Galway Science
8th Grade Curriculum Guide

NYS PI	Major Understandings: The Living Environment (H=Covered by 8th Grade Health / X=Covered by 8th Grade Science)	8
1.2	Explain the functioning of the major human organ systems and their interactions.	H
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.	H
1.2b	Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal.	H
1.2c	The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food. The breakdown process results in molecules that can be absorbed and transported to cells.	H
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).	H
1.2e	The excretory system functions in the disposal of dissolved waste molecules, the elimination of liquid and gaseous wastes, and the removal of excess heat energy.	H
1.2f	The circulatory system moves substances to and from cells, where they are needed or produced, responding to changing demands.	H
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.	H
1.2h	The nervous and endocrine systems interact to control and coordinate the body's responses to changes in the environment, and to regulate growth, development, and reproduction. Hormones are chemicals produced by the endocrine system; hormones regulate many body functions.	H
1.2i	The male and female reproductive systems are responsible for producing sex cells necessary for the production of offspring.	H
1.2j	Disease breaks down the structures or functions of an organism. Some diseases are the result of failures of the system. Other diseases are the result of damage by infection from other organisms (germ theory). Specialized cells protect the body from infectiousdisease. The chemicals they produce identify and destroy microbes that enter the body.	H
4.2	Explain the role of sperm and egg cells in sexual reproduction.	X
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.	X
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.	X
4.3	Observe and describe developmental patterns in selected plants and animals (e.g., insects, frogs, humans, seed-bearing plants).	X
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.	X
4.3b	In humans, the fertilized egg grows into tissue which develops into organs and organ systems before birth.	X
4.3c	Various body structures and functions change as an organism goes through its life cycle.	X
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.	H
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.	H
5.2b	Foods contain a variety of substances, which include carbohydrates, fats, vitamins, proteins, minerals, and water. Each substance is vital to the survival of the organism.	H
5.2c	Metabolism is the sum of all chemical reactions in an organism. Metabolism can be influenced by hormones, exercise, diet, and aging.	H
5.2d	Energy in foods is measured in Calories. The total caloric value of each type of food varies. The number of Calories a person requires varies from person to person.	H
5.2e	In order to maintain a balanced state, all organisms have a minimum daily intake of each type of nutrient based on species, size, age, sex, activity, etc. An imbalance in any of the nutrients might result in weight gain, weight loss, or a diseased state.	H

NYS PI	Major Understandings: The Living Environment continued (H=Covered by 8th Grade Health / X=Covered by 8th Grade Science)	8
5.2f	Contraction of infectious disease, and personal behaviors such as use of toxic substances and some dietary habits, may interfere with one's dynamic equilibrium. During pregnancy these conditions may also affect the development of the child. Some effects of these conditions are immediate; others may not appear for many years.	H
NYS PI	**Major Understandings: The Physical Setting**	**8**
3.1	Observe and describe properties of materials, such as density, conductivity, and solubility.	X
3.1a	Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.	X
3.1b	Solubility can be affected by the nature of the solute and solvent, temperature, and pressure. The rate of solution can be affected by the size of the particles, stirring, temperature, and the amount of solute already dissolved.	X
3.1c	The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. The phase in which matter exists depends on the attractive forces among its particles.	X
3.1d	Gases have neither a determined shape nor a definite volume. Gases assume the shape and volume of a closed container.	X
3.1e	A liquid has definite volume, but takes the shape of a container.	X
3.1f	A solid has definite shape and volume. Particles resist a change in position.	X
3.1g	Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components. For example, iron can be removed from a mixture by means of a magnet. An insoluble substance can be separated from a soluble substance by such processes as filtration, settling, and evaporation.	X
3.1h	Density can be described as the amount of matter that is in a given amount of space. If two objects have equal volume, but one has more mass, the one with more mass is denser.	X
3.1i	Buoyancy is determined by comparative densities.	X
3.2	Distinguish between chemical and physical changes.	X
3.2a	During a physical change a substance keeps its chemical composition and properties. Examples of physical changes include freezing, melting, condensation, boiling, evaporation, tearing, and crushing.	X
3.2b	Mixtures are physical combinations of materials and can be separated by physical means.	X
3.2c	During a chemical change, substances react in characteristic ways to form new substances with different physical and chemical properties. Examples of chemical changes include burning of wood, cooking of an egg, rusting of iron, and souring of milk.	X
3.2d	Substances are often placed in categories if they react in similar ways. Examples include metals, nonmetals, and noble gases.	X
3.2e	The Law of Conservation of Mass states that during an ordinary chemical reaction matter cannot be created or destroyed. In chemical reactions, the total mass of the reactants equals the total mass of the products.	X
3.3	Develop mental models to explain common chemical reactions and changes in states of matter.	X
3.3a	All matter is made up of atoms. Atoms are far too small to see with a light microscope.	X
3.3b	Atoms and molecules are perpetually in motion. The greater the temperature, the greater the motion.	X
3.3c	Atoms may join together in well-defined molecules or may be arranged in regular geometric patterns.	X
3.3d	Interactions among atoms and/or molecules result in chemical reactions.	X
3.3e	The atoms of any one element are different from the atoms of other elements.	X
3.3f	There are more than 100 elements. Elements combine in a multitude of ways to produce compounds that account for all living and nonliving substances. Few elements are found in their pure form.	X
3.3g	The periodic table is one useful model for classifying elements. The periodic table can be used to predict properties of elements (metals, nonmetals, noble gases).	X
4.1	Describe the sources and identify the transformations of energy observed in everyday life.	X
4.1a	The Sun is a major source of energy for Earth. Other sources of energy include nuclear and geothermal energy.	X
4.1b	Fossil fuels contain stored solar energy and are considered nonrenewable resources. They are a major source of energy in the United States. Solar energy, wind, moving water, and biomass are some examples of renewable energy resources.	X

