Florida Science

Grades 9, 10, 11, 12

Adopted 2008

Nature of Science

1. **The Practice of Science**
    1. Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: SC.912.N.1.1
        1. Pose questions about the natural world, (Articulate the purpose of the investigation and identify the relevant scientific concepts). SC.912.N.1.1.1
        2. Conduct systematic observations, (Write procedures that are clear and replicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines). SC.912.N.1.1.2
        3. Examine books and other sources of information to see what is already know. SC.912.N.1.1.3
        4. Review what is known in light of empirical evidence, (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models). SC.912.N.1.1.4
        5. Plan investigations, (Design and evaluate a scientific investigation). SC.912.N.1.1.5
        6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), (Collect data or evidence in an organized way. Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration, technique, maintenance, and storage). SC.912.N.1.1.6
        7. Pose answers, explanations, or descriptions of events. SC.912.N.1.1.7
        9. Use appropriate evidence and reasoning to justify these explanations to others. SC.912.N.1.1.9
        8. Generate explanations that explicate or describe natural phenomena (inferences). SC.912.N.1.1.8
        10. Communicate results of scientific investigations. SC.912.N.1.1.10
        11. Evaluate the merits of the explanations produced by others. SC.912.N.1.1.11
    2. Describe and explain what characterizes science and its methods. SC.912.N.1.2
    3. Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented. SC.912.N.1.3
    4. Identify sources of information and assess their reliability according to the strict standards of scientific investigation. SC.912.N.1.4
    5. Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome. SC.912.N.1.5

6. Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied. SC.912.N.1.6
7. Recognize the role of creativity in constructing scientific questions, methods and explanations. SC.912.N.1.7

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify a problem based on a specific body of knowledge, including life science, earth and space science, or physical science, and do the following: 1. Identify a scientific question 2. Examine reliable sources of informtion to identify what is already known 3. Develop a possible explanation (hypothesis) 4. Plan and carry out an experiment 5. Gather data based on measurement and observations 6. Evaluate the data 7. Use the data to support reasonable explanations, inferences, and conclusions. SC.912.N.1.IN.A
b. Describe the processes used in scientific investigations, including posing a research question, forming a hypothesis, reviewing what is known, collecting evidence, evaluating results, and reaching conclusions. SC.912.N.1.IN.B
c. Identify that scientific investigations are sometimes repeated in different locations. SC.912.N.1.IN.C
d. Identify that scientists use many different methods in conducting their research. SC.912.N.1.IN.D

Supported

a. Recognize a problem based on a specific body of knowledge, including life science, earth and space science, or physical science, and do the following: 1. Recognize a scientific question 2. Use reliable information and identify what is already known 3. Create possible explanation 4. Carry out a planned experiment 5. Record observations 6. Summarize results 7. Reach a reasonable conclusion. SC.912.N.1.SU.A
b. Identify the basic process used in scientific investigations, including questioning, observing, recording, determining, and sharing results. SC.912.N.1.SU.B
c. Recognize that scientific investigations can be repeated in different locations. SC.912.N.1.SU.C
d. Recognize that scientists use a variety of methods to get answers to their research questions. SC.912.N.1.SU.D

Participatory

a. Recognize a problem related to a specific body of knowledge, including life science, earth and space science, or physical science, and do the following: 1. Observe objects and activities 2. Follow planned procedures 3. Recognize a solution. SC.912.N.1.PA.A
b. Recognize a process used in science to solve problems, such as observing, following procedures, and recognizing results. SC.912.N.1.PA.B

c. Recognize that when a variety of common activities are repeated the same way, the outcomes are the same. SC.912.N.1.PA.C

d. Recognize that people try different ways to complete a task when the first one does not work. SC.912.N.1.PA.D

2. **The Characteristics of Scientific Knowledge**
    1. Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science). SC.912.N.2.1
    2. Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion. SC.912.N.2.2
    3. Identify examples of pseudoscience (such as astrology, phrenology) in society. SC.912.N.2.3
    4. Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability. SC.912.N.2.4
    5. Describe instances in which scientists' varied backgrounds, talents, interests, and goals influence the inferences and thus the explanations that they make about observations of natural phenomena and describe that competing interpretations (explanations) of scientists are a strength of science as they are a source of new, testable ideas that have the potential to add new evidence to support one or another of the explanations. SC.912.N.2.5

    Access Point for Students with Significant Cognitive Disabilities

    Independent

    a. Identify examples of investigations that involve science. SC.912.N.2.IN.A
    b. Distinguish between questions that can be answered by science and observable information and questions that can't be answered by science and observable information. SC.912.N.2.IN.B
    c. Recognize that scientific knowledge can be challenged or confirmed by new investigations and reexamination. SC.912.N.2.IN.C
    d. Identify major contributions of scientists. SC.912.N.2.IN.D

    Supported

    a. Identify questions that can be answered by science. SC.912.N.2.SU.A
    b. Recognize that what is known about science can change based on new information. SC.912.N.2.SU.B
    c. Recognize major contributions of scientists. SC.912.N.2.SU.C

    Participatory

    a. Recognize an example of work by scientists. SC.912.N.2.PA.A
    b. Recognize a variety of cause-effect relationships related to science. SC.912.N.2.PA.B

3. **The Role of Theories, Laws, Hypotheses, and Models**
    1. Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists have to offer. SC.912.N.3.1
    2. Describe the role consensus plays in the historical development of a theory in any one of the disciplines of science. SC.912.N.3.2
    3. Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships. SC.912.N.3.3
    4. Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions. SC.912.N.3.4
    5. Describe the function of models in science, and identify the wide range of models used in science. SC.912.N.3.5

    Access Point for Students with Significant Cognitive Disabilities

    Independent

    a. Recognize that a scientific theory is developed by repeated investigations of many scientists and agreement on the likely explanation. SC.912.N.3.IN.A
    b. Identify examples of scientific laws that describe relationships in the natural world, such as Newton's laws. SC.912.N.3.IN.B
    c. Identify ways models are used in the study of science. SC.912.N.3.IN.C

