Science
Grade 2

PURPOSE

The second grade science program will continue to focus on using a broad range of science skills in understanding the natural world. The grade two language arts and mathematics curriculum integrates all the natural sciences so that the students can appreciate the ideas that unify the science and make the connections between these ideas and concepts.

Students will experience the richness and excitement of scientific discovery of the natural world through investigating phenomena and applying scientific concepts, skills and processes to everyday experiences. The aim of this program is to help students develop scientific dispositions and habits of mind including curiosity, demand for verification, respect for logic and rational thinking, attention to accuracy, precision and patience.

Making detailed observations, drawing conclusions and recognizing unusual or unexpected data are skills needed to be able to use and validate information. The science curriculum heightens critical thinking skills by providing opportunities for students to generalize, evaluate and apply information, and solve problems by asking appropriate questions. Utilizing scientific methodology is strongly reinforced.

I. Student Outcomes

5.1- Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.

A. **Understand Scientific Explanations:** Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.
B. **Generate Scientific Evidence Through Active Investigations:** Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.
C. **Reflect on Scientific Knowledge :** Scientific knowledge builds on itself over time.
D. **Participate Productively in Science :** The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms.

5.2 Physical Science: All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

A. **Properties of Matter:** All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.

By the end of second grade, students will:

- Sort and describe objects based on the materials of which they are made and their physical properties.
- Identify common objects as solids, liquids, or gases.

B. **Changes in Matter:** Substances can undergo physical or chemical changes to form new substances. Each change involves energy.

By the end of second grade, students will:

- Generate accurate data and organize arguments to show that not all substances respond the same way when heated or cooled, using common materials, such as shortening or candle wax.

C. **Forms of Energy:** Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.

By the end of second grade, students will:

- Compare, citing evidence, the heating of different colored objects placed in full sunlight.
- Apply a variety of strategies to collect evidence that validates the principle that if there is no light, objects cannot be seen.
- Present evidence that represents the relationship between a light source, solid object, and the resulting shadow.

D. **Energy Transfer and Conservation:** The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.

By the end of second grade, students will:

- Predict and confirm the brightness of a light, the volume of sound, or the amount of heat when given the number of batteries, or the size of batteries.

E. **Forces and Motion:** It takes energy to change the motion of objects. The energy change is understood in terms of forces.

By the end of second grade, students will:

- Investigate and model the various ways that inanimate objects can move.

- Predict an object's relative speed, path, or how far it will travel using various forces and surfaces.

- Distinguish a force that acts by direct contact with an object (e.g., by pushing or pulling) from a force that can act without direct contact (e.g., the attraction between a magnet and a steel paper clip).

5.3 Life Science: All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.

A. **Organization and Development:** Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions.

By the end of second grade, students will:

- Group living and nonliving things according to the characteristics that they share.

B. **Matter and Energy Transformations:** Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.

By the end of second grade, students will:

- Describe the requirements for the care of plants and animals related to meeting their energy needs.

- Compare how different animals obtain food and water.

- Explain that most plants get water from soil through their roots and gather light through their leaves.

C. **Interdependence:** All animals and most plants depend on both other organisms and their environment to meet their basic needs.

   By the end of second grade, students will:

   - Describe the ways in which organisms interact with each other and their habitats in order to meet basic needs.

   - Identify the characteristics of a habitat that enable the habitat to support the growth of many different plants and animals.

   - Communicate ways that humans protect habitats and/or improve conditions for the growth of the plants and animals that live there, or ways that humans might harm habitats.

D. **Heredity and Reproduction:** Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.

   By the end of second grade, students will:

   - Record the observable characteristics of plants and animals to determine the similarities and differences between parents and their offspring.

   - Determine the characteristic changes that occur during the life cycle of plants and animals by examining a variety of species, and distinguish between growth and development.

E. **Evolution and Diversity: :** Sometimes, differences between organisms of the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.

By the end of second grade, students will:

- Describe similarities and differences in observable traits between parents and offspring.

- Describe how similar structures found in different organisms (e.g., eyes, ears, mouths) have similar functions and enable those organisms to survive in different environments.

5.4 Earth Systems Science: All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

A. **Objects in the Universe:** Our universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces. As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These same processes governed the formation of our solar system 4.6 billion years ago.

By the end of second grade, students will:

- Determine a set of general rules describing when the Sun and Moon are visible based on actual sky observations.

B. **History of Earth:** From the time that Earth formed from a nebula 4.6 billion years ago, it has been evolving as a result of geologic, biological, physical, and chemical processes.

C. **Properties of Earth Materials:** Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.

By the end of second grade, students will:

- Describe Earth materials using appropriate terms, such as hard, soft, dry, wet, heavy, and light.

D. **Tectonics**: The theory of plate tectonics provides a framework for understanding the dynamic processes within and on earth.

E. **Energy in Earth Systems:** Internal and external sources of energy drive Earth systems.

By the end of second grade, students will:

- Describe the relationship between the Sun and plant growth.

F. **Climate and Weather:** Earth's weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere.

By the end of second grade, students will:

- Observe and document daily weather conditions and discuss how the weather influences your activities for the day.

G. **Biogeochemical Cycles:** The biogeochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity.

By the end of second grade, students will:

- Observe and discuss evaporation and condensation.
- Identify and use water conservation practices.
- Identify and categorize the basic needs of living organisms as they relate to the environment.
- Identify the natural resources used in the process of making various manufactured products.

II. ACTIVITIES AND MATERIALS

A. Texts: SRA: *Imagine It,* 2008
Scott Foresman Science, 2000

B. Teacher Resources

1. Grade 2 SRA/McGraw-Hill Science/SS Binder
2. Science Resource Kit.
3. United Streaming (Discovery Education)
4. www.discovery.com
5. www.nationalgeographic.com
6. www.howstuffworks.com
7. Additional websites as listed in binder

III. Evaluation

Students will:

A. Be prepared and ready for work.
B. Prepare work neatly.
C. Follow directions.
D. Hand in completed class work and homework assignments.
E. Participate in class discussions, activities and experiments.
F. Prepare for and successfully complete all tests and quizzes
G.The final grade represents the teacher's professional judgment of the student's performance. All of the above areas are included in the evaluation process.

IV. Sequence of Instruction

1. Earth Science, Unit C *The Earth*, Chapter 1.
2. Life Science, Unit A *Fossils*, Chapter 3
3. Physical Science, Unit B *Matter*, Chapter 1
4. Life Science, Unit A *Animals*, Chapter 2
5. Earth Science, Unit C *The Solar System*, Chapter 3
6. Physical Science, Unit C *Forces, Magnets*, Chapter 3
7. Earth Science, Unit C *Weather/Seasons*, Chapter 2
   (ongoing with mathematics)

Revised: September 2000
August 2002
October 2003
July 2010

Reviewed and revised: August 2010