NYS PI	Major Understandings: The Physical Setting continued	8
4.1c	Most activities in everyday life involve one form of energy being transformed into another. For example, the chemical energy in gasoline is transformed into mechanical energy in an automobile engine. Energy, in the form of heat, is almost always one of the products of energy transformations.	X
4.1d	Different forms of energy include heat, light, electrical, mechanical, sound, nuclear, and chemical. Energy is transformed in many ways.	X
4.1e	Energy can be considered to be either kinetic energy, which is the energy of motion, or potential energy, which depends on relative position.	X
4.2	Observe and describe heating and cooling events.	X
4.2a	Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.	X
4.2b	Heat can be transferred through matter by the collisions of atoms and/or molecules (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).	X
4.2c	During a phase change, heat energy is absorbed or released. Energy is absorbed when a solid changes to a liquid and when a liquid changes to a gas. Energy is released when a gas changes to a liquid and when a liquid changes to a solid.	X
4.2d	Most substances expand when heated and contract when cooled. Water is an exception, expanding when changing to ice.	X
4.2e	Temperature affects the solubility of some substances in water.	X
4.3	Observe and describe energy changes as related to chemical reactions.	X
4.3a	3a In chemical reactions, energy is transferred into or out of a system. Light, electricity, or mechanical motion may be involved in such transfers in addition to heat.	X
4.4	Observe and describe the properties of sound, light, magnetism, and electricity.	X
4.4a	Different forms of electromagnetic energy have different wavelengths. Some examples of electromagnetic energy are microwaves, infrared light, visible light, ultraviolet light, X-rays, and gamma rays.	X
4.4b	Light passes through some materials, sometimes refracting in the process. Materials absorb and reflect light, and may transmit light. To see an object, light from that object, emitted by or reflected from it, must enter the eye.	X
4.4c	Vibrations in materials set up wave-like disturbances that spread away from the source. Sound waves are an example. Vibrational waves move at different speeds in different materials. Sound cannot travel in a vacuum.	X
4.4d	Electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy.	X
4.4e	Electrical circuits provide a means of transferring electrical energy.	X
4.4f	Without touching them, material that has been electrically charged attracts uncharged material, and may either attract or repel other charged material.	X
4.5	Describe situations that support the principle of conservation of energy.	X
4.5a	Energy cannot be created or destroyed, but only changed from one form into another.	X
4.5b	Energy can change from one form to another, although in the process some energy is always converted to heat. Some systems transform energy with less loss of heat than others.	X
5.1	Describe different patterns of motion of objects.	X
5.1a	The motion of an object is always judged with respect to some other object or point. The idea of absolute motion or rest is misleading.	X
5.1b	The motion of an object can be described by its position, direction of motion, and speed.	X
5.1c	An object's motion is the result of the combined effect of all forces acting on the object. A moving object that is not subjected to a force will continue to move at a constant speed in a straight line. An object at rest will remain at rest.	X
5.1d	Force is directly related to an object's mass and acceleration. The greater the force, the greater the change in motion.	X
5.1e	For every action there is an equal and opposite reaction.	X
5.2	Observe, describe, and compare effects of forces (gravity, electric current, and magnetism) on the motion of objects.	X
5.2a	Every object exerts gravitational force on every other object. Gravitational force depends on how much mass the objects have and on how far apart they are. Gravity is one of the forces acting on orbiting objects and projectiles.	X
5.2d	Friction is a force that opposes motion.	X