    Supported

    a. Recognize that scientific theories are supported by evidence and agreement of many scientists. SC.912.N.3.SU.A
    b. Recognize examples of scientific laws that describe relationships in nature, such as Newton's laws. SC.912.N.3.SU.B
    c. Recognize ways models are used in the study of science. SC.912.N.3.SU.C

    Participatory

    a. Recognize examples of cause-effect descriptions or explanations related to science. SC.912.N.3.PA.A
    b. Recognize a model used in the context of one's own study of science. SC.912.N.3.PA.B

4. **Science and Society**

    1. Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making. SC.912.N.4.1
    2. Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental. SC.912.N.4.2

        Access Point for Students with Significant Cognitive Disabilities

        Independent

        a. Identify ways scientific knowledge and problem solving benefit people. SC.912.N.4.IN.A
        b. Identify that costs and benefits must be considered when choosing a strategy for solving a problem. SC.912.N.4.IN.B

        Supported

        a. Recognize ways scientific knowledge and problem solving benefit people. SC.912.N.4.SU.A
        b. Recognize that some strategies may cost more to solve a problem. SC.912.N.4.SU.B

        Participatory

        a. Recognize science information that helps people. SC.912.N.4.PA.A
        b. Recognize a local problem that can be solved by science. SC.912.N.4.PA.B

Earth and Space Science

5. Earth in Space and Time

1. Cite evidence used to develop and verify the scientific theory of the Big Bang (also known as the Big Bang Theory) of the origin of the universe. SC.912.E.5.1
2. Identify patterns in the organization and distribution of matter in the universe and the forces that determine them. SC.912.E.5.2
3. Describe and predict how the initial mass of a star determines its evolution. SC.912.E.5.3
4. Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth. SC.912.E.5.4
5. Explain the formation of planetary systems based on our knowledge of our Solar System and apply this knowledge to newly discovered planetary systems. SC.912.E.5.5
6. Develop logical connections through physical principles, including Kepler's and Newton's Laws about the relationships and the effects of Earth, Moon, and Sun on each other. SC.912.E.5.6
7. Relate the history of and explain the justification for future space exploration and continuing technology development. SC.912.E.5.7
8. Connect the concepts of radiation and the electromagnetic spectrum to the use of historical and newly-developed observational tools. SC.912.E.5.8
9. Analyze the broad effects of space exploration on the economy and culture of Florida. SC.912.E.5.9
10. Describe and apply the coordinate system used to locate objects in the sky. SC.912.E.5.10
11. Distinguish the various methods of measuring astronomical distances and apply each in appropriate situations. SC.912.E.5.11

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Recognize that the Milky Way is part of the expanding universe. SC.912.E.5.IN.A
b. Identify stars as giant masses of burning gases that are changing. SC.912.E.5.IN.B
c. Describe the Sun as a medium-sized star with sunspots and storms that can affect weather and radio transmissions on Earth. SC.912.E.5.IN.C
d. Recognize that there are other planetary systems in the universe besides the Solar System. SC.912.E.5.IN.D
e. Identify tools that use different types of radiation, such as radio waves, ultraviolet radiation, and infrared waves. SC.912.E.5.IN.E
f. Identify major contributions and research from space exploration that affected Florida's economy and culture. SC.912.E.5.IN.F
g. Recognize a lunar eclipse, a solar eclipse, and the effect of the Moon on tides on Earth. SC.912.E.5.IN.G

Supported

a. Recognize that the universe consists of many galaxies, including the Milky Way. SC.912.E.5.SU.A

b. Recognize that stars are made of burning gases. SC.912.E.5.SU.B

c. Describe observable effects of the Sun on Earth, such as changes in light and temperature. SC.912.E.5.SU.C

d. Recognize that there are planetary systems in the Universe. SC.912.E.5.SU.D

e. Recognize an eclipse. SC.912.E.5.SU.E

f. Identify major contributions related to space exploration that affected Florida. SC.912.E.5.SU.F

g. Recognize examples of tools that use radiation for observation purposes, such as x-rays and infrared night goggles. SC.912.E.5.SU.G

Participatory

a. Recognize that when objects move away from each other, the distance between them expands. SC.912.E.5.PA.A

b. Recognize that stars are bright. SC.912.E.5.PA.B

c. Observe and recognize effects of the Sun on Earth, such as temperature changes. SC.912.E.5.PA.C

d. Recognize that Earth is a planet. SC.912.E.5.PA.D

e. Recognize items, such as freeze-dried food and space blankets, developed because of space exploration. SC.912.E.5.PA.E

f. Recognize a tool that uses radiation for personal reasons, such as x-rays. SC.912.E.5.PA.F

6. **Earth Structures**

    1. Describe and differentiate the layers of Earth and the interactions among them. SC.912.E.6.1
    2. Connect surface features to surface processes that are responsible for their formation. SC.912.E.6.2
    3. Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates. SC.912.E.6.3
    4. Analyze how specific geologic processes and features are expressed in Florida and elsewhere. SC.912.E.6.4
    5. Describe the geologic development of the present day oceans and identify commonly found features. SC.912.E.6.5
    6. Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies. SC.912.E.6.6

        Access Point for Students with Significant Cognitive Disabilities

        Independent

        a. Describe the three layers of Earth (core, mantle, and crust). SC.912.E.6.IN.A
        b. Describe examples of surface features, such as glaciers, valleys, canyons, and dried riverbeds, which are caused by wind and erosion (surface processes). SC.912.E.6.IN.B
        c. Relate a cause and effect of movements in Earth's crust (plate tectonics), such as fault lines in the plates causing earthquakes. SC.912.E.6.IN.C
        d. Identify natural geological processes that change the land and water in Florida, including beach erosion and sinkholes. SC.912.E.6.IN.D

        Supported

        a. Recognize the three layers of Earth (core, mantle, and crust). SC.912.E.6.SU.A
        b. Identify types of surface features, such as hills and valleys. SC.912.E.6.SU.B
        c. Recognize that Earth's crust is broken into parts (plates) that move and cause mountains and volcanoes. SC.912.E.6.SU.C
        d. Recognize examples of natural changes to Florida's land and water, such as beach erosion. SC.912.E.6.SU.D

