Standard 1: Life Science

As a basis for understanding Life Science, Grade 4 students will develop the following knowledge, skills and understandings:

1.1 All organisms need energy and matter to live and grow.
   1.1.1 Know that plants are the primary source of matter and energy entering most food chains.
   1.1.2 Explain the feeding relationships in a number of ecosystems through food chains and food webs, describing the roles of producers and consumers - herbivores, carnivores, and decomposers.
   1.1.3 Describe how organisms can compete for resources in an ecosystem.
   1.1.4 Know that decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.

1.2 Living organisms depend on one another and on their environment for survival.
   1.2.1 Know ecosystems can be characterized by their living and nonliving components.
   1.2.2 Describe how plants and animals within an environment depend on each other - e.g., many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.
   1.2.3 Understand that in any particular environment some kinds of plants and animals survive well and others survive less well or not at all.
   1.2.4 Understand that most microorganisms do not cause disease and that many are beneficial.
   1.2.5 Conduct experiments with plants to determine their level of tolerance.
   1.2.6 Determine an organism’s optimum conditions and environmental preferences.
   1.2.7 Observe and describe changes in ecosystems over time; interpret those observations.
   1.2.8 Use vocabulary associated with organisms and their environments - e.g., interdependence, food chains, pollination, microorganisms...
Standard 2: Physical Science

As a basis for understanding Physical Science, Grade 4 students will develop the following knowledge, skills and understandings:

2.1 Electricity and magnetism are related effects that have many useful applications in everyday life.

   2.1.1 Know that electric energy can be converted to heat, light and motion.
   2.1.2 Design and build simple open and closed series and parallel electric circuits with components such as wires, batteries, and bulbs.
   2.1.3 Know that electrically charged objects attract or repel each other.
   2.1.4 Know electric currents produce magnetic fields.
   2.1.5 Construct a simple compass and use it to detect magnetic effects, including Earth’s magnetic field.
   2.1.6 Build a simple electromagnet and apply this to building a simple device, such as a telegraph.
   2.1.7 Explain the role of electromagnets in the construction of electric motors, electric generators, and simple devices such as doorbells.
   2.1.8 Know that magnets attract and repel each other and certain kinds of materials.
   2.1.9 Identify a magnet’s two poles (north and south) and demonstrate like poles repelling and unlike poles attracting each other.
   2.1.10 Demonstrate how magnetic force between two magnets changes relative to distance.
   2.1.11 Use vocabulary associated with electricity and magnetism - e.g., circuit, static charge, electromagnet...

Standard 3: Earth and Space Science

As a basis for understanding Earth and Space Science, Grade 4 students will develop the following knowledge, skills and understandings:

3.1 Water on Earth moves between the oceans and land through the processes of evaporation and condensation.

   3.1.1 Know that most of Earth’s water is present as salt water in the oceans, which cover most of Earth’s surface.
   3.1.2 Explain that when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.
   3.1.3 Know that water vapor in the air moves from one place to another and can form fog or clouds.
3.1.4 Know that fog and clouds are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow.

3.1.5 Understand that the amount of fresh water located in rivers, lakes, underground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.

3.1.6 Understand the mechanism of the water cycle and the various ways it is expressed worldwide.

3.1.7 Determine the origin of the water used by the local community.

3.1.8 Use vocabulary associated with water on Earth - e.g., evaporation, condensation, water vapor...

3.2 Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns.

3.2.1 Know that uneven heating of Earth causes air movements (convection currents).

3.2.2 Explain the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.

3.2.3 Understand weather as the condition of the atmosphere in terms of three variables: heat, motion, and moisture.

3.2.4 Know that the Earth's atmosphere exerts a pressure that decreases with distance above Earth's surface and that at any point it exerts this pressure equally in all directions.

3.2.5 Identify the causes and effects of different types of severe weather.

3.2.6 Use weather maps and data to predict local weather and know that weather forecasts depend on many variables.

3.2.7 Use vocabulary associated with weather e.g. atmosphere, pressure, convection currents...

3.3 The solar system consists of planets and other bodies that orbit the Sun in predictable paths.

3.3.1 Know the Sun, an average star, is the central and largest body in the solar system and is composed primarily of hydrogen and helium.

3.3.2 Describe the solar system as including the planet Earth, the Moon, the Sun, the other planets and their satellites, and smaller objects, such as asteroids and comets.

3.3.3 Understand that the path of a planet around the Sun is due to the gravitational attraction between the Sun and the planet.

3.3.4 Use vocabulary associated with stars and planets - e.g., orbit, gravity, attraction...
Standard 4: Nature of Science

As a basis for understanding the nature of science as it relates to scientific knowledge, scientific inquiry, and scientific enterprise and to address content in the other standards, Grade 4 students will develop the following skills, knowledge and understandings:

4.1 Scientific progress is made by asking meaningful questions and conducting careful investigations.
   4.1.1 Follow a set of oral and written instructions for a scientific investigation.
   4.1.2 Differentiate observation from inference (interpretation) and know scientists’ explanations come partly from what they observe and partly from how they interpret their observations.
   4.1.3 Measure and estimate the weight, length, or volume of objects.
   4.1.4 Formulate and justify predictions based on cause-and-effect relationships.
   4.1.5 Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.
   4.1.6 Construct and interpret graphs from measurements.

4.2 Students understand the connections between science, global issues and sustainable solutions.
   4.2.1 Identify impact of human activity on water supplies and environments and suggest ways to reduce negative effects.
   4.2.2 Understand the impact of severe weather on environments and ways communities try to manage and respond to this.
   4.2.3 Analyze the costs and benefits of electricity as an energy source.