

**TIMOTHY LUTHERAN SCHOOL**  
**Teaching Objectives/Learner Outcomes**

**Overall Summary of Subject: Science**

**By the working of the Holy Spirit through God's Word and the Discovery Works Science Curriculum, the students will learn to:**

**Honor God in the value placed on all human life.**

**Honor God in the appreciation, care, and management of plants, animals, natural resources, and the environment.**

**Honor God in the use of their creativity, abilities, skills, and technology to glorify God and serve others.**

**Recognize evidences of God-created orderliness.**

**Interpret scientific data in the light of what God's Word teaches.**

**Recognize that scientific concepts and properties are given by God and can be applied to explain or solve problems and improve life within God's creation.**

**Demonstrate understanding of scientific concepts and properties in four content areas:**

- a. Life science-plants, animals, ecology.**
- b. Physical science-matter, energy, chemistry, electricity.**
- c. Earth science-earth, weather, space.**
- d. Human body-anatomy, physiology, health, and nutrition.**

**Apply scientific thinking and method in investigations and experiments:**

- a. Observe- use all five senses when making observations, interpret observations by applying previous knowledge, record observations accurately, objectively and sequentially.**
- b. Hypothesize-formulate simple hypotheses or predictions.**
- c. Research-gather data from a variety of sources, interpret data from graphic organizers, organize data in a way that is useful for investigating.**
- d. Experiment-follow or construct experiment or investigation to test hypotheses.**
- e. Analyze-group or classify objects, information, and/or results; interpret data from experimentation or investigation; listen to others' views; and revise interpretations when appropriate.**
- f. Conclude-formulate and share meaningful conclusions; report findings in clear, organized, comprehensive manner; and accurately draw and label diagrams or graphic organizers to communicate results.**

**TIMOTHY LUTHERAN SCHOOL**  
**Teaching Objectives/Learner Outcomes**

**Subject: Science**

Grade	Objective
Kindergarten	<p data-bbox="537 239 1224 275"><b>I. <u>Properties and Principles of Matter and Energy</u></b></p> <p data-bbox="537 310 1268 380"><b>1. Changes in properties and states of matter provide evidence of the atomic theory of matter.</b></p> <p data-bbox="537 422 1305 491"><b>A. Objects, and the materials they are made of, have properties that can be used to describe and classify them</b></p> <ul data-bbox="537 491 1370 856" style="list-style-type: none"> <li data-bbox="537 491 1344 638">• Describe physical properties of objects (e.g., size, shape, color, mass) by using the senses, simple tools (e.g., magnifiers, equal arm balances), and/or nonstandard measures (e.g., bigger/smaller; more/less)</li> <li data-bbox="537 638 1370 785">• Identify materials (e.g., cloth, paper, wood, rock, metal) that make up an object and some of the physical properties of the materials (e.g., color, texture, shiny/dull, odor, sound, taste, flexibility)</li> <li data-bbox="537 785 1370 856">• Sort objects based on observable physical properties (e.g., size, material, color, shape, mass)</li> </ul> <p data-bbox="537 898 1370 1003"><b>2. Energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.</b></p> <p data-bbox="537 1045 1305 1115"><b>A. Forms of energy have a source, a means of transfer (work and heat), and a receiver</b></p> <ul data-bbox="537 1115 1354 1297" style="list-style-type: none"> <li data-bbox="537 1115 1354 1220">• Identify the sounds and their source of vibrations in everyday life (e.g., alarms, car horns, animals, machines, musical instruments)</li> <li data-bbox="537 1220 1354 1262">• Compare different sounds (e.g., loudness, pitch, rhythm)</li> <li data-bbox="537 1262 1354 1297">• Recognize that the ear serves as a receiver of sound</li> </ul> <p data-bbox="537 1339 1219 1375"><b>II. <u>Properties and Principles of Force and Motion</u></b></p> <p data-bbox="537 1409 1289 1478"><b>1. The motion of an object is described by its change in position relative to another object or point.</b></p> <p data-bbox="537 1520 1300 1625"><b>A. The motion of an object is described as a change in position, direction, and speed relative to another object (frame of reference)</b></p> <ul data-bbox="537 1625 1328 1703" style="list-style-type: none"> <li data-bbox="537 1625 1328 1703">• Describe an object's position relative to another object (e.g., above, below, in front of, behind)</li> </ul> <p data-bbox="537 1745 857 1780"><b>2. Forces affect motion</b></p> <p data-bbox="537 1780 1317 1877"><b>A. Forces are classified as either contact (pushes, pulls, friction, buoyancy) or non-contact (gravity, magnetism), described in terms of direction and magnitude</b></p>

- Identify ways (push, pull) to cause some objects to move by touching them
- Recognize magnets cause some objects to move without touching them