        Participatory

        a. Identify a surface feature of Earth, such as a hill. SC.912.E.6.PA.A
        b. Recognize that the surface of Earth can change. SC.912.E.6.PA.B

7. **Earth Systems and Patterns**

1. Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon. SC.912.E.7.1
2. Analyze the causes of the various kinds of surface and deep water motion within the oceans and their impacts on the transfer of energy between the poles and the equator. SC.912.E.7.2
3. Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere. SC.912.E.7.3
4. Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans. SC.912.E.7.4
5. Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions. SC.912.E.7.5
6. Relate the formation of severe weather to the various physical factors. SC.912.E.7.6
7. Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change. SC.912.E.7.7
8. Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively. SC.912.E.7.8
9. Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water. SC.912.E.7.9

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify cycles that occur on Earth, such as the water and carbon cycles, and the role energy plays in them. SC.912.E.7.IN.A
b. Recognize that there are circular movements of ocean water (surface and deep-water currents) which move cold water from the poles toward the tropics and vice versa. SC.912.E.7.IN.B
c. Describe the interactions among the atmosphere, hydrosphere, and biosphere, including how air, water, and land support living things and how air temperature affects water and land temperatures. SC.912.E.7.IN.C
d. Describe variations in climate due to geological locations, such as on mountains and the nearness to large bodies of water. SC.912.E.7.IN.D
e. Identify weather conditions using weather data and weather maps. SC.912.E.7.IN.E
f. Compare weather conditions in different types of severe storms, including hurricanes, tornadoes, and thunderstorms. SC.912.E.7.IN.F
g. Recognize that global climate change is related to conditions in the atmosphere and oceans. SC.912.E.7.IN.G

h. Describe how atmospheric and hydrologic conditions, such as hurricanes, drought, wildfires, and sinkholes, affect human behavior. SC.912.E.7.IN.H

i. Recognize that the ocean absorbs most of the solar energy reaching Earth and loses heat primarily by evaporation. SC.912.E.7.IN.I

Supported

a. Recognize the phases of the water cycle that occur on Earth and the role energy plays in the water cycle. SC.912.E.7.SU.A

b. Recognize that currents move the ocean water around Earth. SC.912.E.7.SU.B

c. Recognize components of the atmosphere, the hydrosphere, and the biosphere. SC.912.E.7.SU.C

d. Identify the climate conditions in different parts of the world. SC.912.E.7.SU.D

e. Identify weather conditions, including temperature, wind speed, and humidity. SC.912.E.7.SU.E

f. Recognize conditions in severe storms, such as hurricanes, tornadoes, and thunderstorms. SC.912.E.7.SU.F

g. Recognize that global climate change occurs over a long period of time. SC.912.E.7.SU.G

h. Identify how weather and water conditions affect humans in Florida. SC.912.E.7.SU.H

i. Recognize that the ocean absorbs heat from the Sun and then warms the air. SC.912.E.7.SU.I

Participatory

a. Recognize that clouds release rain (part of the water cycle). SC.912.E.7.PA.A

b. Recognize waves in the ocean. SC.912.E.7.PA.B

c. Recognize that humans, plants, and animals live on the Earth (biosphere). SC.912.E.7.PA.C

d. Recognize that weather (climate) is different in different locations. SC.912.E.7.PA.D

e. Recognize the weather conditions, including severe weather, in Florida. SC.912.E.7.PA.E

f. Recognize that the Sun heats the water in the ocean. SC.912.E.7.PA.F

Physical Science

8. Matter

1. Differentiate among the four states of matter. SC.912.P.8.1
2. Differentiate between physical and chemical properties and physical and chemical changes of matter. SC.912.P.8.2
3. Explore the scientific theory of atoms (also known as atomic theory) by describing changes in the atomic model over time and why those changes were necessitated by experimental evidence. SC.912.P.8.3
4. Explore the scientific theory of atoms (also known as atomic theory) by describing the structure of atoms in terms of protons, neutrons and electrons, and differentiate among these particles in terms of their mass, electrical charges and locations within the atom. SC.912.P.8.4
5. Relate properties of atoms and their position in the periodic table to the arrangement of their electrons. SC.912.P.8.5
6. Distinguish between bonding forces holding compounds together and other attractive forces, including hydrogen bonding and van der Waals forces. SC.912.P.8.6
7. Interpret formula representations of molecules and compounds in terms of composition and structure. SC.912.P.8.7
8. Characterize types of chemical reactions, for example: redox, acid-base, synthesis, and single and double replacement reactions. SC.912.P.8.8
9. Apply the mole concept and the law of conservation of mass to calculate quantities of chemicals participating in reactions. SC.912.P.8.9
10. Describe oxidation-reduction reactions in living and non-living systems. SC.912.P.8.10
11. Relate acidity and basicity to hydronium and hydroxyl ion concentration and pH. SC.912.P.8.11
12. Describe the properties of the carbon atom that make the diversity of carbon compounds possible. SC.912.P.8.12
13. Identify selected functional groups and relate how they contribute to properties of carbon compounds. SC.912.P.8.13

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Classify states of matter as solid, liquid, and gaseous. SC.912.P.8.IN.A
b. Compare characteristics of physical and chemical changes of matter. SC.912.P.8.IN.B
c. Identify the nucleus as the center of an atom. SC.912.P.8.IN.C
d. Recognize that the periodic table includes all known elements. SC.912.P.8.IN.D
e. Identify that compounds are made of two or more elements. SC.912.P.8.IN.E

f. Identify formulas for common compounds, such as H2O and CO2. SC.912.P.8.IN.F

g. Identify properties of common acids and bases. SC.912.P.8.IN.G

h. Identify that carbon is found in all living things. SC.912.P.8.IN.H

Supported

a. Identify examples of states of matter as solid, liquid, and gaseous. SC.912.P.8.SU.A

b. Identify examples of physical and chemical changes. SC.912.P.8.SU.B

c. Recognize that atoms are tiny particles in materials, too small to see. SC.912.P.8.SU.C

d. Recognize examples of common elements, such as oxygen and hydrogen. SC.912.P.8.SU.D

e. Recognize examples of common compounds, such as water and salt. SC.912.P.8.SU.E

f. Match common chemical formulas to their common name, such as H2O to water. SC.912.P.8.SU.F

g. Categorize common materials or foods as acids or bases. SC.912.P.8.SU.G

h. Recognize that carbon is found in all living things. SC.912.P.8.SU.H

Participatory

a. Select an example of a common solid, liquid, and gas. SC.912.P.8.PA.A

b. Recognize a common chemical change, such as cooking, burning, rusting, or decaying. SC.912.P.8.PA.B

c. Recognize that the parts of an object can be put together to make a whole. SC.912.P.8.PA.C

d. Match common compounds to their names or communication symbols. SC.912.P.8.PA.D

e. Recognize that some acids and bases can be dangerous and identify related hazard symbols. SC.912.P.8.PA.E

