



MONTH	CONTENT	<b>NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR</b> 4.1.2a, 4.1.2e-I, 4.1.3a4.5.1a-e, 4.6.1a 4.2.1 a-g, 4.2.1 I, 4.3.1 d, 4.4.1 b, 4.4.1 d, 4.5.2 i, 4.5.2 j	LAB THEMES/SKILLS
<h1 style="writing-mode: vertical-rl; transform: rotate(180deg);">October</h1>	<p><b>Cell Structure and Function</b></p> <p><b>Photosynthesis/Cellular Respiration</b></p> <p><b>Cell Growth and Divisions</b></p>	<p>____ 1.2a Important levels of organization for structure and function include organelles, cells, tissues, organs, organ systems, and whole organisms.</p> <p>____ 1.2e-I The organs and systems of the body help to provide all the cells with their basic needs. The cells of the body are of different kinds and are grouped in ways that enhance how they function together. Cells have particular structures that perform specific jobs. These structures perform the actual work of the cell. Just as systems are coordinated and work together, cell parts must also be coordinated and work together. Each cell is covered by a membrane that performs a number of important functions for the cell. These include: separation from its outside environment, controlling which molecules enter and leave the cell, and recognition of chemical signals. The processes of diffusion and active transport are important in the movement of materials in and out of cells. Many organic and inorganic substances dissolved in cells allow necessary chemical reactions to take place in order to maintain life. Large organic food molecules such as proteins and starches must initially be broken down (digested to amino acids and simple sugars respectively), in order to enter cells. Once nutrients enter a cell, the cell will use them as building blocks in the synthesis of compounds necessary for life. Inside the cell a variety of specialized structures, formed from many different molecules, carry out the transport of materials (cytoplasm), extraction of energy from nutrients (mitochondria), protein building (ribosomes), waste disposal (cell membrane), storage (vacuole), and information storage (nucleus).</p> <p>____ 1.3a The structures present in some single-celled organisms act in a manner similar to the tissues and systems found in multicellular organisms, thus enabling them to perform all of the life processes needed to maintain homeostasis.</p> <p>____ 5.1a-d The energy for life comes primarily from the Sun. Photosynthesis provides a vital connection between the Sun and the energy needs of living systems. Plant cells and some one-celled organisms contain chloroplasts, the site of photosynthesis. The process of photosynthesis uses solar energy to combine the inorganic molecules carbon dioxide and water into energy-rich organic compounds (e.g., glucose) and release oxygen to the environment. In all organisms, organic compounds can be used to assemble other molecules such as proteins, DNA, starch, and fats. The chemical energy stored in bonds can be used as a source of energy for life processes. In all organisms, the energy stored in organic molecules may be released during cellular respiration. This energy is temporarily stored in ATP molecules. In <b>many</b> organisms, the process of cellular respiration is concluded in mitochondria, in which ATP is produced more efficiently, oxygen is used, and carbon dioxide and water are released as wastes.</p>	<p><b>LAB THEMES:</b></p> <ul style="list-style-type: none"> <li>❖ Cell Microscopy</li> <li>❖ Osmosis Diffusion*</li> <li>❖ Photosynthesis/Respiration</li> <li>❖ Mitosis</li> <li>❖ *required state lab</li> </ul> <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Distinguish difference between plant and animal cells, cell parts</li> <li>❖ Test with chemical</li> <li>❖ Indicators for starch/glucose</li> <li>❖ Gather data and form conclusions</li> <li>❖ Identify different mitotic phases</li> </ul>

