



Science Curriculum – Middle Level

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Introduction

Science Curriculum

Science literacy is important for all students and it is our goal to provide science instruction that teaches children to understand and use the vocabulary of science, grasp and apply scientific concepts, understand what is currently happening in the scientific field, and develop competence in the use of scientific tools and processes. In our increasingly technological world, scientific literacy is imperative and we will work toward that goal. Scientific literacy means that a person can ask, find, or determine answers to questions derived from curiosity about everyday experiences.

Learning about science at Baker means that children are actively involved in the inquiry and discovery process. This “inquiry process” is central to science learning. When engaging in inquiry, students describe objects and events, ask questions, acquire knowledge, construct explanations of natural phenomena, test those explanations in many different ways and communicate their ideas to others. In this way, students actively develop their understanding of science by combining scientific knowledge with reasoning and thinking skills.

6th- 8th Grade Science Inquiry:

Concepts

Scientific
Investigation

Skills and Processes

- Conduct controlled experiments
- Design investigations using the scientific method
- Frame questions to distinguish cause and effect; and identify or control variables in experimental and non-experimental research setting

Scientific Thinking

- Use evidence from reliable sources to develop descriptions, explanations, and models
- Propose, recognize, analyze, consider, and critique alternative explanations; and distinguish between fact and opinion
- Work individually and in teams to collect and share information and ideas
- Use technology and tools (such as traditional laboratory equipment, video, and computer aids) to observe and measure objects, organisms, and phenomena, directly, indirectly, and remotely

Scientific Tools And
Technology

- Collect and analyze data using concepts and techniques in mathematics such as mean, median, and mode: outcome probability and reliability; and appropriate data displays
- Acquire information from multiple sources, such as print, the Internet, computer data bases, and experimentation
- Represent data and results in multiple ways, such as numbers, tables, and graphs; drawings, diagrams, and artwork; and technical and creative writing

Scientific
Communication

- Critique published materials
- Explain scientific concepts and procedures to other students

Concepts

Assessments

Skills and Processes

- The student demonstrates scientific competence by completing projects using a variety of methods of investigation. Students will complete least one full, and independent, investigation each year (Science Expo)
- The student demonstrates competence with the tools and technologies of science by using them to collect data, make observations, analyze results, and accomplish tasks effectively
- The students demonstrates effective science communication by clearly describing aspects of the natural world using accurate data, graphs, or other appropriate media to convey depth of conceptual understanding in science
- The student demonstrates scientific inquiry and problem solving by using thoughtful questioning and reasoning strategies, common sense and conceptual understanding for the Science Standards and appropriate methods to investigate the natural world

6th Grade Science:

Theme

Oceanography

Content and Knowledge

- Water has unique characteristics that have a wide variety of implication on our planet
- Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the water cycle
- Our oceans have wide reaching human implications including climate, currents, tides, and marine life
- The Earth's oceans are home to several scarcely explored ecosystems

Waves and Energy

- Energy comes in many forms including light, heat, sound, electrical and mechanical
- The characteristics of waves (wavelength, frequency, amplitude) affect what our senses perceive

Populations and Ecosystems

- There are various relationships between different organisms in their environments
- The physical features of plants and animals that allow them to live in different ecosystems
- Populations consist of all individuals of a species that occur together at a given place
- Populations of organisms can be categorized by the function they serve in an ecosystem

Body Systems/Comparative Anatomy

- Although different species look very different, the unity among organisms becomes apparent from an analysis of internal structures, the similarity of their chemical processes, and the evidence of common ancestry
- Living systems at all levels of organization demonstrate complementarily of structure and function
- Specialized cells perform specialized functions in multi-cellular organisms
- All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment

7th Grade Life Science:

Themes

Content and Knowledge

Cells

- Cells function as “building blocks” of organisms
- Cells are able to carry on all the functions needed to sustain life
- Each organelle in the cell carries a specific role necessary for life
- Cells go through of division by the processes of mitosis and meiosis

Genetics

- The characteristics of an organism can be described in terms of a combination of traits, those characteristics are controlled by genes
- Hereditary information is contained in genes, located in the chromosomes of each cell
- Populations that are genetically diverse have a greater chance of surviving environmental change

Evolution

- An organism's anatomy and behavior has evolved through adaptation to its environment
- A populations’ survival is determined by its ability to adapt to a changing environment, and pass its adaptations on to its offspring
- Variation in characteristics comes from mutations

7th – 8th Looped Grade Units:

Themes

Content and Knowledge

Earth History

- The Earth processes we see today, including erosion, movement of crustal plates, and changes in atmospheric composition, are similar to those that occurred in the past
- Fossils provide important evidence of how life and environmental conditions have changed
- Land forms are the result of a combination of constructive and destructive forces
- Changes in the solid Earth can be described as the rock cycle.
- Living organisms have played many roles in the Earth system, including affecting the composition of the atmosphere and contributing to the weathering of rocks

Planetary Science

- The Earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects such as asteroids and comets
- Most objects in the solar system are in regular and predictable motion
- Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system
- The sun is the major source of energy for phenomena on the Earth's surface, such as growth of plants, winds, ocean currents, and the water cycle

Themes

Environmental Science

Content and Knowledge

- Biotic and abiotic factors in an environment affect population density, habitat and placement of organisms in an energy pyramid
- The number of organisms an ecosystem can support depends on the resources available and abiotic factors such as quantity of light and water, range of temperatures, and the soil composition. Overpopulation of an area can result from increased numbers of people, or the increased use of resources
- Causes of environmental degradation and resource depletion vary from region to region and from country to country

Chemistry

- Matter is made of minute particles called atoms, and atoms are composed of even smaller components. It is neither created nor destroyed
- Atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus
- Bonds between atoms are created when electrons are transferred or shared
- Chemical elements do not break down by normal laboratory reactions such as heating, electric current, or reaction with acids

8th Grade Physical Science:**Themes**

Electronics

Content and Knowledge

- Electricity is the flow of electrons through a circuit
- Components can be added to electric circuits that change the flow of electrons
- The energy of these electrons can be converted into light, sound, kinetic, or chemical energy

Physics

- The motion of an object can be described by its position, direction of motion, and speed
- An object that is not being subjected to a force will continue to move at a constant speed and in a straight line
- Potential, Kinetic, and Thermal Energy are neither created nor destroyed

Matter

- Substances have characteristic properties such as density, boiling point, and solubility, which are independent of the amount of the sample
- Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties