Curriculum Guide for Parents

Fourth Grade Science

STANDARD 1: ANALYSIS, INQUIRY AND DESIGN

Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

Scientific Inquiry:

The Scientific Method is the process scientists use to go from asking a question to finding an answer. Students should:

- define/identify a problem
- form a hypothesis
- follow a procedure of experiments
- make observations throughout experiment
- gather results
- draw a conclusion using written and/or verbal responses
- communicate results

For a more detailed list of process skills refer to pages 10 and 15 of the New York State Elementary Science Core Curriculum at http://www.emsc.nysed.gov/ciai/mst/pub/elecoresci.pdf.

STANDARD 4: LIVING ENVIRONMENT

Life Sciences – Animals

- Animals require air, water and food (essential nutrients) in order to live and thrive
- Some traits of living things have been inherited (i.e., number of limbs…)
- Some characteristics result from an individual's interactions with the environment and cannot be inherited by the next generation (i.e., having scars; riding a bicycle)
- Observe animals have different structures that serve different functions in growth, survival and reproduction
  - wings, legs or fins enable some animals to seek shelter and escape predators
  - the mouth, including teeth, jaws, and tongue, enables some animals to eat and drink
  - eyes, nose, ears, tongue and skin of some animals enable the animals to sense their surroundings
  - claws, shells, spines, feathers, fur, scales, and color of body covering enable some animals to protect themselves from predators and other environmental conditions, or enable them to obtain food
  - some animals have parts that are used to produce sounds and smells to help the animal meet its needs
  - the characteristics of some animals change as seasonal conditions change (i.e., fur grows and is shed to help regulate body heat; body fat is a form of stored energy and it changes as the seasons change)

STANDARD 4: LIVING ENVIRONMENT

Life Sciences – Animals continued

- In order to survive in their environment, animals must be adapted to that environment: animal adaptations include coloration for warning or attraction, camouflage, defense mechanisms, movement, hibernation and migration
- Individuals within a species may compete with each other for food, mates, space, water and shelter in their environment
- All individuals have variations and because of these variations individuals of a species may have an advantage in surviving and reproducing
- Each generation of animals goes through changes in form from young to adult. This completed sequence of changes in form is called a life cycle. Some insects change from egg to larva to pupa to adult
- Each kind of animal goes through its own stages of growth and development during its life span
- The length of time from an animal's birth to its death is called its life span. Life spans of different animals vary
- Everyday events involve one form of energy being changed to another: animals convert food to heat and motion
- Food supplies the energy and materials necessary for growth and repair
- All living things grow, take in nutrients, breathe, reproduce and eliminate waste
- An organism's external physical features can enable it to carry out life functions in its particular environment
- Animals respond to change in their environment (i.e., perspiration, heart rate, breathing rate, eye blinking, shivering and salivating)
- Some animals, including humans, move from place to place to meet their needs
- Particular animal characteristics are influenced by changing environmental conditions including; fat storage in winter, coat thickness in winter, camouflage, shedding of fur
- Some animal behaviors are influenced by environmental conditions. These behaviors may include: nest building, hibernation, hunting, migrating and communicating
- The health, growth, and development of organisms are affected by environmental conditions such as the availability of food, air, water, space, shelter, heat and sunlight
- All animals depend on plants. Some animals (predators) eat other animals (prey)
- Animals that eat plants for food may in turn become food for other animals. This sequence is called a food chain
- Decomposers are living things that play a vital role in recycling nutrients
- An organism's pattern of behavior is related to the nature of that organism's environment, including the kinds and numbers of other organisms present, the availability of food and other resources, and the physical characteristics of the environment
- The Sun's energy is transferred on Earth from plants to animals through the food chain

STANDARD 4: LIVING ENVIRONMENT

Health and Nutrition

- Humans need a variety of healthy foods, exercise and rest in order to grow and maintain good health
- Good health habits include hand washing and personal cleanliness, avoiding harmful substances, eating a balanced diet, engaging in regular exercise

Human decisions and activities have had a profound impact on the physical and living environments.

- Humans depend on their natural and constructed environments
- Over time humans have changed their environment by cultivating crops and raising animals, creating shelter, using energy, manufacturing goods, developing means of transportation, changing populations, and carrying out other activities
- Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms

STANDARD 4: PHYSICAL SETTING

Magnetism

- Magnetism is a force that may attract or repel certain materials
- The materials an object is made up of determine some specific properties of the object (sink/float). Properties can be observed or measured with tools such as hand lenses, metric rulers, thermometers, balances, magnets, circuit testers and graduated cylinders
- The forces of magnetism can affect objects through gases, liquids, and solids
- The force of magnetism on objects decreases as distance increases

Electrical Circuits

- Objects and/or materials can be sorted or classified according to their properties
- Energy exists in various forms: heat, electric, sound, chemical, mechanical, light
- Energy can be transferred from one place to another
- Some materials transfer energy better than others (heat and electricity)
- Students will utilize understanding of conductivity and electromagnetism to identify properties of different objects
- Energy and matter interact: a bulb is lighted by means of electrical current
- Electricity travels in a closed circuit
- Energy exists in various forms: heat, electric, sound, chemical, mechanical, light
- Heat can be released in many ways. For example, by burning, rubbing (friction) or combining one substance with another

STANDARD 4: PHYSICAL SETTING

Electrical Circuits continued

- Interactions with forms of energy can be either helpful or harmful
- Humans utilize interactions between matter and energy:
  - chemical to electrical, light and heat, battery and bulb
  - electrical to sound (i.e., doorbell buzzer)
  - light to electrical (i.e., solar-powered calculator)

Motion and Design

- The force of gravity pulls objects toward the center of Earth
- The amount of change in the motion of an object is affected by friction (i.e., sliding an object over wax paper and sandpaper)
- Mechanical energy may cause change in motion through the application of force and through the use of simple machines such as pulleys, lever, and inclined planes
- Heat can be released in many ways. For example, by burning, rubbing (friction) or combining one substance with another
- Energy exists in various forms: heat, electric, sound, chemical, mechanical, light
- The position of an object can be described by locating it relative to another object or the background (i.e., on top of, next to, over, under…)
- The position or direction of motion of an object can be changed by pushing or pulling
- Utilize different experimentation to demonstrate cause and effect relationship of differing forces on an object. Specifically, students will understand that the greater the force that is applied to an object, the greater the change in motion the object will have; the more massive the object is, the smaller the effect a given force will have
- The forces of gravity can affect objects through gases, liquids, and solids