MONTH	CONTENT	NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR 4.2.1i, 4.3.1d, 4.4.1b, 4.4.1d, 4.5.2i, 4.5.2j4.2.1e, 4.3.1c, 4.4.1c	LAB THEMES/SKILLS
<b>November</b>	<p><b>Cell Growth and Divisions</b></p> <p><b>Intro to Genetics</b></p>	<p>___ 4.1d The zygote may divide by mitosis and differentiate to form the specialized cells, tissues, and organs of multicellular organisms.</p> <p>___ 5.2i Gene mutations in a cell can result in uncontrolled cell division, called cancer. Exposure of cells to certain chemicals and radiation increases mutations and thus increases the chance of cancer.</p> <p>___ 2.1e In sexually reproducing organisms, the new individual receives half of the genetic information from its mother (via the egg) and half from its father (via the sperm). Sexually produced offspring often resemble, but are not identical to, either of their parents.</p> <p>___ 3.1c Mutation and the sorting and recombining of genes during meiosis and fertilization result in a great variety of possible gene combinations.</p> <p>___ 4.1c The processes of meiosis and fertilization are key to sexual reproduction in a wide variety of organisms. The process of meiosis results in the production of eggs and sperm which each contain half of the genetic information. During fertilization, gametes unite to form a zygote, which contains the complete genetic information for the offspring.</p>	<p><b>LAB THEMES:</b></p> <ul style="list-style-type: none"> <li>❖ Mitosis</li> <li>❖ Karyotype</li> <li>❖ Investigate inherited traits</li> <li>❖ Probabilities</li> </ul> <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Interpret Karyotypes</li> <li>❖ Compare and Contrast DNA Fingerprints</li> <li>❖ Analyze genetic inheritance and calculate probability of inheritance</li> </ul>

MONTH	CONTENT	<b>NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR</b> 4.1.2i4.2.1f-I, 4.2.2c, 4.3.1d, 4.5.1c4.5.1g 4.3.1b, 4.3.1d, 4.2.1e, 4.2.1i , 4.2.1j, 4.2.2e, 4.5.2h	<b>LAB THEMES/SKILLS</b>
<h1 style="writing-mode: vertical-rl; transform: rotate(180deg);">December</h1>	<p><b>DNA / RNA</b></p> <p><b>Genetic Engineering</b></p> <p><b>The Human Genome</b></p>	<p>____2.1f-h In all organisms, the coded instructions for specifying the characteristics of the organism are carried in DNA, a large molecule formed from subunits arranged in a sequence with bases of four kinds (represented by A, G, C, and T). The chemical and structural properties of DNA are the basis for how the genetic information that underlies heredity is both encoded in genes (as a string of molecular "bases") and replicated by means of a template. Cells store and use coded information. The genetic information stored in DNA is used to direct the synthesis of the thousands of proteins that each cell requires. Genes are segments of DNA molecules. Any alteration of the DNA sequence is a mutation. Usually, an altered gene will be passed on to every cell that develops from it.</p> <p>____2.2cd Different enzymes can be used to cut, copy, and move segments of DNA. Characteristics produced by the segments of DNA may be expressed when these segments are inserted into new organisms, such as bacteria. Inserting, deleting, or substituting DNA segments can alter genes. An altered gene may be passed on to every cell that develops from it.</p> <p>____3.1d Mutations occur as random chance events. Gene mutations can also be caused by such agents as radiation and chemicals. When they occur in sex cells, the mutations can be passed on to offspring; if they occur in other cells, they can be passed on to other body cells only.</p> <p>____5.1c In all organisms, organic compounds can be used to assemble other molecules such as proteins, DNA, starch, and fats. The chemical energy stored in bonds can be used as a source of energy for life processes.</p>	<p><b>LAB THEMES</b></p> <ul style="list-style-type: none"> <li>❖ : DNA / RNA Replication</li> <li>❖ Transcription</li> <li>❖ Translation</li> <li>❖ Biodiversity*</li> <li>❖ Genetic Engineering</li> <li>❖ Human Genetics</li> <li>❖ *required state lab</li> </ul> <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Transcribe/translate DNA to a protein</li> <li>❖ Compare/contrast plant specimens</li> <li>❖ Compare/contrast DNA and proteins</li> <li>❖ Analyze and evaluate experimental data</li> <li>❖ Research current information</li> <li>❖ Analyze pedigrees and human genetic disorders</li> </ul>

