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RHINEBECK PRIORITIZED CURRICULUM
Grade 7
The Living Environment

Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 1:	**Living things are both similar to and different from each other and from nonliving things.**

Background:

Living things are similar to each other yet different from nonliving things. The cell is the basic unit of structure and function of living things (cell theory).
For all living things, life activities are accomplished at the cellular level. Human beings are an interactive organization of cells, tissues, organs, and systems.
Viruses lack cellular organization.

Guiding Questions

What is living? Non-living?

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Standard 4: Key Idea 1: Performance Indicator 1.1: Compare and contrast the parts of plants, animals, and one-celled organisms.

Essential Knowledge/Skills (Major Understandings)	*Priority Code*	*Essential Questions*	*Classroom Ideas*	*Assessment Ideas*	*Time/ Notes*
1.1a Living things are composed of cells. Cells provide the structure and carry on the 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, thereby 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. 1.1d Some organisms are single cell; others, including humans, are multi-cellular.	E E E E	• How are living things different from non-living things? • How are living things adapted to survive? • How are different animals adapted to survive? • How are living things classified?	• Create a model or poster of a cell using different available materials. • Make classroom cell – suspend cell parts from ceiling & students "travel" through cell. • Compare/contrast microscopically prepared slides of various types of tissue. • Using different types of plants, identify major parts and differences • Labs for various: - Monocots vs. dicots - Labeling parts of leaves w/microscopes - Dissecting flowers - Transpiration (variables) - Photosynthesis (indicators, variables) - Development of flower & fruit - Yeast cells, budding and respiration (variables) - Osmosis and diffusion in cells (models) - Comparing plant and animal cells (microscope)	• Teacher observations • Student responses • Student demonstrations • Teacher-developed and student-developed rubrics for performance tasks and projects • Pre, post-unit quiz *Ex. Assess posters and/or models of cells for understanding and knowledge of cell parts.* *Ex. Assess comparisons for knowledge of cell characteristics.*	

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Standard 4: Key Idea 1: Performance Indicator 1.1: Compare and contrast the parts of plants, animals, and one-celled organisms.

Essential Knowledge/Skills (Major Understandings)	*Priority Code*	*Essential Questions*	*Classroom Ideas*	*Assessment Ideas*	
1.1e Cells are organized for more effective functioning in multi-cellular organisms. Levels of organization for structure and function of a multi-cellular 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 Multi-cellular animals often have similar organs and systems specialized for carrying out the 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)	E E I E	• How are living things different from non-living things? • How are living things adapted to survive? • How are different animals adapted to survive? • How are living things classified?	• Frog or worm dissection comparison lab. • Construct a poster, chart or diagram comparing the systems of a worm & grasshopper • Video: Eyewitness-"Life" • Microscope lab- Identifying protists • Sequence and examples- arrange levels by increasing complexity and provide examples • "Want Ads" Advertising jobs for plant parts • Classification project: student create poster of related species at each of 7 levels of classification • Classification of animals Lab • Video: "Classification of Living Things" • Classification Pyramid Project • Paper doll frog (anatomy)	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects • Video quiz *Ex. Assess graphic displays using a rubric to evaluate accuracy, neatness, etc.*	

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Standard 4: Key Idea 1: Performance Indicator 1.2: Explain the functioning of the major human organ systems and their interactions.

Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	
1.2a The human organism has systems for digestion, respiration, reproduction, circulation, excretion, control and coordination, movement, and for protection from disease. These systems interact with one another. 1.2b Tissues, organs, and organ systems help to provide all cells with nutrients, oxygen, and waste removal. 1.2c The digestive system consists of organs that are responsible for the mechanical and chemical breakdown of food. This process results in molecules that can be absorbed and transported to cells. 1.2d During respiration, cells use oxygen to release the energy stored in food. To do this, the respiratory system supplies oxygen and removes carbon dioxide; this is called gas exchange. 1.2e The excretory system functions in the disposal of dissolved waste molecules, the elimination of solid, liquid, and gaseous wastes, and the removal of excess heat energy.	E E E E I	• How do cells get needed nutrients, and oxygen delivered and wastes removed? • What happens to the food we eat? • Why do we need to breathe? • How does our body maintain a constant internal environment? (homeostasis)	• System Project: Student created models and presentations to class on one system of the body • Cracker Lab – test for starch • Diagram path of digestion in humans and frogs. Compare the paths. Summarize. • Video: "Systems of the Body" and worksheet • Systems songs/poems (integration with ELA) • Systems analagies- (The circulatory system is like_____because…) students create and present • Video: "Nova-The Universe Within" • Test for lung (vital) capacity • CO_2 test with bromthymol blue or lime water. • affects, and current research being done on this disease. • Use model of living heart to follow blood flow through circulatory system. • Dissection of sheep heart	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Assess summaries using a rubric for clarity and understanding of knowledge.* *Ex. Assess models for accuracy and knowledge of content.*	

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Standard 4: Key Idea 1: Performance Indicator 1.2: Explain the functioning of the major human organ systems and their interactions.

Essential Knowledge/Skills (Major Understandings)	*Priority Code*	*Essential Questions*	*Classroom Ideas*	*Assessment Ideas*	*Time/ Notes*
1.2f The circulatory system moves substances to and from cells where they are needed or produced, responding to changing demands. 1.2g Locomotion, necessary to escape danger, obtain food and shelter, and reproduce, is accomplished by the interaction of skeletal muscles and bones, and coordinated by the nervous system. 1.2h The nervous and endocrine systems interact to control and coordinate the body's responses to changes in the environment, to regulate growth, development, and reproduction. Hormones are chemicals produced by the endocrine system; hormones regulate many body functions. 1.2i The male and female reproductive systems are responsible for producing sex cells necessary for the production of offspring. 1.2j Disease is a breakdown in structures or functions of an organism. Some diseases are the result of intrinsic failures of the system. Others diseases are the result of damage by infection by other organisms. Specialized cells accomplish protecting the body from infectious disease and the molecules they produce which identify and destroy microbes that enter the body	E I E E I	• How does the circulatory system keep us alive? • How do bones and muscles help us move and keep us alive? • How does the body coordinate functions and growth? • What are the endocrine glands and what is their function? • What are the major parts of the brain and their functions? • How do living things reproduce? • What is disease? • How does our body fight disease?	• Create models of the heart using available materials (shoebox) • Follow the path of a red blood cell from the brain, through the circulatory system and back to the brain • Skin lab- How much skin do I have? • Heart rate and recovery lab • Research one disease and prepare mind map(illustrated) - cause transmission - symptoms - treatment - progression - prevention - history • Reflex and control lab – Lab checks student's reflex action in seconds. • Research project using a variety of sources to research a disease, its cause, how and whom it affects, and current research • Flow chart: Disease and Immunity • Tribble Project (Genetics, Sexual Reproduction and Meiosis) • Lab – Most intelligent mammals	• Teacher observation • Student responses • Student demonstrations • Lab reports/summaries teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Research project rubric evaluating depth of information, sources used, organization, etc.*	

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Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 2:	**Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.**
Background: **Every organism requires a set of instructions for specifying its traits. This information is found in the chromosomes of cells. As organisms reproduce, these instructions are passed from one generation to the next.**	
Guiding Questions: How do the different types of reproduction ensure both continuity and variety of a species? How can the appearance of traits be predicted?	

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Standard 4: Key Idea 2: Performance Indicator 2.1:		**Describe sexual and asexual mechanisms for passing genetic materials from generation to generation.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
2.1a Hereditary information is contained in genes, composed of a molecule known as DNA and located in 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 many 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.	E E E E E	• Why do we look like our parents? • How is sexual reproduction different from asexual reproduction?	• Construct a DNA model using construction paper (whole class activity). • Graphically illustrate DNA's relationship to chromosomes • Build model of DNA portion (like piano keys) that would show gene locations. Show where certain traits may be found (Blood types, eye color etc.) • Look at pictures of mitosis vs. meiosis. Build models of mitosis and meiosis. Compare and contrast these processes. • Create a pedigree chart following a specific trait through 3 generations. • Tribble Project-"Creature" is assigned traits and characteristics, chromosome #; genes are "mapped" on chromosomes; sex cells are produced, random fertilization of sex cells occurs, and finally offspring are produced. Students apply genetic principles, use Punnett Squares to predict what "Jr." will look like. • Observe slides of hydra or yeast budding	• Teacher observations • Student responses • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Assess models for accuracy and knowledge of content.* *Ex. Assess pedigree charts for accuracy of charting trait.*	

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Standard 4: Key Idea 2: Performance Indicator 2.2: Describe simple mechanisms related to the inheritance of some physical traits in offspring.