### **III. Characteristics and Interactions of Living Organisms**

**1. There is a fundamental unity underlying the diversity of all living organisms.**

**A. Organisms have basic needs for survival.**

- Identify the basic needs of most animals (e.g., air, water, food, shelter)
- Identify the basic needs of most plants (e.g. air, water, light)

**B. Plants and animals have different structures that serve similar functions necessary for the survival of the organism.**

- Observe and compare the structures and behaviors of different kinds of plants and animals

**2. There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes.**

**A. There is heritable variation within every species of organism**

- Recognize that living things have offspring
- Recognize a parent - offspring relationship based on the organisms' physical similarities and differences

### **IV. Changes in Ecosystems and Interactions of Organisms with Their Environments.**

**1. Organisms are interdependent with one another and with their environment.**

**A. All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem**

- Describe how the seasons affect the behavior of plants and animals
- Describe how the seasons affect the everyday life of humans (e.g., clothing, activities)

### **V. Processes and Interactions of the Earth's Systems**

**(Geosphere, Atmosphere and Hydrosphere)**

**1. Earth's systems (geosphere, atmosphere and hydrosphere) have common components and unique structures.**

**A. The atmosphere (air) is composed of a mixture of gases, including water vapor and minute particles**

- Recognize moving air is felt as wind

**2. Earth's systems (geosphere, atmosphere and hydrosphere) interact with one another as they undergo change by common processes.**

**A. Constantly changing properties of the atmosphere occur in patterns which are described as weather**

- Observe and describe daily weather: precipitation (e.g., snow, rain, sleet, fog), wind (e.g., light breezes to strong wind), cloud cover, temperature
- Observe and describe the general weather conditions that occur during each season

**VI. Composition and Structure of the Universe and the Motion of the Objects Within It.**

**1. The universe has observable properties and structure.**

**A. The Earth, Sun, and moon are part of a larger system that includes other planets and smaller celestial bodies**

- Observe and describe the presence of the Sun, moon and stars in the sky
- Recognize there are more stars in the sky than anyone can easily count, but they vary in brightness and are not scattered evenly

**2. Regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.**

**A. The apparent position of the Sun and other stars, as seen from Earth, changes in observable patterns**

- Describe the Sun as only being seen in the daytime
- Recognize the Sun appears to move across the sky from morning to night

**B. The apparent position of the moon, as seen from Earth, and its actual position relative to Earth change in observable**

**patterns**

- **Observe the moon can be seen sometimes at night and sometimes during the daytime**
- **Recognize the moon appears to change shape over the course of a month**

**C. The regular and predictable motions of the Earth and moon relative to the Sun explain natural phenomena on Earth, such as day, month, year, shadows, moon phases, eclipses, tides, and seasons**

- **Observe and describe the characteristics of the four seasons as they cycle through the year (summer, fall, winter, spring)**

## **VII. Scientific Inquiry**

**1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning and critical thinking.**

**A. Scientific inquiry includes the ability of students to formulate a testable question and explanation, and to select appropriate investigative methods in order to obtain evidence relevant to the explanation**

- **Pose questions about objects, materials, organisms and events in the environment**
- **Conduct a simple investigation (fair test) to answer a question**

**B. Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations**

- **Make qualitative observations using the five senses**
- **Make observations using simple tools and equipment (e.g., magnifiers/hand lenses, magnets, equal arm balances, thermometers)**
- **Measure length and mass using non-standard units**
- **Compare amounts/measurements**

**C. Evidence is used to formulate explanations**

- **Use observations as support for reasonable explanations**
- **Use observations to describe relationships and patterns and to make predictions to be tested**

**D. Scientific inquiry includes evaluation of explanations (hypotheses, laws, theories) in light of scientific principles (understandings)**

- **Compare explanations with prior knowledge**

**E. The nature of science relies upon communication of results and justification of explanations**

- **Communicate observations using words, pictures, and numbers**

### **VIII. Impact of Science, Technology and Human Activity.**

**1. The nature of technology can advance, and is advanced by, science as it seeks to apply scientific knowledge in ways that meet human needs.**

**A. Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all**

- **Recognize some objects occur in nature (natural objects); others have been designed and made by people**

**B. Advances in technology often result in improved data collection and an increase in scientific information**

- **Describe how tools have helped scientists make better observations (e.g., magnifiers)**

**2. Science and technology affect, and are affected by, society.**

**A. People, alone or in groups, are always making discoveries about nature and inventing new ways to solve problems and get work done**

- **Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of individuals solving everyday problems or learning through discovery)**
- **Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member**

**Grade 1**

**Overall Objective: First grade students learn that they have a responsibility to be good stewards of all the gifts God has given to this world.**

