

## Galway Science 7<sup>th</sup> Grade Curriculum Guide

NYS PI	Major Understandings: The Living Environment
1.1	Compare and contrast the parts of plants, animals, and one-celled organisms.
1.1a	Living things are composed of cells. Cells provide structure and carry on major functions to sustain life. Cells are usually microscopic in size.
1.1b	The way in which cells function is similar in all living things. Cells grow and divide, producing more cells. Cells take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs.
1.1c	Most cells have cell membranes, genetic material, and cytoplasm. Some cells have a cell wall and/or chloroplasts. Many cells have a nucleus.
1.1d	Some organisms are single cells; others, including humans, are multicellular.
1.1e	Cells are organized for more effective functioning in multicellular organisms. Levels of organization for structure and function of a multicellular organism include cells, tissues, organs, and organ systems.
1.1f	Many plants have roots, stems, leaves, and reproductive structures. These organized groups of tissues are responsible for a plant's life activities.
1.1g	Multicellular animals often have similar organs and specialized systems for carrying out major life activities.
1.1h	Living things are classified by shared characteristics on the cellular and organism level. In classifying organisms, biologists consider details of internal and external structures. Biological classification systems are arranged from general (kingdom) to specific (species).
1.2	Explain the functioning of the major human organ systems and their interactions.
1.2a	Each system is composed of organs and tissues which perform specific functions and interact with each other, e.g., digestion, gas exchange, excretion, circulation, locomotion, control, coordination, reproduction, and protection from disease.
1.2b	Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.
1.2d	During respiration, cells use oxygen to release the energy stored in food. The respiratory system supplies oxygen and removes carbon dioxide (gas exchange).
1.2g	Locomotion, necessary to escape danger, obtain food and shelter, and reproduce, is accomplished by the interaction of the skeletal and muscular systems, and coordinated by the nervous system.
1.2i	The male and female reproductive systems are responsible for producing sex cells necessary for the production of offspring.
2.1	Describe sexual and asexual mechanisms for passing genetic materials from generation to generation.
2.1a	Hereditary information is contained in genes. Genes are composed of DNA that makes up the chromosomes of cells.
2.1b	Each gene carries a single unit of information. A single inherited trait of an individual can be determined by one pair or by many pairs of genes. A human cell contains thousands of different genes.
2.1c	Each human cell contains a copy of all the genes needed to produce a human being.
2.1d	In asexual reproduction, all the genes come from a single parent. Asexually produced offspring are genetically identical to the parent.
2.1e	In sexual reproduction typically half of the genes come from each parent. Sexually produced offspring are not identical to either parent.
2.2	Describe simple mechanisms related to the inheritance of some physical traits in offspring.
2.2a	In all organisms, genetic traits are passed on from generation to generation.
2.2b	Some genes are dominant and some are recessive. Some traits are inherited by mechanisms other than dominance and recessiveness.
2.2c	The probability of traits being expressed can be determined using models of genetic inheritance. Some models of prediction are pedigree charts and Punnett squares.
3.1	Describe sources of variation in organisms and their structures and relate the variations to survival.
3.1a	The processes of sexual reproduction and mutation have given rise to a variety of traits within a species.
3.1b	Changes in environmental conditions can affect the survival of individual organisms with a particular trait. Small differences between parents and offspring can accumulate in successive generations so that descendants are very different from their ancestors. Individual organisms with certain traits are more likely to survive and have offspring than individuals without those traits.
3.1c	Human activities such as selective breeding and advances in genetic engineering may affect the variations of species.

Based on NYS Core Curriculum Performance Indicators and Major Understandings. Prepared with teacher input summer curriculum work 2008.

NYS PI	Major Understandings: The Living Environment continued
3.2	Describe factors responsible for competition within species and the significance of that competition.
3.2a	In all environments, organisms with similar needs may compete with one another for resources.
3.2b	Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to permit its survival. Extinction of species is common. Fossils are evidence that a great variety of species existed in the past.
3.2c	Many thousands of layers of sedimentary rock provide evidence for the long history of Earth and for the long history of changing life forms whose remains are found in the rocks. Recently deposited rock layers are more likely to contain fossils resembling existing species.
3.2d	Although the time needed for change in a species is usually great, some species of insects and bacteria have undergone significant change in just a few years.
4.1	Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction.
4.1a	Some organisms reproduce asexually. Other organisms reproduce sexually. Some organisms can reproduce both sexually and asexually.
4.1b	There are many methods of asexual reproduction, including division of a cell into two cells, or separation of part of an animal or plant from the parent, resulting in the growth of another individual.
4.1c	Methods of sexual reproduction depend upon the species. All methods involve the merging of sex cells to begin the development of a new individual. In many species, including plants and humans, eggs and sperm are produced.
4.1d	Fertilization and/or development in organisms may be internal or external.
4.2	Explain the role of sperm and egg cells in sexual reproduction.
4.2a	The male sex cell is the sperm. The female sex cell is the egg. The fertilization of an egg by a sperm results in a fertilized egg.
4.2b	In sexual reproduction, sperm and egg each carry one-half of the genetic information for the new individual. Therefore, the fertilized egg contains genetic information from each parent.
4.3	Observe and describe developmental patterns in selected plants and animals (e.g., insects, frogs, humans, seed-bearing plants).
4.3a	Multicellular organisms exhibit complex changes in development, which begin after fertilization. The fertilized egg undergoes numerous cellular divisions that will result in a multicellular organism, with each cell having identical genetic information.
4.3b	In humans, the fertilized egg grows into tissue which develops into organs and organ systems before birth.
4.3c	Various body structures and functions change as an organism goes through its life cycle.
4.3d	Patterns of development vary among animals. In some species the young resemble the adult, while in others they do not. Some insects and amphibians undergo metamorphosis as they mature.
4.3e	Patterns of development vary among plants. In seed-bearing plants, seeds contain stored food for early development. Their later development into adulthood is characterized by varying patterns of growth from species to species.
4.3f	As an individual organism ages, various body structures and functions change.
4.4	Observe and describe cell division at the microscopic level and its macroscopic effects.
4.4a	In multicellular organisms, cell division is responsible for growth, maintenance, and repair. In some one-celled organisms, cell division is a method of asexual reproduction.
4.4b	In one type of cell division, chromosomes are duplicated and then separated into two identical and complete sets to be passed to each of the two resulting cells. In this type of cell division, the hereditary information is identical in all the cells that result.
4.4c	Another type of cell division accounts for the production of egg and sperm cells in sexually reproducing organisms. The eggs and sperm resulting from this type of cell division contain one-half of the hereditary information.
4.4d	Cancers are a result of abnormal cell division.
5.1	Compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium.
5.1a	Animals and plants have a great variety of body plans and internal structures that contribute to their ability to maintain a balanced condition.
5.1b	An organism's overall body plan and its environment determine the way that the organism carries out the life processes.

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NYS PI	Major Understandings: The Living Environment continued
5.1c	All organisms require energy to survive. The amount of energy needed and the method for obtaining this energy vary among cells. Some cells use oxygen to release the energy stored in food.
5.1d	The methods for obtaining nutrients vary among organisms. Producers, such as green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich foods.
5.1e	Herbivores obtain energy from plants. Carnivores obtain energy from animals. Omnivores obtain energy from both plants and animals. Decomposers, such as bacteria and fungi, obtain energy by consuming wastes and/or dead organisms.
5.1f	Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required for survival. Regulation includes a variety of nervous and hormonal feedback systems.
5.1g	The survival of an organism depends on its ability to sense and respond to its external environment.
5.2	Describe the importance of major nutrients, vitamins, and minerals in maintaining health and promoting growth, and explain the need for a constant input of energy for living organisms.
5.2a	Food provides molecules that serve as fuel and building material for all organisms. All living things, including plants, must release energy from their food, using it to carry on their life processes.
5.2c	Metabolism is the sum of all chemical reactions in an organism. Metabolism can be influenced by hormones, exercise, diet, and aging.
6.1	Describe the flow of energy and matter through food chains and food webs.
6.1a	Energy flows through ecosystems in one direction, usually from the Sun, through producers to consumers and then to decomposers. This process may be visualized with food chains or energy pyramids.
6.1b	Food webs identify feeding relationships among producers, consumers, and decomposers in an ecosystem.
6.1c	Matter is transferred from one organism to another and between organisms and their physical environment. Water, nitrogen, carbon dioxide, and oxygen are examples of substances cycled between the living and nonliving environment.
6.2	Provide evidence that green plants make food and explain the significance of this process to other organisms.
6.2a	Photosynthesis is carried on by green plants and other organisms containing chlorophyll. In this process, the Sun's energy is converted into and stored as chemical energy in the form of a sugar. The quantity of sugar molecules increases in green plants during photosynthesis in the presence of sunlight.
6.2b	The major source of atmospheric oxygen is photosynthesis. Carbon dioxide is removed from the atmosphere and oxygen is released during photosynthesis.
6.2c	Green plants are the producers of food which is used directly or indirectly by consumers.
7.1	Describe how living things, including humans, depend upon the living and nonliving environment for their survival.
7.1a	A population consists of all individuals of a species that are found together at a given place and time. Populations living in one place form a community. The community and the physical factors with which it interacts compose an ecosystem.
7.1b	Given adequate resources and no disease or predators, populations (including humans) increase. Lack of resources, habitat destruction, and other factors such as predation and climate limit the growth of certain populations in the ecosystem.
7.1c	In all environments, organisms interact with one another in many ways. Relationships among organisms may be competitive, harmful, or beneficial. Some species have adapted to be dependent upon each other with the result that neither could survive without the other.
7.1d	Some microorganisms are essential to the survival of other living things.
7.1e	The environment may contain dangerous levels of substances (pollutants) that are harmful to organisms. Therefore, the good health of environments and individuals requires the monitoring of soil, air, and water, and taking steps to keep them safe.
7.2	Describe the effects of environmental changes on humans and other populations.
7.2a	In ecosystems, balance is the result of interactions between community members and their environment.
7.2b	The environment may be altered through the activities of organisms. Alterations are sometimes abrupt. Some species may replace others over time, resulting in long-term gradual changes (ecological succession).
7.2c	Overpopulation by any species impacts the environment due to the increased use of resources. Human activities can bring about environmental degradation through resource acquisition, urban growth, land-use decisions, waste disposal, etc.
7.2d	Since the Industrial Revolution, human activities have resulted in major pollution of air, water, and soil. Pollution has cumulative ecological effects such as acid rain, global warming, or ozone depletion. The survival of living things on our planet depends on the conservation and protection of Earth's resources.

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NYS PI	Major Understandings: The Physical Setting (The following are addressed in 7 <sup>th</sup> Grade Technology)	7
5.2c	Machines transfer mechanical energy from one object to another.	T
5.2d	Friction is a force that opposes motion.	T
5.2e	A machine can be made more efficient by reducing friction. Some common ways of reducing friction include lubricating or waxing surfaces.	T
5.2f	Machines can change the direction or amount of force, or the distance or speed of force required to do work.	T
5.2g	Simple machines include a lever, a pulley, a wheel and axle, and an inclined plane. A complex machine uses a combination of interacting simple machines, e.g., a bicycle.	T

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