

**Springfield Public Schools**  
**SCIENCE**

**FIFTH GRADE**

**COURSE DESCRIPTION**

Science in fifth grade will be taught four to five times a week for 40 – 50 minutes within a regular classroom. Students will be introduced to objectives within the areas of life science and the interaction of living systems with the physical world. The program emphasizes a scientific inquiry hands-on approach.

**MAJOR INSTRUCTIONAL GOALS**

The intent of the Springfield R-12 Science Program is:

1. The student will design and conduct hands-on scientific investigations using appropriate tools and techniques and data collection to construct a reasonable explanation to observable phenomenon.
  - a. Identify questions that can be answered through scientific investigations. (SC7; 1.1; 3.1)
    - Recognize that the total mass of a material remains constant whether it is together, in parts, or in a different state (1.1.I.4.a.)
    - Recognize the mass of water remains constant as it changes state (as evidenced in a closed container) (1.1.I.5.a.)
    - Pose questions about objects, materials, organisms, and events in the environment (7.1.A.3.a.)
    - Plan and conduct a fair test to answer a question (7.1.A.3.b.) (7.1.A.4.c.) (7.1.A.5.c.)
    - Formulate testable questions and explanations (hypotheses) (7.1.A.4.a.) (7.1.A.5.a.)
    - Recognize the characteristics of a fair and unbiased test (7.1.A.4.b.) (7.1.A.5.b.)
    - Communicate the procedures and results of investigations and explanations through: oral presentations, drawings and maps, data tables, graphs (bar, single line, pictograph), writings
  - b. Understand that changes in variables produce different outcomes in scientific investigations. (SC7; 1.6; 2.1; 3.5)
    - Use quantitative and qualitative data as support for reasonable explanations (7.1.C.5.a.)
    - Use data as support for observed patterns and relationships, and to make predictions to be tested (7.1.C.5.b.)
    - Evaluate the reasonableness of an explanation (7.1.D.5.a.)
    - Analyze whether evidence and scientific principles support proposed explanations (7.1.D.5.b.)
  - c. Use the metric system in measurements and calculations of scientific data. (SC7; 1.6)
    - Determine the appropriate tools and techniques to collect data (7.1.B.5.b.)
    - Use a variety of tools and equipment to gather data (e.g., hand lenses, magnets, thermometers, metric rulers, balances, graduated cylinders, spring scales) (7.1.B.5.c.)
    - 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 (7.1.B.5.d.)
    - Judge whether measurements and computation of quantities are reasonable (7.1.B.5.f.)
2. The student will understand that women and men of various backgrounds work in teams and alone, but all communicate extensively with others.
  - a. Solve a problem by designing a plan or product that provides an appropriate solution. (SC8; 3.5; 3.7; 4.1)
  - b. Determine the impact science has on various careers and occupations. (SC8; 2.6; 4.8)
  - c. Research the history of space exploration and report on future space exploration initiatives. (SC8; 1.3; 1.4; 2.2; 4.1)

- d. Demonstrate an understanding that safety is an important part of science investigations and that following safety rules prevent injuries in school and the workplace. (SC8; **3.5**)
  - e. Research and report on well-known scientists or scientific events. (SC8; **2.1**; 2.2)
3. The student will show specific examples of the effects that science and technology has on human populations throughout the world.
    - a. Describe and define the inventions process and identify factors that promote inventions. (SC8; 2.3; **3.6**)
    - b. Identify and analyze ways in which advances in science and technology have affected society. (SC8; 2.4; **3.2**; **3.6**)
    - c. Research and explain how information received from telescopes and space probes has either confirmed or modified scientific theories concerning physical properties and conditions of the solar system. (SC8; **1.7**; 2.4; **3.1**; **3.5**; **4.1**; 2.7)
  4. The student will demonstrate an understanding of living organisms and their relationship to natural resources and the environment.
    - a. Identify and describe physical and behavioral adaptations of organisms that affect their chances for survival. (SC4; **1.5**; 1.8; 2.4; **3.7**; **3.3**).
      - 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) (4.1.A.4.a.)
      - Identify specialized structures and describe how they help plants survive in their environment (e.g., root, cactus needles, thorns, winged seed, waxy leaves) (4.3.C.4.a.)
      - Identify specialized structures and senses and describe how they help animals survive in their environment (e.g., antennae, body covering, teeth, beaks, whiskers, appendages) (4.3.C.4.b.)
      - 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) (4.3.C.4.c.)
      - Predict which plant or animal will be able to survive in a specific environment based on its special structures or behaviors (4.3.C.4.d.)
    - b. Describe the basic survival needs of plants/animals, and how they obtain energy and nutrients from their environment. (SC3; **1.1**; 1.2)
      - Recognize the Sun is the primary source of light and food energy on Earth (1.2.C.3.a.)
      - Describe the basic needs of most plants (i.e., air, water, light, nutrients, temperature) (3.1.A.3.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 greenspace) (4.1.D.4.a.)
      - Observe and describe the breakdown of plant and animal material into soil through decomposition processes (i.e., decay, rotting, composting, digestion) (5.2.A.4.a.)
    - c. Identify common plants and animals and classify them according to their similarities and differences. (SC3; **1.6**)
      - Explain how similarities are the basis for classification (3.1.E.5.a.)
      - Classify animals as vertebrates or invertebrates (3.1.E.5.c.)
      - Identify plants or animals using simple dichotomous keys (3.1.E.5.e.)
    - d. Identify common organisms and classify within their **kingdom** (vertebrate classes mentioned in GLEs). (SC3 , 1.1; 2.4; 3.3; 3.7)
      - 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 (3.1.D.5.a.)
      - Classify vertebrate animals into classes (amphibians, birds, reptiles, mammals, fish) based on their characteristics (3.1.E.5.d.)