**During first grade instruction, students will learn to:**

**I. General**

**1. Follow the steps of the scientific method:**

**Observe  
Hypothesize  
Research  
Experiment  
Analyze  
Conclude**

**2. Work cooperatively with peers to perform a science experiment;**

**3. Take care of and use science tools carefully;**

**4. Follow oral and/or written directions and steps in a sequential order;**

**5. Keep a science log;**

**6. Demonstrate an understanding of key scientific concepts and properties in each of the content areas.**

**II. Life Science- Kinds of Living Things;**

**The students will understand that -**

**1. God, our creator, made man in His own image;**

**2. A wide variety of plants and animals can be found living almost everywhere on the earth;**

**3. Some plants are similar to one another in the way they look and in the things they do;**

**4. The characteristics of plants vary from one kind of plant to another and among plants of the same kind;**

**5. Some animals are similar to one another in appearance and in the things they do;**

**6. All animals have the ability to move from place to place;**

**7. Animal movement frequently varies from one kind of animal to another and includes walking, running, crawling, hopping, flying, and swimming;**

**8. All animals have body coverings, which vary with the kinds of animals;**

**9. Animal homes vary, but all the homes provide shelter and limited safety for the animals;**

**10. All animals must eat in order to survive;**

**11. Different kinds of animals have different mouthparts to help them eat their own kinds of food;**

**12. Animals can be grouped or classified according to their characteristics;**

### **III. Physical Science-Magnets**

**The students will understand that -**

- 1. Materials can be classified as to whether or not magnets attract them;**
- 2. Magnetic force can pass through air and certain materials, making it possible to move objects without touching them;**
- 3. The strength of the magnet being used and the thickness of the material will affect the magnetic force on an object;**
- 4. Magnets have different amounts of strength;**
- 5. The size of a magnet is not always an indication of its strength;**
- 6. Magnetic force is greatest at the ends (poles) of a magnet;**
- 7. The poles of two magnets always act in the same way when they are brought near each other;**
- 8. Two like poles repel each other, and two unlike poles attract each other;**
- 9. The space around which the force of a magnet acts or is felt is called the magnetic field;**
- 10. Evidence of this magnetic field can be observed by using iron filings;**
- 11. A temporary magnet can be made by stroking an object with a magnet to line up the magnetic domains within the magnetic materials comprising the object;**
- 12. When floating in water, a bar magnet acts like a compass by turning until its north-seeking pole points to the earth's north pole.**

### **IV. Earth-Weather and Seasons**

**The students will understand that -**

- 1. Weather conditions change daily;**
- 2. Sunlight warms the earth's surface, which in turn warms the air above it;**
- 3. The more sunlight received, the warmer that surfaces and air become;**
- 4. Some materials absorb more of the sun's heat than do other materials;**
- 5. Wind, or moving air, can blow fast or slow;**
- 6. Water in and from the air can exist as water vapor (an invisible gaseous state of water), as a liquid (clouds,**

- fog, rain, dew), and as a solid (snow, hail, sleet, frost);
7. There are four seasons-spring, summer, autumn, winter, and the weather varies with each season;
  8. The weather conditions change with the seasons, and people adjust their activities and their clothing to meet the changes;
  9. Animals change in a variety of ways in response to seasonal weather conditions;
  10. Weather conditions, such as temperature, affect the growth of plants.

**V. Earth's Land and Water**

The students will understand that -

1. Several kinds of soil compose the different layers of the earth's surface;
2. Soil contains rocks, water, once-living things, and living organisms;
3. When water is added to soil, some of the water will be absorbed by the soil;
4. Rocks can be grouped according to color, shape, and texture;
5. Rocks have varying degrees of hardness;
6. Rocks vary in size from grains of sand to boulders;
7. Water flows downhill in streams or rivers;
8. A small amount of water may accumulate to form a puddle;
9. A large amount of water may accumulate to form a lake;
10. Food scraps change form in soil over time and can be recycled as compost for a vegetable garden.

**Grade 2**

**Overall Objective:** Second grade students learn that they have a responsibility to be a good steward of all the gifts God has given to this world.

**I. General**

During second-grade science instruction, students will continue to develop their skills in:

1. Applying and using the scientific method -  
Observe  
Hypothesize  
Research  
Experiment  
Analyze  
Conclude
2. Working cooperatively with peers to complete a science experiment.
3. Taking care of and using science equipment safely.
4. Developing the skill of keeping a science log;
5. Demonstrating an understanding of the grade level concepts and properties in the content areas.

**II. Life Science Interactions of Living Things**

The students will understand that -

1. Objects from an environment can be classified into two categories;
2. Living and once living, and nonliving;
3. Most plants and animals need food, water, light, and suitable environments to survive;
4. Green plants have specific parts that enable them to meet their basic needs;
5. Living things are dependent on both living and nonliving parts of their environments to meet their basic needs;
6. Animals use living and nonliving resources in their environment to provide shelter;
7. Animals' characteristics and body structures are uniquely adapted to their environment and to the kinds of food they eat;
8. Some animals change the places that they live to make the environment better meet their needs;
9. Environments can be changed by both natural and human forces;
10. Different environments contain plants and animals

that are suited to that environment and are able to survive under the conditions of that environment;  
11. Specific plants and animals have features that allow them to survive in specific environments.

### **III. Physical Science – Light and Color**

The students will understand that -

1. A variety of sources of light exist, some that are natural and others that are made by people;
2. An object can be seen by people when the object is illuminated by a light source;
3. Light sources produce both light and heat;
4. Light travels in a straight line;
5. Different objects transmit light in different ways;
6. Objects placed in a beam of light cast shadows;
7. The size and clarity of a shadow can be altered by adjusting the distance and angle between the light source and the object casting the shadow;
8. White light is a combination of many colors, and when separated, produces the colors of the spectrum;
9. Mixing colors produces different colors.

### **IV. Physical Science - Solids, Liquids, and Gases**

The students will understand that -

1. Solid objects have properties that can be used to describe and group the objects;
2. Liquids have properties that can be used to describe and group the liquids;
3. A solid has a definite shape, but a liquid does not; a liquid takes the shape of the container it is in;
4. All objects occupy space;
5. When heat is applied to ice, the ice (solid water) changes to liquid water;
6. When heat energy is applied to water, the liquid water changes to gaseous water (water vapor);
7. When gaseous water (water vapor) is cooled, the water vapor changes to liquid water.
8. When a liquid is cooled, it changes to a solid; the amount of the material before and after freezing is the same;
9. Some properties of a material may change when it experiences some external change, while other properties do not.

### **V. Earth Science – Earth through Time**

The students will understand that -

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|  | <ol style="list-style-type: none"><li>1. God made the dinosaurs;</li><li>2. Earth changes with time;</li><li>3. God does not change;</li><li>4. Dinosaurs, which lived on land long ago, had many different characteristics;</li><li>5. Fossils provide evidence that some dinosaurs were among the largest animals that have ever lived and that others were quite small;</li><li>6. Some fossils are the remains of once-living things;</li><li>7. Some fossils are imprints of once-living things;</li><li>8. A fossil imprint is formed when a plant or animal leaves a trace, or print, of itself in soil, which gradually turns to rock;</li><li>9. Dinosaur fossil footprints are clues to the size of a dinosaur and the size and shape of its feet;</li><li>10. Fossil bones give clues to sizes and shapes of dinosaurs;</li><li>11. Flat teeth are good for grinding food, and pointed teeth are good for tearing food;</li><li>12. Skeletons are clues to sizes and shapes of dinosaurs;</li><li>13. Although dinosaurs became extinct a long time ago, some of them had characteristics similar to animals that are alive today.</li></ol> |
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**Grade 3**

**I. Investigating States of Matter**

The students will be able to...

1. Compare the observable physical properties of solids, liquids, or gases (air) (i.e., visible vs. invisible, changes in shape, changes in the amount or space occupied).
2. Identify everyday objects /substances as solid, liquid, or gas.
3. Recognize water evaporates (liquid water changes into a gas as it moves into the air).
4. Measure and compare the temperature of water when it exists as a solid to its temperature of water when it exists as a solid to its temperature changes.
5. Investigate and recognize water can change from a liquid to a solid (freeze), and back again to a liquid (melt), as the result of temperature changes.
6. Describe the changes in the physical properties of water (i.e., shape, volume) when frozen or melted.
7. Predict and investigate the effect of heat energy (i.e., change in temperature, melting, evaporation) on objects and materials.
8. Identify sources of thermal energy (e.g., Sun, stove, fire, body) that can cause solids to change to liquids, and liquids change to gas.
9. Identify sources of light energy (e.g., Sun, bulbs, flames).
10. Recognize light can be transferred from the source to the receiver (eye) through space.
11. Identify the three things (light source, object, and surface) necessary to produce a shadow.
12. Recognize the Sun is the primary source of light and food energy on Earth.

**II. Plants**

The students will be able to...

1. Describe the basic needs of most plants (i.e., air, water, light, nutrients, temperature).
2. Recognize plants progress through life cycles of seed germination, growth and development, reproduction, and death.
3. Sequence and describe the stages in the life cycle of a flowering plant.
4. Identify the major organs (roots, stems, flowers, leaves) and their functions in vascular plants (absorption, transport, reproduction).
5. Illustrate and trace the path of water and nutrients as they move through the transport of a plant.
6. Identify and relate the similarities and differences

between plants and their offspring (seedlings).

### **III. Food Chains**

The students will be able to...

1. Identify sunlight as the primary source of energy plants use to produce their own food.
2. Classify populations of organisms as producers or consumers by the role they serve in the ecosystem.
3. Sequence the flow energy through a food chain beginning with the Sun.
4. Predict the possible effects of removing an organism from a food chain.

### **IV. Earth's Water**

The students will be able to...

1. Recognize liquid water can change into a gas (vapor) in the air.
2. Recognize clouds and fog are made of tiny droplets of water.
3. Recognize air is a substance that surrounds us, takes up space, and moves around us as wind.
4. Describe clouds and precipitation as forms of water in the water cycle.

### **V. Earth, Sun, and Moon**

The students will be able to...

1. Describe our Sun as a star because it provides light energy to the solar system.
2. Recognize the moon is a reflector of light.
3. Illustrate and describe how the sun and/or moon appear to move slowly across the sky from east to west during the day and/or night.
4. Observe the change in the moon's appearance relative to time of day and month over several months and note the pattern in this change.
5. Recognize there is a day/night cycle every 24 hours.
6. Describe the changes in length and position (direction) of shadows from morning to midday to afternoon.
7. Describe how the Sun's position in the sky changes the length and position of shadows.
8. Describe the rotation and revolution of Earth and moon.
9. Describe the Earth's seasonal changes.
10. Describe eclipses.

### **VI. Scientific Inquiry**

**The students will be able to...**

- 1. Pose questions about objects, materials, organisms, and events in the environment.**
- 2. Plan and conduct a fair test to answer a question.**
- 3. Make qualitative observations, using the five senses.**
- 4. Make observations, using simple tools and equipment.**
- 5. Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume using liters.**
- 6. Compare amounts and measurements.**
- 7. Judge whether measurements and computation of quantities are reasonable.**
- 8. Use quantitative and qualitative data as a support for reasonable explanations.**
- 9. Use data as support for observed patterns and relationships, and make predictions to be tested.**
- 10. Communicate simple procedures and results of investigations and explanations through oral presentations, drawings and maps, data tables, graphs, and writings.**
- 11. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member.**

**VII. Science and Technology**

**The students will be able to...**

**Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology.**

**Grade 4**

The students will be able to:

**1. Scope and Sequence – Mixtures and Solutions**

a. Describe and compare the masses of objects to the nearest gram, using balances.

b. Describe and compare the volumes (the amount of space an object occupies) of objects, using a graduated cylinder.

c. Recognize no two objects can occupy the same space at the same time (e.g., water level rises when an object or substance, such as a rock, is placed in a quantity of water).

d. Classify types of materials (e.g., water, salt, sugar, iron filings, salt water) into substances (materials that have specific physical properties) or mixtures of substances by using their characteristic properties.

**2. Scope and Sequence – Mixtures and Solutions/Changes on the Earth's Surface**

a. Identify water as a solvent that dissolves materials (Do NOT assess the term solvent).

b. Observe and describe how mixtures are made by combining solids or liquids, or a combination of these.

c. Distinguish between the components in a mixture (e.g., trail mix, conglomerate rock, salad).

d. Describe ways to separate the components of a mixture by their properties (i.e., sorting, filtration, magnets, screening).

**3. Scope and Sequence – Mixtures and Solutions**

a. Recognize that the total mass of a material remains constant whether it is together, in parts, or in a different state.

**4. Scope and Sequence – Forms of Energy: Electrical Circuits**

a. Construct and diagram a complete electric circuit by using a source (e.g., battery), means of transfer (e.g., wires), and receiver (e.g., resistance bulbs, motors, fans).

b. Observe and describe the evidence of energy transfer in a closed series circuit (e.g., lit bulb, moving motor, fan).

c. Classify materials as conductors or insulators of electricity when placed within a circuit (e.g., wood, pencil lead, plastic, glass, aluminum foil, lemon juice, air, water).

**5. Scope and Sequence – Forms of Energy: Electrical Circuits**

a. Identify the evidence of energy transformations (temperature change, light, sound, motion, and magnetic effects) that occur in electrical circuits.

**6. Scope and Sequence – Laws of Motion**

a. Classify different types of motion (straight line, curved, back and forth).

b. Describe an object's motion in terms of distance and time.

**7. Scope and Sequence – Laws of Motion**

a. Identify the forces acting on the motion of objects traveling in a straight line.

b. Recognize friction as a force that slows down or stops a moving object that is touching another object or surface.

c. Compare the forces (measured by a spring scale in Newtons) required to overcome friction when an object moves over different surfaces (i.e., rough/smooth).

