that molecules attempt to reach equilibrium within their environment. Students will explain how homeostasis is maintained in organisms.

Conduct internet research on viruses and/or bacteria - Students will choose a disease to research. They will be able to identify how viruses reproduce, grow, and cause disease.

Describe some helpful uses of viruses.

Explain how vaccines fight viral infections.

Recognize the work of scientists in the discovery and prevention of disease through a research project.

Explain the natural defenses that your body has against diseases.

Describe the difference between active and passive immunity.

View United streaming video “Understanding Viruses”

View pH video explorations DVD: Viruses and Bacteria

Mitosis models - Create drawings and /or construct models of the stages of Mitosis. Students will learn that as cells grow, DNA has limits in controlling cell activities and cannot keep up with the demands of a large cell. They will understand that cells need a proper surface area-to-volume ratio to efficiently exchange materials like oxygen, nutrients, and waste. To solve this problem, cells undergo mitosis, dividing to form smaller, more efficient cells that maintain proper function and balance.

Cellular Respiration / Photosynthesis / Fermentation

Cellular Respiration - Students will model the pathway of cellular respiration by tracing how glucose, a carbohydrate, is broken down in the presence of oxygen to produce ATP, the cell’s main energy source. Using the chemical equation C□H□□O□ + 6O□ → 6CO□ + 6H□O + ATP, students will identify the reactants and products and explain where in the cell each step occurs. This activity will help students connect the role of carbohydrates in the diet to energy production in the mitochondria.

Photosynthesis - Students will model the process of photosynthesis by showing how plants use carbon dioxide, water, and sunlight to produce glucose and oxygen, using the chemical formula: 6CO□ + 6H□O + sunlight → C□H□□O□ + 6O□. They will then connect this to cellular respiration, which occurs in plant cells as well, where the glucose produced during photosynthesis is broken down in the mitochondria to create ATP for energy, using the formula: C□H□□O□ + 6O□ → 6CO□ + 6H□O + ATP. This activity helps students understand the interdependence of photosynthesis and respiration and how both processes are essential for energy flow in plants.

Yeast Fermentation - Students will conduct a yeast fermentation lab to observe alcoholic fermentation and understand how organisms like yeast convert sugar into energy, producing carbon dioxide and alcohol as byproducts. This hands-on investigation will help students explore the differences between aerobic respiration, photosynthesis, and anaerobic fermentation, and how fermentation is used in the food industry to make products like bread and beverages. By measuring gas production and observing changes over time, students will connect the process to real-world applications and cellular energy production.

Explain the relationship between diet and health. Discuss the roles of organic and inorganic compounds in

cells.

Digestive System

Perform Smart Board Digestive System Activities

View "Digestive and Excretory Systems" video - Students follow the path of food through the digestive system to understand the importance of the organs involved in processing food.

Perform Frog dissection Laboratory (GIZMO virtual option) - LAB: students will perform a frog dissection to examine both the external and internal anatomy, with a focus on the digestive system, allowing them to identify key organs, observe structural functions, and compare the anatomy and organ systems of the frog to those of humans to better understand similarities and differences in vertebrate body systems. GIZMO: students will complete a GIZMO virtual frog dissection, allowing them to explore the external and internal anatomy of a frog in a virtual environment, identify major organs and body systems, especially the digestive system, and compare the structure and function of these systems to those found in humans, reinforcing concepts of anatomy, physiology, and comparative biology without the use of physical specimens.

Create Digestive System Model - Students will build a model of the digestive system using common household items, such as stockings, crackers, cups, water (to represent saliva), and juices (to represent bile and stomach acid), to simulate both mechanical and chemical digestion; as they follow the path of food through the mouth, esophagus, stomach, small intestine, and large intestine, students will observe how digestion and nutrient absorption occur, reinforcing their understanding of the structure and function of the human digestive system in an engaging, hands-on way.

Conduct Nutrient Identification lab - Students will test various foods for the presence of starch, sugar, or protein.

Explore websites www.yucky.kids.discover.com, www.kidshealh.org/kid/body/digest

Excretory System

Students will know that the kidneys are the major excretory organs and help the body to maintain homeostasis. The kidneys are the body's main excretory organs and help maintain homeostasis by filtering blood and removing waste. Inside each kidney, nephrons filter out waste like urea while reabsorbing useful substances through diffusion and filtration. Just as oxygen and carbon dioxide are exchanged in the lungs, the kidneys exchange waste and water between the blood and nephron to keep the body balanced.