Essential Knowledge/Skills (Major Understandings)	*Priority Code*	*Essential Questions*	*Classroom Ideas*	*Assessment Ideas*	*Time/ Notes*
2.2a In all organisms, 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 recessivness. 2.2c The probability of traits being expressed can be determined using models of genetic inheritance. Some models of predication are pedigree charts and Punnett squares.	E E E	• Why do we look like our parents? • How are traits passed from one generation to another?	• Human genetics lab • Punnett Squares activity • Activity- Mystery Flower (probility) • Activity- Blue vs. Brown (Probability- Dominant vs. Recessive) • Activity- Sex linked traits	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Assess pedigree charts for accuracy of charting trait.*	

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Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 3:	**Individuals organisms and species change over time.**
Background: **Evolution is the change in species over time. Millions of diverse species are alive today. Generally, this diversity of species developed through gradual processes of change occurring over many generations. Species acquire many of their unique characteristics through biological adaptation, which involves the selection of naturally occurring variations in populations (natural selection). Biological adaptations are differences in structures, behaviors, or physiology that enhance survival and reproductive success in a particular environment.**	
Guiding Questions: How do mutations allow for or enable survival of an organism?	

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Standard 4: Key Idea 3: Performance Indicator 3.1: Describe sources of variation in organisms and their structures and relate the variations to survival.					
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
3.1a The processes of sexual reproduction and mutation have given rise to a variety of traits within a species. 3.1b The processes of sexual reproduction and mutation have given rise to a variety of traits within a species. 3.1c Human activities such as selective breeding and advances in genetic engineering may affect the variations of species.	E E E	• How are traits passed from one generation to another? • How are living things adapted to survive? • How do living things interact with their environment?	• David Attenborough- Life on Earth, video series; Part I, II • Natural Selection Lab • Research pros and cons of selective breeding and/or genetic engineering. Write Position Paper or have a debate (possible integration with ELA) • Research and compare biological diversity among groups of living things (ex: different kingdoms, different phyla of animals, classes of chordates, orders of insects). Create graph or table of results	• Teacher observations • Student responses • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Presentation rubric evaluating information chosen to present, etc.*	

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Standard 4: Key Idea 3: Performance Indicator 3.2: Describe factors responsible for competition within species and the significance of that competition.					
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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. 3.2d 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	E I N	• How are living things adapted to survive? • How do living things change over time?	• Natural Selection Lab • Biome project • Lab activity- Examine fossils and explore their origins, using charts. • Peppered moth activity	• Teacher observations • Student responses • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Presentation rubric evaluating information chosen to present, etc.*	

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Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 4:	**The continuity of life is sustained through reproduction and development.**
Background: **The survival of a species depends on the ability of a living organism to have offspring. Living things go through a life cycle involving both reproductive and developmental stages. Development follows an orderly sequence of events.**	
Guiding Questions: How is reproduction and development essential to survival of the species, including their ability to have offspring? How are forms of asexual reproduction important to certain species?	