**8. Scope and Sequence – Laws of Motion**

a. Determine the gravitational pull of the Earth on an object (weight) using a spring scale.

**9. Scope and Sequence – Laws of Motion**

a. Recognize that balanced forces do not affect an object's motion.

b. Describe how unbalanced forces acting on an object changes its speed (faster/slower), direction of motion, or both.

c. Explain how increasing or decreasing the amount of force on an object affects the motion of that object.

d. Explain how the mass of an object (e.g., cars, marbles, rocks, boulders) affects the force required to move it.

e. Predict how the change in speed of an object (i.e., faster/slower/remains the same) is affected by the amount of force applied to an object and the mass of the object.

f. Predict the effects of an electrostatic force (static electricity) on the motion of objects (attract or repel).

**10. Scope and Sequence – Interactions Among Organisms and Their Environment**

a. Identify the ways a specific organism may interact with other organisms or with the environment (e.g., pollination, shelter, seed dispersal, camouflage, migration, hibernation, defensive mechanism).

b. Recognize different environments (i.e., pond, forest, prairie) support the life of different types of plants and animals.

**11. Scope and Sequence – Interactions Among Organisms and Their Environment**

a. Identify examples in Missouri where human activity has had a beneficial or harmful effect on other organisms (e.g., feeding birds, littering vs. picking up trash, hunting/conservation of species, paving/restoring green space).

**12. Scope and Sequence – Interactions Among Organisms and Their Environment**

a. Classify populations of organisms as producers,

consumers, or decomposers by the role they serve in the ecosystem.

- b. Differentiate between the three types of consumers (herbivore, carnivore, omnivore).
- c. Categorize organisms as predator or prey in a given ecosystem.

**13. Scope and Sequence – Changes in the Earth’s Surface**

- a. Compare and contrast common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, mastodons) to organisms present on Earth today.

**14. Scope and Sequence – Interactions Among Organisms and Their Environment**

- a. Identify specialized structures and describe how they help plants survive in their environment (e.g., root, cactus needles, thorns, winged seed, waxy leaves).
- b. Identify specialized structures and senses and describe how they help animals survive in their environment (e.g., antennae, body covering, teeth, beaks, whiskers, appendages).
- c. Recognize internal cues (e.g., hunger) and external cues (e.g., changes in the environment) that cause organisms to behave in certain ways (e.g., hunting, migration, hibernation).
- d. Predict which plant or animal will be able to survive in a specific environment based on its special structures or behaviors.

**15. Scope and Sequence – Changes in the Earth’s Surface**

- a. Identify and describe the components of soil (e.g., plant roots and debris, bacteria, fungi, worms, types of rock) and its properties (e.g., odor, color, resistance to erosion, texture, fertility, relative grain size, absorption rate).
- b. Compare the physical properties (i.e., size, shape, color, texture, layering, presence of fossils) of rocks (mixtures of different Earth materials, each with observable physical properties).

**16. Scope and Sequence – Changes in the Earth’s Surface**

- a. Observe and describe the breakdown of plant and animal material into soil through decomposition processes (i.e., decay, rotting, composting, digestion).
- b. Identify the major landforms on Earth (i.e., mountains, plains, oceans, river valleys, coastlines, canyons).
- c. Describe how weathering agents (e.g., water, chemicals, temperature, wind, plants) cause surface changes that create and/or change Earth’s surface materials and/or landforms.
- d. Describe how erosion processes (i.e., action of gravity, waves, wind, rivers, glaciers) cause surface changes

that create and/or change Earth's surface materials and/or landforms.

**17. Scope and Sequence – Changes in the Earth's Surface**

- a. Identify the ways humans affect the erosion and deposition of Earth's materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings).
- b. Propose ways to solve simple environmental problems (e.g., recycling, composting, ways to decrease soil erosion) that result from human activity.

**18. Scope and Sequence - All Units**

- a. Formulate testable questions and explanations (hypotheses).
- b. Recognize the characteristics of a fair and unbiased test.
- c. Conduct a fair test to answer a question.

**19. Scope and Sequence - All Units**

- a. Make qualitative observations using the five senses.
- b. Make observations using simple tools and equipment (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scale).
- c. Measure length to the nearest centimeter, mass using grams, temperature using degrees Celsius, volume to the nearest milliliter, weight to the nearest Newton.
- d. Compare amounts/measurements.
- e. Judge whether measurements and computation of quantities are reasonable.

**20. Scope and Sequence - All Units**

- a. Use quantitative and qualitative data as support for reasonable explanations.
- b. Use data as support for observed patterns and relationships, and to make predictions to be tested.

**21. Scope and Sequence - All Units**

- a. Evaluate the reasonableness of an explanation.
- b. Analyze whether evidence supports proposed explanations.