Students will know how cells are organized in multicellular organisms and how organ systems must work

together to ensure survival.

Students will know that photosynthesis is one way autotrophs create their own food.

Students will know that a cycle exists between autotrophs and heterotrophs that work to maintain a balance of oxygen and carbon dioxide in the environment.

Students will know that cells undergo various processes to break down food for energy such as cellular respiration and fermentation.

Respiratory System

Discuss the three functions of the respiratory system - The lungs are spongy organs that help us breathe by exchanging oxygen and carbon dioxide through tiny air sacs called alveoli. Only small molecules like gases can pass through these sacs, while larger molecules like proteins stay in the blood. Breathing also helps regulate blood pH, and conditions like COPD, often caused by smoking or pollution, can damage the lungs and make breathing difficult.

Describe how oxygen and carbon dioxide are exchanged in the lungs and the tissues - Oxygen and carbon dioxide are exchanged through a process called diffusion. In the lungs, oxygen from inhaled air moves from the alveoli into the capillaries and enters the bloodstream, while carbon dioxide moves from the blood into the alveoli to be exhaled. In body tissues, the process reverses: oxygen leaves the blood and enters the cells, and carbon dioxide, a waste product of cellular respiration, moves into the blood to be carried back to the lungs.

Research three effects of smoking/vaping on the human body system. Students will research the harmful effects of smoking and vaping.

Perform Lung Function Laboratory - Students will perform a Lung Function Lab using BTB (bromothymol blue) solution to observe changes in carbon dioxide levels before and after exercise; by exhaling into the solution through a straw, students will see how the color changes from blue to green/yellow as CO□ increases, allowing them to compare the rate of CO□ production at rest and after physical activity and better understand the role of the lungs in gas exchange and maintaining blood pH balance.

View the Respiratory and Circulatory System video

Discuss the Heimlich Maneuver and Choking

Cardiovascular System - 1. Compare arteries, veins, and capillaries - Students will observe how arteries

carry blood away from the heart and have thick, muscular walls to handle high pressure. Veins carry blood back to the heart, have thinner walls, and contain valves to prevent backflow. Capillaries are the smallest blood vessels and have thin walls that allow gases, nutrients, and waste to pass between the blood and body tissues. 2. Trace the pathway of blood through the chambers of the heart and the lungs. 3. Explain the importance of checking blood types before a transfusion is given 4. Describe the characteristics and the functions of the parts of blood. Blood is made up of four main parts: red blood cells, white blood cells, platelets, and plasma. Red blood cells contain hemoglobin, a protein that carries oxygen from the lungs to the body and returns carbon dioxide to the lungs to be exhaled. White blood cells fight infection, platelets help stop bleeding by forming clots, and plasma is the liquid part that carries nutrients, hormones, and waste throughout the body. 4. Conduct Simulated Blood Typing Laboratory. 5. Describe pulmonary, systemic, and coronary circulation. 6. Perform Pig/Sheep Heart Dissection Laboratory.

View Video series: “100 Greatest Discoveries” by the Science Channel

Lab Safety Will Be Reviewed Prior To All Lab Activities

Assessment

Science courses are designed to promote skill attainment. Student progression and pace through which they proceed through the performance tasks is based on their affinity for and ability to reach skill attainment. The teacher will determine formative and summative skill attainment; alternative assessments will be incorporated for each student based on their strengths and challenges.

Formative Assessments:

Worksheets

Do Nows

Exit Tickets

Class Discussion

Quizzes:

Microscope Parts and Functions

Functions of Organelles

Characteristics/Needs of Living Things

Cell Processes - Cell Respiration and Photosynthesis

Body Systems

Summative:

Unit Tests:

Scientific Method

Living Things

Cell Processes and Energy

Body Systems

Cells and Cell Organelles

Research Project - Bacteria / Viruses

Bench Marks:

Formal Lab Reports/Lab Write-ups:

Scientific Method

Fermentation Lab

Nutrient Identification Lab

Alternative :

Model of Digestive System

Frog Dissection

Heart Dissection

Create Cell Model/Travel Brochure/Cell story

Cell Division Models

Materials

Elevate Science - Savvas -Life

Safety Equipment

Computer(s)