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Standard 4: Key Idea 4: Performance Indicator 4.1:		**Observe and describe the variations in reproductive patterns of organisms, including asexual and sexual reproduction.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
4.1a Some organisms reproduce asexually. Other organisms, including asexual 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 when part of an animal or plant is separated from the parent and becomes another individual. 4.1c Methods of sexual reproduction depend upon the species, but all 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.	I I E E	• How do living things reproduce?	• Compare reproduction of 2 animals (i.e., frogs and humans) • Trout in the Classroom Project- Observe eyed eggs and their development • Identify types of asexual reproduction in various plants or invertebrates • Show hydra, planaria, elodea (repeat from above) • Cuttings lab (vegetative propagation) • Yeast budding lab (from 1.1b – observe budding under microscope) also hydra • Discuss process of regeneration with starfish • Observe planaria regeneration • State relationships (qualitative & quantitative) between internal & external fertilization & development	• Teacher observations • Student responses • Journal entries • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Standard 4: Key Idea 4: Performance Indicator 4.2: Explain the role of sperm and egg cells in sexual reproduction.					
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
4.2a The sperm is the male sex cell. The egg is the female sex cell. 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 from each parent.	E E	• How do living things reproduce? • How are traits passed from one generation to another?	• Tribble project • Model of meiosis • Construct a diagram/model showing the process of fertilization and the role of chromosomes in this process.	• Teacher observations • Student responses *Ex. Assess diagrams/models for accuracy and knowledge of content.*	

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Standard 4: Key Idea 4: Performance Indicator 4.3:		**Observe and describe developmental patterns in selected plants and animals (e.g., insects, frogs, humans, seed-bearing plants).**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
4.3a Multi-cellular organisms exhibit complex changes in development, which begin after fertilization. The fertilized eggs undergoes numerous cellular divisions that will result in a multi-cellular 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.	I N N E I N	• How are traits passed from one generation to another? • Why do we look like our parents? • How do living things grow? • How do plants grow? • What distinguishes living things from non-living things (lifespan)?	• Video-"The Cell" • Germinate seeds and chart/graph growth and development (compare monocots and dicots) • Compare growth to peers from birth to present- create a graph to show different rates • Stream Study- Biotic assessment of Aquatic Invertebrates • Life Cycle of Frog- Diagram labeling activity • Life Cycle of Insects- Diagram labeling activity • Seed dissection lab	• Teacher observations • Student responses • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Standard 4: Key Idea 4: Performance Indicator 4.4: Observe and describe cell division at the microscopic level and its macroscopic effects.

Essential Knowledge/Skills (Major Understandings)	*Priority Code*	*Essential Questions*	*Classroom Ideas*	*Assessment Ideas*	*Time/ Notes*
4.4a In multi-cellular organisms, cell division is responsible for growth, maintenance, and repair. In some one-celled organisms, cell division is a method of asexual reproduction.	E	• How do living things grow? • How are traits passed from one generation to another? • How do living things interact with their environment?	• Make flash cards that show each stage of mitosis on cards. • Cell division math "Bacteria Bottles" • Tribble Project	• Teacher observations • Student responses • Teacher-developed and student-developed rubrics for performance tasks and projects	
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.	E				
4.4c Another type of cell division is responsible 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.	E				
4.4d Cancers are a result of abnormal cell division.	N				

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Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 5:	**Organisms maintain a dynamic equilibrium that sustains life.**
Background: **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. Organisms respond to internal or environmental stimuli.**	
Guiding Questions: How do living organisms use energy to carry out basic life functions? How do changes in the environment affect an organism's ability to carry out basic life functions? How does an organism's ability to sense and respond to the environment affect its ability to survive? How may an organism's dynamic equilibrium be maintained or upset?	