**22. Scope and Sequence - All Units**

Communicate the procedures and results of investigations and explanations through oral presentations, drawings and maps, data tables, graphs (bar, single line, pictograph) and writings.

**23. Scope and Sequence – Forms of Energy: Electrical Circuits**

- a. Design and construct an electrical device, using materials and/or existing objects, that can be used to

perform a task (assess locally).

**24. Scope and Sequence – Mixtures and Solutions/Forms of Energy: Electrical Circuits**

- a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, magnifiers, balances, microscopes, computers, stethoscopes, thermometers).

**25. Scope and Sequence – Forms of Energy: Electrical Circuits/Laws of Motion/Interactions Among Organisms and Their Environments**

- a. Identify how the effects of inventions or technological advances (e.g., different types of light bulbs, semiconductors/integrated circuits and electronics, satellite imagery, robotics, communication, transportation, generation of energy, renewable materials) may be helpful, harmful, or both (assess locally).

**26. Scope and Sequence – All units**

- a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (assess locally).

**27. Scope and Sequence - All Units**

- a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery).
- b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (assess locally).

**Grade 5**

The students will be able to:

1. **Scope and Sequence – Water Cycle and Weather**
  - a. Recognize how changes in state (i.e., freezing/melting, condensation/evaporation) provide evidence that matter is made of particles too small to be seen.
2. **Scope and Sequence – Water Cycle and Weather**
  - a. Classify matter as a solid, a liquid, or a gas, as it exists at room temperature, using physical properties (i.e., volume, shape, ability to flow).
  - b. Predict the effect of heat energy on the physical properties of water as it changes to and from a solid, liquid, or gas (i.e., freezing/melting, evaporation/condensation).
3. **Scope and Sequence – Water Cycle and Weather**
  - a. Recognize the mass of water remains constant as it changes state (as evidenced in a closed container).
4. **Scope and Sequence – Solar System**
  - a. Recognize light can be transferred from the source to the receiver (eye) through space in straight lines.
  - b. Recognize how an object (e.g., moon, mirror, objects in a room) can only be seen when light is reflected from that object to the receiver (eye).
5. **Scope and Sequence – Water Cycle and Weather**
  - a. Recognize the Sun as the primary source of energy for temperature change on Earth.
6. **Scope and Sequence – Work and Simple Machines**
  - a. Identify the forces acting on a load and use a spring scale to measure the weight (resistance force) of the load.
7. **Scope and Sequence – Work and Simple Machines**
  - a. Describe how friction affects the amount of force needed to do work over different surfaces or through different media.
8. **Scope and Sequence – Work and Simple Machines**
  - a. Explain how work affects an object (force applied and distance moved) (No formula calculations at this level).
  - b. Recognize simple machines change the amount of effort force and/or direction of force.
  - c. Compare the measures of effort force (measured using a spring scale to the nearest Newton) needed to lift a load with and without the use of simple machines.
  - d. Identify the simple machines in common tools and household items.
9. **Scope and Sequence – Classification of Plants and Animals**
  - a. Compare structures (e.g., wings vs. fins vs. legs; gills vs. lungs; feathers vs. hair vs. scales) that serve similar

functions for animals belonging to different vertebrate classes.

**10. Scope and Sequence – Classification of Plants and Animals**

- a. Explain how similarities are the basis for classification.
- b. Distinguish between plants (which use sunlight to make their own food) and animals (which must consume energy-rich food).
- c. Classify animals as vertebrates or invertebrates.
- d. Classify vertebrate animals into classes (amphibians, birds, reptiles, mammals, fish) based on their characteristics.
- e. Identify plants or animals using simple dichotomous keys.

**11. Scope and Sequence – Classification of Plants and Animals**

- a. Recognize the major life processes carried out by the major systems of plants and animals (e.g., support, reproductive, digestive, transport/circulatory, excretory, response) (Do NOT assess naming of organs within each system or explanation of the processes carried out by those systems).

**12. Scope and Sequence – Water Cycle and Weather**

- a. Classify major bodies of surface water (e.g., rivers, lakes, oceans, glaciers) as fresh or salt water, flowing or stationary, large or small, solid or liquid, surface or groundwater.
- b. Relate the type of water body to the process by which it was formed.

**13. Scope and Sequence – Water Cycle and Weather**

- a. Recognize the atmosphere is composed of a mixture of gases, water, and minute particles.

**14. Scope and Sequence – Water Cycle and Weather**

- a. Describe and trace the path of water as it cycles through the hydrosphere, geosphere, and atmosphere (i.e., the water cycle: evaporation, condensation, precipitation, surface runoff/groundwater flow).
- b. Identify the different forms water can take (e.g., snow, rain, sleet, fog, clouds, dew) as it moves through the water cycle.