10. Energy

1. Differentiate among the various forms of energy and recognize that they can be transformed from one form to others. SC.912.P.10.1
2. Explore the Law of Conservation of Energy by differentiating among open, closed, and isolated systems and explain that the total energy in an isolated system is a conserved quantity. SC.912.P.10.2
3. Compare and contrast work and power qualitatively and quantitatively. SC.912.P.10.3
4. Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter. SC.912.P.10.4
5. Relate temperature to the average molecular kinetic energy. SC.912.P.10.5
6. Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum. SC.912.P.10.6
7. Distinguish between endothermic and exothermic chemical processes. SC.912.P.10.7
8. Explain entropy's role in determining the efficiency of processes that convert energy to work. SC.912.P.10.8
9. Describe the quantization of energy at the atomic level. SC.912.P.10.9
10. Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear). SC.912.P.10.10
11. Explain and compare nuclear reactions (radioactive decay, fission and fusion), the energy changes associated with them and their associated safety issues. SC.912.P.10.11
12. Differentiate between chemical and nuclear reactions. SC.912.P.10.12
13. Relate the configuration of static charges to the electric field, electric force, electric potential, and electric potential energy. SC.912.P.10.13
14. Differentiate among conductors, semiconductors, and insulators. SC.912.P.10.14
15. Investigate and explain the relationships among current, voltage, resistance, and power. SC.912.P.10.15
16. Explain the relationship between moving charges and magnetic fields, as well as changing magnetic fields and electric fields, and their application to modern technologies. SC.912.P.10.16
17. Explore the theory of electromagnetism by explaining electromagnetic waves in terms of oscillating electric and magnetic fields. SC.912.P.10.17
18. Explore the theory of electromagnetism by comparing and contrasting the different parts of the electromagnetic spectrum in terms of wavelength, frequency, and energy, and relate them to phenomena and applications. SC.912.P.10.18

19. Explain that all objects emit and absorb electromagnetic radiation and distinguish between objects that are blackbody radiators and those that are not. SC.912.P.10.19

20. Describe the measurable properties of waves and explain the relationships among them and how these properties change when the wave moves from one medium to another. SC.912.P.10.20

21. Qualitatively describe the shift in frequency in sound or electromagnetic waves due to the relative motion of a source or a receiver. SC.912.P.10.21

22. Construct ray diagrams and use thin lens and mirror equations to locate the images formed by lenses and mirrors. SC.912.P.10.22

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify examples of energy being transformed from one form to another (conserved quantity). SC.912.P.10.IN.A

b. Identify power as work done in a certain amount of time using measurable terms, such as watts or horsepower. SC.912.P.10.IN.B

c. Relate the transfer of heat to the states of matter, including gases result from heating, liquids result from cooling a gas, and solids result from further cooling a liquid. SC.912.P.10.IN.C

d. Describe a process that gives off heat (exothermic), such as burning, and a process that absorbs heat (endothermic), such as water coming to a boil. SC.912.P.10.IN.D

e. Identify fundamental forces, including gravitational and electromagnetic. SC.912.P.10.IN.E

f. Identify that atoms can be changed to release energy, such as in nuclear power plants, and recognize one related safety issue. SC.912.P.10.IN.F

g. Identify common conductors and insulators of electricity. SC.912.P.10.IN.G

h. Identify that some electrical devices use different types of power sources and explain what might happen if incorrect electrical components are used. SC.912.P.10.IN.H

i. Identify common applications of electromagnetic waves moving through different media, such as radio waves, microwaves, x-rays, or infrared. SC.912.P.10.IN.I

Supported

a. Recognize energy transformations that occur in everyday life, such as solar energy to electricity. SC.912.P.10.SU.A

b. Recognize the relationship between work and power, such as power is how fast a person or machine does work. SC.912.P.10.SU.B

c. Observe and recognize ways that heat travels, such as through space (radiation), through solids (conduction), and through liquids and gases

(convection). SC.912.P.10.SU.C

d. Recognize common processes that give off heat (exothermic), such as burning, and processes that absorb heat (endothermic), such as water coming to a boil. SC.912.P.10.SU.D

e. Recognize that nuclear power plants generate electricity and can be dangerous. SC.912.P.10.SU.E

f. Recognize fundamental forces, such as gravitational. SC.912.P.10.SU.F

g. Recognize common objects that conduct electricity (conductors) and objects that do not conduct electricity (insulators). SC.912.P.10.SU.G

h. Recognize that some electrical devices use different types of power sources. SC.912.P.10.SU.H

i. Observe and identify the effects of magnetic attraction on iron. SC.912.P.10.SU.I

j. Recognize examples of electromagnetic waves moving through different media, such as microwave ovens, radios, and x-rays. SC.912.P.10.SU.J