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Standard 4: Key Idea 3: Performance Indicator 5.1:		**Compare the way a variety of living specimens carry out basic life functions and maintain dynamic equilibrium.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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 processes of respiration and circulation. 5.1c All organisms require energy to survive. The amount of energy needed and the method for obtaining this energy varies 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 green plants, use light energy to make their food. Consumers, such as animals, take in energy-rich food. 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.	I I E E E E E	• How are living things adapted to survive?	• Hot & Cold Water Lab (student response to immersing one hand in hot water, one hand in cold water for 2 minutes. Students then place each hand separately into lukewarm water and observe responses.) • Euglenas and response to light • Organism response to salt water • Design experiment showing an organism's response to light, gravity, and salinity. • Symmetry activity • BMR- Calculating BMR activity (Basal Metabolic Rate) • The Most Intelligent Mammals Lab • Tropism Lab • Plasmolysis Lab (Elodia and Salt water) • Food chain and energy pyramid models • Lab- Exercise and recovery rate • Natural selection lab	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Standard 4: Key Idea 5: Performance Indicator 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.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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. 5.2b Foods contain a variety of substances, which include carbohydrates, fats, vitamins, proteins, minerals, and water. Each substances is vital to the survival of the organism. 5.2c Metabolism is the sum of all chemical reactions in the body. Hormones, exercise, and diet influence metabolism. 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. 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 can result in weight gain, weight loss, or a diseased state. 5.2f Contraction of infectious disease, and other personal behaviors such as use of toxic substances and some dietary habits, may interfere with one's dynamic equilibrium. During pregnancy these may also affect the development of the child. Some effects are immediate; others may not appear for many years.	E E E I I N	• How are living things adapted to survive? • What are some similarities and differences among us (humans)? • What human adaptations help us survive? • How do living things interact with their environment?	• Prepare a chart of food calories taken in and burned and their affect on the body • Compare the number of calories taken in with the number burned • Read food labels for calories & nutrition • Record personal calorie and nutrition intake for a day. Then, compare to recommended intake for male/female. Summarize. • Nutrient/calorie labels (see 2d) • BMR Activity • Nova Video-"The Universe Within" • Testing foods for different nutrients • Disease research activity (mind maps) • Identify nutrients needed to stay healthy- Match food items to nutrients provided	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects *Ex. Assess summaries for level of reasoning and accuracy of support.* .	

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Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 6:	**Plants and animals depend on each other and their physical environment.**
Background: **An environmentally aware citizen should have an understanding of the natural world. All organisms interact with one another and are dependent upon their physical environment. Energy and matter flow from one organism to another. Matter is recycled in ecosystems. Energy enters ecosystems as sunlight, and is eventually lost from the community, to the environment, mostly as heat.**	
Guiding Questions: How are all organisms interdependent? Why do terrariums work? How are all organisms dependent on energy from the sun?	

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Standard 4: Key Idea 6: Performance Indicator 6.1:		**Describe the flow of energy and matter through food chains and food webs.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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 non-living environment.	E E E	• How do living things interact with their environment?	• Food web activity (Clearwater) • Biome Energy Pyramid and Food Web Project • Cycles diagrams • Understanding Ecosystems video	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Standard 4: Key Idea 6: Performance Indicator 6.2:		**Provide evidence that green plants make food and explain the significance of this process to other organisms.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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 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.	I I E	• How do living things interact with their environment? • How are living things adapted to survive?	• Photosynthesis Sequence Cards • Photosynthesis Lab with geranium leaves • Photosynthesis Lab with Elodea	• Teacher observations • Student responses • Student demonstrations • Lab reports/ summaries • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Standard 4:	**Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**
Key Idea 7:	**Human decisions and activities have had a profound impact on the physical and living environment.**
Background: **An environmentally aware citizen should have an understanding of the natural world. All organisms interact with one another and are dependent upon their physical environment. Energy and matter flow from one organism to another. Matter is recycled in ecosystems. Energy enters ecosystems as sunlight, and is eventually lost from the community, to the environment, mostly as heat.**	
Guiding Questions: How are all organisms interdependent? Why do terrariums work? How are all organisms dependent on energy from the sun?	

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Standard 4: Key Idea 7: Performance Indicator 7.1:		**Describe how living things, including humans, depend upon the living and non-living environment for their survival.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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 indivduals requires the monitoring of soil, air, and water, and taking steps to keep them safe.	E E E I E	• How do living things interact with their environment? • How are organisms adapted to survive?	• Ecology video • Apply terms to local Stream Study Project • Climatograms • TIC • Video- "The Secret Lives of Plants" with worksheets • Owl Pellet Lab • Biome Project- Find evidence in your biome of competition, parasitism, symbiosis • Bacteria- Harmful or Helpful? Activity • Stream Study • Field Trip to Water and wastewater Treatment Plants • Video- Stream Keepers, Bill Nye • Trout in Classroom Project (TIC) • Adaptations Book Project (Research and write children's story book on unique adaptations of an organism- with ELA	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Standard 4: Key Idea 7: Performance Indicator 7.2:		**Describe the effects of environmental changes on humans and other populations.**			
Essential Knowledge/Skills (Major Understandings)	***Priority Code***	***Essential Questions***	***Classroom Ideas***	***Assessment Ideas***	***Time/ Notes***
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 thing on our planet depends on the conservation and protection of Earth's resources.	E I E E	• How do living things interact with their environment?	• Food web game • Stream Study • Sequence and explain changes in pictures to show ecological succession • Research local population of White Tailed Deer, and reasons for change in population over time • Assess stream bank. Look for evidence of human impact and possible effects • Human impact on a biome (Biome Project) • Jason XV Panama- Rainforests At the Crossroads (2004)	• Teacher observations • Student responses • Student demonstrations • Lab reports/summaries • Teacher-developed and student-developed rubrics for performance tasks and projects	