Smartboard

Powerpoints

Gizmo

PhET

Gimkit

Edpuzzle

Quizlet

Kahoot

Blooket

Relevant worksheets/notes

Relevant videos

Relevant virtual activities

Relevant interactive programs

Microscopes

Various prepared slides

Slides/coverslips

Protozoan samples

Magnetic cell models

Bunsen burners

Flasks

Test tubes

hot plates

Graduated cylinders

Petri dishes

Agar

balloons

Dialysis Tubing

Glucose solution

Starch solution

iodine

benedict’s solution

biuret solution

sodium chloride

glucose

yeast

Food coloring

carrots

fresh produce/foods/beverages for nutrient identification

Glucose test strips

Iodine

Bromothymol blue

Simulated blood

Elodea

Cotton swabs

Frog specimens

Pig hearts

Dissection kits /pans / pins

Circulatory system model

Heart model

Digestive system model

Standards

9.2.8.CAP	Career Awareness and Planning
7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems
9.2.8.CAP.2	Develop a plan that includes information about career areas of interest.
RI.CR.7.1	Cite several pieces of textual evidence and make relevant connections to support analysis of what an informational text says explicitly as well as inferences drawn from the text.
RI.CI.7.2	Determine a central idea in an informational text and explain how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
W.AW.7.1	Write arguments on discipline-specific content (e.g., social studies, science, technical subjects, English/Language Arts) to support claims with clear reasons and relevant evidence.
W.AW.7.1.A	Introduce claim(s) about a topic or issue, acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
W.AW.7.1.B	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
W.AW.7.1.C	Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.
W.AW.7.1.D	Establish and maintain a formal style/academic style, approach, and form.
W.AW.7.1.E	Provide a concluding statement or section that follows from and supports the argument presented.
7.G.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume
W.IW.7.2	Write informative/explanatory texts (including the narration of historical events, scientific procedures/experiments, or technical processes) to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
W.IW.7.2.A	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia) when useful to aid in comprehension.
W.IW.7.2.F	Provide a concluding statement or section (e.g., sentence, part of a paragraph, paragraph, or multiple paragraphs) that follows the flow of ideas, reflects back on the topic, and supports the information or explanation presented.
SL.PE.7.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
MS-LS1	From Molecules to Organisms: Structures and Processes

MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
	Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.
	Planning and Carrying Out Investigations
	Planning and carrying out investigations in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.
	Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.
LS1.A	Structure and Function
	All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).
	Scale, Proportion, and Quantity
	Phenomena that can be observed at one scale may not be observable at another scale.
MS-LS1-2	Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
	Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.
	Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.
	Developing and Using Models
	Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
	Develop and use a model to describe phenomena.
LS1.A	Structure and Function
	Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.
	Structure and Function
	Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function.
MS-LS1-3	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
	Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.
	Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.
	Engaging in Argument from Evidence

	Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon.
LS1.A	Structure and Function In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. Systems and System Models Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.
MS-LS1-4	Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury. Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.
LS1.B	Growth and Development of Organisms Animals engage in characteristic behaviors that increase the odds of reproduction. Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. Cause and Effect Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.
MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds. Assessment does not include genetic mechanisms, gene regulation, or biochemical processes. Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and

	progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.
	Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
LS1.B	Growth and Development of Organisms
	Genetic factors as well as local conditions affect the growth of the adult plant.
	Cause and Effect
	Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.
MS-LS1-6	Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
	Emphasis is on tracing movement of matter and flow of energy.
	Assessment does not include the biochemical mechanisms of photosynthesis.
	Constructing Explanations and Designing Solutions
	Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.
	Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
LS1.C	Organization for Matter and Energy Flow in Organisms
	Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.
PS3.D	Energy in Chemical Processes and Everyday Life
	The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen.
	Energy and Matter
	Within a natural system, the transfer of energy drives the motion and/or cycling of matter.
MS-LS1-7	Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
	Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.
	Assessment does not include details of the chemical reactions for photosynthesis or respiration.
	Developing and Using Models
	Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
	Develop a model to describe unobservable mechanisms.
LS1.C	Organization for Matter and Energy Flow in Organisms

	Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy.
PS3.D	Energy in Chemical Processes and Everyday Life
	Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials.
	Energy and Matter
	Matter is conserved because atoms are conserved in physical and chemical processes.
MS-LS1-8	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
	Assessment does not include mechanisms for the transmission of this information.
	Obtaining, Evaluating, and Communicating Information
	Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.
	Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.
LS1.D	Information Processing
	Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.
	Cause and Effect
	Cause and effect relationships may be used to predict phenomena in natural systems.

Modifications/Accommodations

This link includes content specific accommodations and modifications for the populations listed below the link

https://docs.google.com/spreadsheets/d/1QL15CF_i_gwqtoPintFW-FmY85ALeKv4J1PQQxb-vbM/edit?usp=sharing