Participatory

a. Observe and recognize examples of the transformation of electrical energy to light and heat. SC.912.P.10.PA.A

b. Recognize that work requires energy. SC.912.P.10.PA.B

c. Recognize the source and recipient of heat transfer. SC.912.P.10.PA.C

d. Identify materials that provide protection (insulation) from heat. SC.912.P.10.PA.D

e. Recognize the universal symbols for radioactive and other hazardous materials. SC.912.P.10.PA.E

f. Recognize that an object falls unless stopped (gravity). SC.912.P.10.PA.F

g. Recognize safe and unsafe practices related to the use of electricity, such as keeping foreign objects out of electrical sockets and not using electrical devices around water. SC.912.P.10.PA.G

h. Demonstrate opening and closing an electrical circuit to turn an electrical device on and off. SC.912.P.10.PA.H

i. Recognize how magnets are used in real-world situations. SC.912.P.10.PA.I

j. Recognize primary and secondary colors in visible light. SC.912.P.10.PA.J

12. Motion

1. Distinguish between scalar and vector quantities and assess which should be used to describe an event. SC.912.P.12.1
2. Analyze the motion of an object in terms of its position, velocity, and acceleration (with respect to a frame of reference) as functions of time. SC.912.P.12.2
3. Interpret and apply Newton's three laws of motion. SC.912.P.12.3
4. Describe how the gravitational force between two objects depends on their masses and the distance between them. SC.912.P.12.4
5. Apply the law of conservation of linear momentum to interactions, such as collisions between objects. SC.912.P.12.5
6. Qualitatively apply the concept of angular momentum. SC.912.P.12.6
7. Recognize that nothing travels faster than the speed of light in vacuum which is the same for all observers no matter how they or the light source are moving. SC.912.P.12.7
8. Recognize that Newton's Laws are a limiting case of Einstein's Special Theory of Relativity at speeds that are much smaller than the speed of light. SC.912.P.12.8
9. Recognize that time, length, and energy depend on the frame of reference. SC.912.P.12.9
10. Interpret the behavior of ideal gases in terms of kinetic molecular theory. SC.912.P.12.10
11. Describe phase transitions in terms of kinetic molecular theory. SC.912.P.12.11
12. Explain how various factors, such as concentration, temperature, and presence of a catalyst affect the rate of a chemical reaction. SC.912.P.12.12
13. Explain the concept of dynamic equilibrium in terms of reversible processes occurring at the same rates. SC.912.P.12.13

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Recognize that scalar quantities describe the magnitude of the measurement, such as size, weight, volume, area, temperature, or speed. SC.912.P.12.IN.A
b. Identify acceleration as a change in speed or direction. SC.912.P.12.IN.B
c. Recognize various situations that show Newton's third law of motion: for every action there is an equal and opposite reaction. SC.912.P.12.IN.C
d. Identify examples of how gravity attracts other objects, such as people to Earth or orbits of planets in the Solar System. SC.912.P.12.IN.D
e. Recognize that the speed of light is always the same. SC.912.P.12.IN.E
f. Identify that gases exert pressure in a closed surface, such as pressure inside a basketball or a hot air balloon. SC.912.P.12.IN.F

Supported

a. Recognize that speed is expressed as distance moved in a certain time, such as miles per hour or feet per second. SC.912.P.12.SU.A

b. Recognize that acceleration generally involves a change in speed. SC.912.P.12.SU.B

c. Recognize the action and reaction in a situation that show Newton's third law of motion: for every action there is an equal and opposite reaction. SC.912.P.12.SU.C

d. Identify that gravity is a force that attracts objects. SC.912.P.12.SU.D

e. Recognize that light travels very fast. SC.912.P.12.SU.E

f. Recognize that a gas can exert pressure, such as in balloons, car tires, or pool floats. SC.912.P.12.SU.F

Participatory

a. Recognize that objects travel at different speeds. SC.912.P.12.PA.A

b. Identify the speed and direction of a moving object, including fast and slow, up and down, round and round, straight line. SC.912.P.12.PA.B

c. Identify the source of the force moving an object. SC.912.P.12.PA.C

d. Recognize that things fall down toward Earth unless stopped or held up (gravity). SC.912.P.12.PA.D

e. Recognize ways to stop light from traveling, such as closing a door. SC.912.P.12.PA.E

f. Recognize that some objects contain air, such as balloons, tires, and balls. SC.912.P.12.PA.F

Life Science

14. Organization and Development of Living Organisms

1. Describe the scientific theory of cells (cell theory) and relate the history of its discovery to the process of science. SC.912.L.14.1
2. Relate structure to function for the components of plant and animal cells. Explain the role of cell membranes as a highly selective barrier (passive and active transport). SC.912.L.14.2
3. Compare and contrast the general structures of plant and animal cells. Compare and contrast the general structures of prokaryotic and eukaryotic cells. SC.912.L.14.3
4. Compare and contrast structure and function of various types of microscopes. SC.912.L.14.4
5. Explain the evidence supporting the scientific theory of the origin of eukaryotic cells (endosymbiosis). SC.912.L.14.5
6. Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health. SC.912.L.14.6
7. Relate the structure of each of the major plant organs and tissues to physiological processes. SC.912.L.14.7
8. Explain alternation of generations in plants. SC.912.L.14.8
9. Relate the major structure of fungi to their functions. SC.912.L.14.9
10. Discuss the relationship between the evolution of land plants and their anatomy. SC.912.L.14.10
11. Classify and state the defining characteristics of epithelial tissue, connective tissue, muscle tissue, and nervous tissue. SC.912.L.14.11
12. Describe the anatomy and histology of bone tissue. SC.912.L.14.12
13. Distinguish between bones of the axial skeleton and the appendicular skeleton. SC.912.L.14.13
14. Identify the major bones of the axial and appendicular skeleton. SC.912.L.14.14
15. Identify major markings (such as foramina, fossae, tubercles, etc.) on a skeleton. Explain why these markings are important. SC.912.L.14.15
16. Describe the anatomy and histology, including ultrastructure, of muscle tissue. SC.912.L.14.16
17. List the steps involved in the sliding filament of muscle contraction. SC.912.L.14.17
18. Describe signal transmission across a myoneural junction. SC.912.L.14.18
19. Explain the physiology of skeletal muscle. SC.912.L.14.19
20. Identify the major muscles of the human on a model or diagram. SC.912.L.14.20
21. Describe the anatomy, histology, and physiology of the central and peripheral nervous systems and name the major divisions of the nervous