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Resource Materials			
Title	**Source**	**Title**	**Source**
ADAM software	1600 River Edge Park 3800 Atlanta, GA 30328	Science Experiments in Chemistry & Physics By T.K. Williams	Mark Twain Media, 1995
Science 2000 software	BOCES Center for Instructional Support (CIS) 361-5660	Science Super Sleuths By Wood & Walker	Instructional Fair ISBN 1-56822-843-0
Life Science Enrichment Activities	Merrill	Science & Technology: How Things Work By D. Crotts	Frank Schaffer ISBN 0-86734-799-6
Teaching Resources Cells & Heredity	Prentice Hall Explorer	Hands On Science	Instructional Fair ISBN 1-56822-131-2
Doing Science by Neal Glasgow	Corwin Press, Inc. ISBN 0-8-39-6477-3	GEMS (Great Explorations in Math & Science)	Lawrence Hall of Science, University of California Berkeley, Ca. 94720
Assessing Student Outcomes By Marzano, Pickering, and McTighe	ASCD 1-800-933-2723 (ISBN 0-87120-225-5)	Exploring Physical Science Text and Resource Book	Prentice Hall ISBN 0-13-422833-2
Assessing Hands-On Science	Corwin Press ISBN 0-8039-6443-9	How to Assess Thoughtful Outcomes By Kay Burke	IRI/Skylight ISBN 0-932935-58-3
Investigate & Connect Physical Science	Instructional Fair ISBN 1-56822-479-6	Interdisciplinary Thematic Unit- "Energy"	Teacher Created Materials, Inc. ISBN 1-55734-569-4
50 Terrific Science Experiments Grade 5-8	Instructional Fair ISBN 1-56822-658-6	Physical Science By Marshall & Jacobs	American Guidance Service, Inc. ISBN 0-7854-1018-X
Earth Science for Every Kid By Janice Van Cleave	Wiley & Sons ISBN 0-471-53010-7	Physical Science-Discovering Science Series By Connie Blood	Frank Schaffer ISBN 0-86734-561-6
Our World	Usborne Publications (ISBN 0-590-92186-X) (usually available through Scholastic, Inc.)	Mr. Wizard's 400 Experiments in Science By Don Herbert	Book Lab Prism Productions, 1968 ISBN 87594-012-9
Creative Sciencing By Devito & Krockover	Scott Foresman ISBN 0-673-52008-0	333 Science Tricks & Experiments	TAB Books, 1984 ISBN 0-8306-1825-2
Exploring Earth Science Lab Manual	Prentice Hall ISBN 0-113-80-7652-9	More Science Tricks & Experiments	TAB Books, 1984 ISBN 0-8306-1835-X

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Integrated Science Activity Book	Prentice Hall ISBN 0-13-402199-1	100 Blackboard Science Activities	Fearon Teaching Aids ISBN 0-86653-920-4
Global Science Lab Manual	Kendall/Hunt ISBN 0-8403-7485-2	Concepts & Challenges in Physical Science	Globe Fearon ISBN 0-835-92253-7
Investigations in Science Chemistry	Creative Teaching Press	Science Plus-Tech & Society	HBJ ISBN 0-03-074958-1
Big Blast of Science By Bill Nye	Addison-Wesley ISBN 0-201-60864-2	Science Up to Standards	Instructional Fair ISBN 1-56822-748-5