- e. Describe and compare the internal and external structures of different plant and animal species, that perform a common function, and explain how the structure enhances the organism's ability to survive. (SC3; 1.3; 1.4; 2.3; 3.5; 4.1)
- Identify the relationships between the physical structures of plants and the function of those structures (e.g., absorption of water, absorption of light energy, support, reproduction) (3.1.D.1.c.)  
 Identify the relationships between the physical structures of animals and the function of those structures (e.g., taking in water, support, movement, obtaining food, reproduction) (3.1.D.1.d.)  
 Illustrate and trace the path of water and nutrients as they move through the transport system of a plant (3.2.C.3.a.)  
 Identify the major organs (roots, stems, flowers, leaves) and their functions in vascular plants (e.g., absorption, transport, reproduction) (Do NOT assess the term vascular) (3.1.D.3.a.)
- f. Explain the process of photosynthesis and conduct simple experiments with green plants to determine its requirements and products. (SC7; SC3; 1.2; 1.3; 1.8; 4.6)
- g. Collect and organize data, information, and ideas to explain the stages through which a fertilized egg or seed changes into its adult form. (SC3; 1.1; 1.8; 2.2; 4.6)
- Sequence and describe the stages in the life cycle of a flowering plant (3.1.B.3.b.)  
 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) (3.2.C.5.a.)
5. Explore the relationship between abiotic factors and population rates of living organisms in ecosystems.
- a. Relate how water passing through the water cycle dissolves minerals and gases and carries them to the ocean to be utilized by living systems. (SC4; 1.3; 1.6)
- b. Examine fossils and discuss how they give evidence of the nature of the environment and the plants and animals that lived long ago. (SC4; 1.2; 1.6)
- Compare and contrast common fossils found in Missouri (i.e., trilobites, ferns, crinoids, gastropods, bivalves, fish, mastodons) to organisms present on Earth today (4.3.A.4.a.)
- c. Conduct research and evaluate current theories regarding the existence of life forms on other planets. (SC8; 1.3; 1.4; 2.2; 4.1)
- d. Explain why the number of organisms an ecosystem can support is dependent on abiotic factors (e.g. quantity of light, water, range of temperature and soil composition) and the availability of resources. (SC4; SC8; 2.1; 2.4; 3.6)
- Recognize different environments (i.e., pond, forest, prairie) support the life of different types of plants and animals (4.1.A.4.b.)
6. The student will explore the interdependence of living systems and basic properties of matter and energy.
- a. Use information to explain that living organisms obtain and use energy and materials from the environment and depend on one another for energy and raw materials. (SC8; 1.1; 1.2; 1.4; 1.6; 3.5)
- Distinguish between plants (which use sunlight to make their own food) and animals (which must consume energy-rich food) (3.1.E.5.b.)  
 Classify populations of organisms as producers, consumers, or decomposers by the role they serve in the ecosystem (4.2.A.4.a.)  
 Differentiate between the three types of consumers (herbivore, carnivore, omnivore) (4.2.A.4.b.)  
 Categorize organisms as predator or prey in a given ecosystem (4.2.A.4.c.)

- b. Interpret and create a food chain or web to show the energy flow from one organism to another, and predict adjustments that will occur naturally within the system. (SC4; **3.5**)

Sequence the flow of energy through a food chain beginning with the Sun (4.2.A.3.c.)

\*Processing skills in **bold print** are assessed by the Missouri Assessment Program at this grade level.

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