system. SC.912.L.14.21

22. Describe the physiology of nerve conduction, including the generator potential, action potential, and the synapse. SC.912.L.14.22
23. Identify the parts of a reflex arc. SC.912.L.14.23
24. Identify the general parts of a synapse and describe the physiology of signal transmission across a synapse. SC.912.L.14.24
25. Identify the major parts of a cross section through the spinal cord. SC.912.L.14.25
26. Identify the major parts of the brain on diagrams or models. SC.912.L.14.26
27. Identify the functions of the major parts of the brain, including the meninges, medulla, pons, midbrain, hypothalamus, thalamus, cerebellum and cerebrum. SC.912.L.14.27
28. Identify the major functions of the spinal cord. SC.912.L.14.28
29. Define the terms endocrine and exocrine. SC.912.L.14.29
30. Compare endocrine and neural controls of physiology. SC.912.L.14.30
31. Describe the physiology of hormones including the different types and the mechanisms of their action. SC.912.L.14.31
32. Describe the anatomy and physiology of the endocrine system. SC.912.L.14.32
33. Describe the basic anatomy and physiology of the reproductive system. SC.912.L.14.33
34. Describe the composition and physiology of blood, including that of the plasma and the formed elements. SC.912.L.14.34
35. Describe the steps in hemostasis, including the mechanism of coagulation. Include the basis for blood typing and transfusion reactions. SC.912.L.14.35
36. Describe the factors affecting blood flow through the cardiovascular system. SC.912.L.14.36
37. Explain the components of an electrocardiogram. SC.912.L.14.37
38. Describe normal heart sounds and what they mean. SC.912.L.14.38
39. Describe hypertension and some of the factors that produce it. SC.912.L.14.39
40. Describe the histology of the major arteries and veins of systemic, pulmonary, hepatic portal, and coronary circulation. SC.912.L.14.40
41. Describe fetal circulation and changes that occur to the circulatory system at birth. SC.912.L.14.41
42. Describe the anatomy and the physiology of the lymph system. SC.912.L.14.42
43. Describe the histology of the respiratory system. SC.912.L.14.43
44. Describe the physiology of the respiratory system including the mechanisms of ventilation, gas exchange, gas transport and the mechanisms that control the rate of ventilation. SC.912.L.14.44

45. Describe the histology of the alimentary canal and its associated accessory organs. SC.912.L.14.45

46. Describe the physiology of the digestive system, including mechanical digestion, chemical digestion, absorption and the neural and hormonal mechanisms of control. SC.912.L.14.46

47. Describe the physiology of urine formation by the kidney. SC.912.L.14.47

48. Describe the anatomy, histology, and physiology of the ureters, the urinary bladder and the urethra. SC.912.L.14.48

49. Identify the major functions associated with the sympathetic and parasympathetic nervous systems. SC.912.L.14.49

50. Describe the structure of vertebrate sensory organs. Relate structure to function in vertebrate sensory systems. SC.912.L.14.50

51. Describe the function of the vertebrate integumentary system. SC.912.L.14.51

52. Explain the basic functions of the human immune system, including specific and nonspecific immune response, vaccines, and antibiotics. SC.912.L.14.52

53. Discuss basic classification and characteristics of plants. Identify bryophytes, pteridophytes, gymnosperms, and angiosperms. SC.912.L.14.53

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify that all living things are made of cells and cells function in similar ways (cell theory). SC.912.L.14.IN.A

b. Identify the major parts of plant and animal cells, including the cell membrane, nucleus, and cytoplasm, and their basic functions. SC.912.L.14.IN.B

c. Identify that parts of cells (organelles) can combine to work together. SC.912.L.14.IN.C

d. Describe common human health issues. SC.912.L.14.IN.D

e. Describe the general processes of food production, support, water transport, and reproduction in the major parts of plants. SC.912.L.14.IN.E

Supported

a. Identify that the cell is the smallest basic unit of life and that all living things are made of cells. SC.912.L.14.SU.A

b. Recognize that cells have different parts and each has a function. SC.912.L.14.SU.B

c. Recognize common human health issues. SC.912.L.14.SU.C

d. Relate parts of plants, such as leaf, stem, root, seed, and flower, to the functions of food production, support, water transport, and reproduction. SC.912.L.14.SU.D

Participatory

a. Match parts of common living things to their functions. SC.912.L.14.PA.A

b. Recognize that small parts of a living thing can work together. SC.912.L.14.PA.B

c. Identify ways to prevent infection from bacteria and viruses, such as hand washing and first aid. SC.912.L.14.PA.C

d. Recognize major plant parts, such as root, stem, leaf, and flower. SC.912.L.14.PA.D

15. Diversity and Evolution of Living Organisms

1. Explain how the scientific theory of evolution is supported by the fossil record, comparative anatomy, comparative embryology, biogeography, molecular biology, and observed evolutionary change. SC.912.L.15.1
2. Discuss the use of molecular clocks to estimate how long ago various groups of organisms diverged evolutionarily from one another. SC.912.L.15.2
3. Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction. SC.912.L.15.3
4. Describe how and why organisms are hierarchically classified and based on evolutionary relationships. SC.912.L.15.4
5. Explain the reasons for changes in how organisms are classified. SC.912.L.15.5
6. Discuss distinguishing characteristics of the domains and kingdoms of living organisms. SC.912.L.15.6
7. Discuss distinguishing characteristics of vertebrate and representative invertebrate phyla, and chordate classes using typical examples. SC.912.L.15.7
8. Describe the scientific explanations of the origin of life on Earth. SC.912.L.15.8
9. Explain the role of reproductive isolation in the process of speciation. SC.912.L.15.9
10. Identify basic trends in hominid evolution from early ancestors six million years ago to modern humans, including brain size, jaw size, language, and manufacture of tools. SC.912.L.15.10
11. Discuss specific fossil hominids and what they show about human evolution. SC.912.L.15.11
12. List the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature. Use the Hardy-Weinberg equation to predict genotypes in a population from observed phenotypes. SC.912.L.15.12
13. Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success. SC.912.L.15.13
14. Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow. SC.912.L.15.14
15. Describe how mutation and genetic recombination increase genetic variation. SC.912.L.15.15