**15. Scope and Sequence – Water Cycle and Weather**

- a. Identify and use appropriate tools (i.e., thermometer, anemometer, wind vane, hygrometer, barometer, rain gauge, satellite images, weather maps) to collect weather data (i.e., temperature, wind speed and direction, relative humidity, air pressure, precipitation, cloud type and cover).

- b. Recognize and summarize relationships between weather data (e.g., temperature and time of day, cloud cover and temperature, wind direction and temperature) collected over a period of time.

**16. Scope and Sequence – Water Cycle and Weather**

- a. Explain how major bodies of water are important natural resources for human activity (e.g., food, recreation, habitat, irrigation, solvent, transportation).
- b. Describe how human needs and activities (e.g., irrigation, damming of rivers, waste treatment, sources of drinking water) have affected the quantity and quality of major bodies of fresh water.
- c. Propose solutions to problems related to water quality and availability that result from human activity.

**17. Scope and Sequence – Solar System**

- a. Recognize the Earth is one of several planets within a solar system that orbits the Sun.
- b. Recognize the moon orbits the Earth.
- c. Recognize planets look like stars and appear to move across the sky among the stars.

**18. Scope and Sequence – Solar System**

- a. Describe physical features of the planet Earth that allows life to exist (e.g., air, water, temperature) and compare these to the physical features of the Sun, the moon, and other planets.

**19. Scope and Sequence – Solar System**

- a. Sequence images of the lit portion of the moon seen from Earth as it cycles day-to-day in about a month in order of occurrence (Do NOT assess cause of moon phases).

**20. Scope and Sequence – Solar System**

- a. Recognize the Earth rotates once every 24 hours.
- b. Relate changes in the length and position of a shadow to the time of day and apparent position.

**21. Scope and Sequence – Solar System**

- a. Recognize the Earth rotates once every 24 hours.
- b. Relate changes in the length and position of a shadow to the time of day and apparent position of the Sun in the sky, as determined by Earth's rotation.
- c. Relate the apparent motion of the Sun, moon, and stars in the sky to the rotation of the Earth (Do not assess apparent motion of polar constellations).

**22. Scope and Sequence - All Units**

- a. Formulate testable questions and explanations (hypotheses).

- b. Recognize the characteristics of a fair and unbiased test.
- c. Conduct a fair test to answer a question.
- d. Make suggestions for reasonable improvements or extensions of a fair test.

**23. Scope and Sequence - All Units**

- a. Make qualitative observations using the five senses.
- b. Determine the appropriate tools and techniques to collect data.
- c. Use a variety of tools and equipment to gather data (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scales).
- d. Measure length to the nearest centimeter, mass to the nearest gram, volume to the nearest milliliter, temperature to the nearest degree Celsius, weight to the nearest Newton.
- e. Compare amounts/measurements.
- f. Judge whether measurements and computation of quantities are reasonable.

**24. Scope and Sequence - All Units**

- a. Use quantitative and qualitative data as support for reasonable explanations.
- b. Use data as support for observed patterns and relationships, and to make predictions to be tested.

**25. Scope and Sequence - All Units**

- a. Evaluate the reasonableness of an explanation.
- b. Analyze whether evidence and scientific principles support proposed explanations.

**26. Scope and Sequence - All Units**

- a. Communicate the procedures and results of investigations and explanations through oral presentations, drawings and maps, data tables, graphs (bar, single line, pictograph), and writings.

**27. Scope and Sequence – Work and Simple Machines**

- a. Design and construct a machine, using materials and/or existing objects, that can be used to perform a task (assess locally).

**28. Scope and Sequence – Work and Simple Machines/Water Cycle and Weather/Solar System/Classification of Plants and Animals**

- a. Describe how new technologies have helped scientists make better observations and measurements for investigations (e.g., telescopes, electronic balances, electronic microscopes, x-ray technology, computers, ultrasounds, computer probes such as thermometers).

**29. Scope and Sequence – Simple Machines/Water Cycle and Weather/Solar System/Classification of Plants and Animals**

- a. Identify how the effects of inventions or technological

advances (e.g., complex machinery, technologies used in space exploration, satellite imagery, weather observation and prediction, communication, transportation, robotics, tracking devices) may be helpful, harmful, or both (assess locally).

**30. Scope and Sequence – All units**

- a. Research biographical information about various scientists and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology (assess locally)

**31. Scope and Sequence - All Units**

- a. Identify a question that was asked, or could be asked, or a problem that needed to be solved when given a brief scenario (fiction or nonfiction of people working alone or in groups solving everyday problems or learning through discovery).
- b. Work with a group to solve a problem, giving due credit to the ideas and contributions of each group member (assess locally).