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify that prehistoric plants and animals changed over time (evolved) or became extinct. SC.912.L.15.IN.A
b. Classify living organisms into their kingdoms. SC.912.L.15.IN.B

c. Identify that there are scientific explanations of the origin of life on Earth. SC.912.L.15.IN.C

d. Recognize ways that the appearance of humans, their language, and their tools have changed over time. SC.912.L.15.IN.D

e. Recognize that some living things produce very large numbers of offspring to ensure that enough survive to continue the species (a condition for natural selection). SC.912.L.15.IN.E

f. Recognize that changes in the genes of a species can affect the characteristics of their offspring. SC.912.L.15.IN.F

Supported

a. Match fossils to related species. SC.912.L.15.SU.A

b. Match organisms to the animal, plant, and fungus kingdoms. SC.912.L.15.SU.B

c. Recognize that there are scientific explanations of how life began. SC.912.L.15.SU.C

d. Recognize that humans have changed in appearance over a very long period of time. SC.912.L.15.SU.D

e. Recognize that some living things, such as fish and turtles, produce very large numbers of offspring because most will die as a result of dangers in the environment before they grow up. SC.912.L.15.SU.E

f. Recognize that characteristics of the offspring of living things are sometimes different from their parents. SC.912.L.15.SU.F

Participatory

a. Recognize that plants and animals change as they age. SC.912.L.15.PA.A

b. Sort common living things into plant and animal kingdoms. SC.912.L.15.PA.B

c. Recognize that animals produce offspring. SC.912.L.15.PA.C

d. Recognize differences in physical characteristics within a species of animals, such as different types of dogs. SC.912.L.15.PA.D

16. Heredity and Reproduction

1. Use Mendel's laws of segregation and independent assortment to analyze patterns of inheritance. SC.912.L.16.1
2. Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles. SC.912.L.16.2
3. Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic information. SC.912.L.16.3
4. Explain how mutations in the DNA sequence may or may not result in phenotypic change. Explain how mutations in gametes may result in phenotypic changes in offspring. SC.912.L.16.4
5. Explain the basic processes of transcription and translation, and how they result in the expression of genes. SC.912.L.16.5
6. Discuss the mechanisms for regulation of gene expression in prokaryotes and eukaryotes at transcription and translation level. SC.912.L.16.6
7. Describe how viruses and bacteria transfer genetic material between cells and the role of this process in biotechnology. SC.912.L.16.7
8. Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer. SC.912.L.16.8
9. Explain how and why the genetic code is universal and is common to almost all organisms. SC.912.L.16.9
10. Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues. SC.912.L.16.10
11. Discuss the technologies associated with forensic medicine and DNA identification, including restriction fragment length polymorphism (RFLP) analysis. SC.912.L.16.11
12. Describe how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, polymerase chain reaction, ligation, and transformation) is used to construct recombinant DNA molecules (DNA cloning). SC.912.L.16.12
13. Describe the basic anatomy and physiology of the human reproductive system. Describe the process of human development from fertilization to birth and major changes that occur in each trimester of pregnancy. SC.912.L.16.13
14. Describe the cell cycle, including the process of mitosis. Explain the role of mitosis in the formation of new cells and its importance in maintaining chromosome number during asexual reproduction. SC.912.L.16.14
15. Compare and contrast binary fission and mitotic cell division. SC.912.L.16.15
16. Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores. SC.912.L.16.16
17. Compare and contrast mitosis and meiosis and relate to the processes of sexual and asexual reproduction and their consequences for genetic

variation. SC.912.L.16.17

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify that genes are sets of instructions that determine which characteristics are passed from parent to offspring. SC.912.L.16.IN.A

b. Identify traits that plants and animals, including humans, inherit. SC.912.L.16.IN.B

c. Recognize that a substance called DNA carries genetic information in all organisms, and changes (mutations) in DNA can be helpful or harmful to an organism. SC.912.L.16.IN.C

d. Identify that cancer can result when cells change or grow uncontrollably. SC.912.L.16.IN.D

e. Identify ways that biotechnology has impacted society and the environment, such as the development of new medicines and farming techniques. SC.912.L.16.IN.E

f. Describe the basic process of human development from fertilization to birth. SC.912.L.16.IN.F

g. Recognize that cells reproduce by dividing to produce new cells that are identical (mitosis) or new cells that are different (meiosis). SC.912.L.16.IN.G

Supported

a. Recognize characteristics (traits) that offspring inherit from parents. SC.912.L.16.SU.A

b. Recognize that all organisms have a substance called DNA with unique information. SC.912.L.16.SU.B

c. Recognize that cancer may result when cells change or grow too fast. SC.912.L.16.SU.C

d. Recognize that new medicines and foods can be developed by science (biotechnology). SC.912.L.16.SU.D

e. Recognize major phases in the process of human development from fertilization to birth. SC.912.L.16.SU.E

f. Recognize that cells reproduce by dividing. SC.912.L.16.SU.F

Participatory

a. Recognize similar characteristics (traits) between a child and parents, such as hair, eye, and skin color, or height. SC.912.L.16.PA.A

b. Recognize similarities in characteristics of plants and animals of the same type (species). SC.912.L.16.PA.B

c. Recognize that illness can result when parts of our bodies are not working properly. SC.912.L.16.PA.C

d. Recognize a food. SC.912.L.16.PA.D

e. Recognize the sequence of human development from baby to child to adult. SC.912.L.16.PA.E

f. Recognize that living things produce offspring (reproduce). SC.912.L.16.PA.F

17. Interdependence

1. Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution. SC.912.L.17.1
2. Explain the general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature. SC.912.L.17.2
3. Discuss how various oceanic and freshwater processes, such as currents, tides, and waves, affect the abundance of aquatic organisms. SC.912.L.17.3
4. Describe changes in ecosystems resulting from seasonal variations, climate change and succession. SC.912.L.17.4
5. Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity. SC.912.L.17.5
6. Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism. SC.912.L.17.6
7. Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems. SC.912.L.17.7
8. Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species. SC.912.L.17.8
9. Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels. SC.912.L.17.9
10. Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle. SC.912.L.17.10
11. Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. SC.912.L.17.11
12. Discuss the political, social, and environmental consequences of sustainable use of land. SC.912.L.17.12
13. Discuss the need for adequate monitoring of environmental parameters when making policy decisions. SC.912.L.17.13
14. Assess the need for adequate waste management strategies. SC.912.L.17.14
15. Discuss the effects of technology on environmental quality. SC.912.L.17.15
16. Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution. SC.912.L.17.16
17. Assess the effectiveness of innovative methods of protecting the environment. SC.912.L.17.17
18. Describe how human population size and resource use relate to environmental quality. SC.912.L.17.18
19. Describe how different natural resources are produced and how their rates of use and renewal limit availability. SC.912.L.17.19

20. Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability. SC.912.L.17.20

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Recognize that living things in oceans and fresh water are affected by the location, availability of light, depth of the water, and temperature. SC.912.L.17.IN.A

b. Identify that living things in an ecosystem are affected by changes in the environment, such as changes to the food supply, climate change, or the introduction of predators. SC.912.L.17.IN.B

c. Identify relationships among organisms, including helping each other (mutualism); obtaining food (predation); benefiting at the expense of the other (parasitism); and competing with each other for food, space, or shelter (competition). SC.912.L.17.IN.C

d. Recognize possible changes in an ecosystem (biodiversity) that can result from natural catastrophic events, changes in climate, and human activity. SC.912.L.17.IN.D

e. Identify the components of a food web, including sunlight, producers, consumers, and decomposers, and trace the flow of energy from the Sun. SC.912.L.17.IN.E

f. Identify the contributions of non-living elements, such as carbon and oxygen, to maintaining life in an ecosystem. SC.912.L.17.IN.F

g. Identify types of renewable and nonrenewable natural resources and explain the need for conservation. SC.912.L.17.IN.G

h. Describe ways the lifestyles of individuals and groups can help or hurt the environment. SC.912.L.17.IN.H

Supported

a. Recognize that living things in bodies of water are affected by the location and depth of the water. SC.912.L.17.SU.A

b. Recognize how animals and plants in an ecosystem may be affected by changes to the food supply or climate. SC.912.L.17.SU.B

c. Recognize that organisms can interact with other organisms in an ecosystem to help each other (mutualism), to obtain food (predation), and to benefit at expense of the other (parasitism). SC.912.L.17.SU.C

d. Recognize changes in living things (biodiversity) that can result from natural catastrophic events and human activity. SC.912.L.17.SU.D

e. Identify producers, consumers, and decomposers in a simple food chain. SC.912.L.17.SU.E

f. Identify that clean water and air are important for supporting life in an ecosystem. SC.912.L.17.SU.F

g. Identify a way to conserve a familiar, nonrenewable, natural resource. SC.912.L.17.SU.G

h. Identify ways individuals can help the environment. SC.912.L.17.SU.H

Participatory

a. Recognize common living things in bodies of water. SC.912.L.17.PA.A

b. Recognize what happens to plants and animals when they don't get enough food or water. SC.912.L.17.PA.B

c. Recognize examples of mutual relationships between people and other living things. SC.912.L.17.PA.C

d. Recognize actions that are harmful to living things. SC.912.L.17.PA.D

e. Recognize that animals (consumers) eat animals and plants for food. SC.912.L.17.PA.E

f. Recognize the importance of clean water for living things. SC.912.L.17.PA.F

g. Recognize a way to help the local environment. SC.912.L.17.PA.G

18. Matter and Energy Transformations

1. Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules. SC.912.L.18.1
2. Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things. SC.912.L.18.2
3. Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes. SC.912.L.18.3
4. Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes. SC.912.L.18.4
5. Discuss the use of chemiosmotic gradients for ATP production in chloroplasts and mitochondria. SC.912.L.18.5
6. Discuss the role of anaerobic respiration in living things and in human society. SC.912.L.18.6
7. Identify the reactants, products, and basic functions of photosynthesis. SC.912.L.18.7
8. Identify the reactants, products, and basic functions of aerobic and anaerobic cellular respiration. SC.912.L.18.8
9. Explain the interrelated nature of photosynthesis and cellular respiration. SC.912.L.18.9
10. Connect the role of adenosine triphosphate (ATP) to energy transfers within a cell. SC.912.L.18.10
11. Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity. SC.912.L.18.11
12. Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent. SC.912.L.18.12

Access Point for Students with Significant Cognitive Disabilities

Independent

a. Identify that carbohydrates, fats, proteins, and nucleic acids (macromolecules) are important for human organisms. SC.912.L.18.IN.A
b. Identify the products and function of photosynthesis. SC.912.L.18.IN.B
c. Identify that cells release energy from food so the organism can use it (cellular respiration). SC.912.L.18.IN.C
d. Recognize that plants give off oxygen that is used by animals and animals give off carbon dioxide that is used by plants. SC.912.L.18.IN.D
e. Recognize that energy is stored in cells. SC.912.L.18.IN.E

f. Recognize that enzymes break down food molecules during the digestive process. SC.912.L.18.IN.F

g. Identify that special properties of water, such as the ability to moderate temperature and dissolve substances, help to sustain living things on Earth. SC.912.L.18.IN.G

Supported

a. Recognize that humans use proteins, carbohydrates, and fats. SC.912.L.18.SU.A

b. Recognize that the function of photosynthesis is to produce food for plants. SC.912.L.18.SU.B

c. Recognize that cells get energy from food. SC.912.L.18.SU.C

d. Recognize that people and animals breathe in the oxygen that plants give off. SC.912.L.18.SU.D

e. Recognize that food is broken down in digestion (use of enzymes). SC.912.L.18.SU.E

f. Identify the important role of water in sustaining life of plants and animals. SC.912.L.18.SU.F

Participatory

a. Recognize that humans need different kinds of food. SC.912.L.18.PA.A

b. Recognize that plants need water, light, and air to grow. SC.912.L.18.PA.B

c. Identify that food is a source of energy. SC.912.L.18.PA.C

d. Recognize that saliva helps people eat when they chew. SC.912.L.18.PA.D

e. Recognize that plants and animals use water to live. SC.912.L.18.PA.E