MONTH	CONTENT	NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR 1.1.1a-b, 4.2.1c-e, 4.2.2a, 4.3.1a-l,k	LAB THEMES/SKILLS
January	<p><b>Darwin Theory of Evolution</b></p> <p><b>Evolution of Populations</b></p> <p><b>Classification</b></p>	<p>____ 1.1a Populations can be categorized by the function they serve. Food webs identify the relationships among producers, consumers, and decomposers carrying out either autotrophic or heterotrophic nutrition. The nonliving environments as well as its interacting species shape an ecosystem. The world contains a wide diversity of physical conditions, which creates a variety of environments.</p> <p>____ 2.1c Hereditary information is contained in genes, located in the chromosomes of each cell. An inherited trait of an individual can be determined by one or by many genes, and a single gene can influence more than one trait. A human cell contains many thousands of different genes in its nucleus.</p> <p>____ 2.1e In sexually reproducing organisms, the new individual receives half of the genetic information from its mother (via the egg) and half from its father (via the sperm). Sexually produced offspring often resemble, but are not identical to, either of their parents.</p> <p>____ 3.1a-g The basic theory of biological evolution states that the Earth's present-day species developed from earlier, distinctly different species. New inheritable characteristics can result from new combinations of existing genes or from mutations of genes in reproductive cells. Mutation and the sorting and recombining of genes during meiosis and fertilization result in a great variety of possible gene combinations. Mutations occur as random chance events. Such agents as radiation and chemicals can also cause Gene mutations. When they occur in sex cells, the mutations can be passed on to offspring; if they occur in other cells, they can be passed on to other body cells only. Natural selection and its evolutionary consequences provide a scientific explanation for the fossil record of ancient life forms, as well as for the molecular and structural similarities observed among the diverse species of living organisms. Species evolve over time. Evolution is the consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection by the environment of those offspring better able to survive and leave offspring. Some characteristics give individuals an advantage over others in surviving and reproducing, and the advantaged offspring, in turn, are more likely than others to survive and reproduce. The proportion of individuals that have advantageous characteristics <b>will increase</b>.</p>	<p><b>LAB THEMES:</b></p> <ul style="list-style-type: none"> <li>❖ Evolution *</li> <li>❖ (Beaks of Finches)*</li> <li>❖ *required state lab</li> <li>❖ Classification</li> </ul> <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Compare/contrast characteristics of beaks</li> <li>❖ Understand competition between species</li> <li>❖ Assess effects of environmental changes on species</li> <li>❖ Use a Dichotomous Key</li> <li>❖ Classify specimens</li> </ul>

MONTH	CONTENT	<b>NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR</b> 4.5.1b, 4.5.3b 4.1.2a-e, 4.1.2j, 4.5.2d,h,j	LAB THEMES/SKILLS
<h1 style="writing-mode: vertical-rl; transform: rotate(180deg);">February</h1>	<p><b>Plants</b> <b>Angiosperms</b></p> <p><b>Nervous System</b></p> <p><b>Skeletal, Muscular, Integumentary, Circulatory, Respiratory System</b></p>	<p>____1.2a-e Important levels of organization for structure and function include organelles, cells, tissues, organs, organ systems, and whole organisms. Humans are complex organisms. They require multiple systems for digestion, respiration, reproduction, circulation, excretion, movement, coordination, and immunity. The systems interact to perform the life functions. The components of the human body, from organ systems to cell organelles, interact to maintain a balanced internal environment. To successfully accomplish this, organisms possess a diversity of control mechanisms that detect deviations and make corrective actions. If there is a disruption in any human system, there may be a corresponding imbalance in homeostasis. The organs and systems of the body help to provide all the cells with their basic needs. The cells of the body are of different kinds and are grouped in ways that enhance how they function together.</p> <p>____1.2j Receptor molecules play an important role in the interactions between cells. Two primary agents of cellular communication are hormones and chemicals produced by nerve cells. If nerve or hormone signals are blocked, cellular communication is disrupted and the organism's stability is affected.</p> <p>____5.2d-j Some white blood cells engulf invaders. Others produce antibodies that attack them or mark them for killing. Some specialized white blood cells will remain, able to fight off subsequent invaders of the same kind. Vaccinations use weakened microbes (or parts of them) to stimulate the immune system to react. This reaction prepares the body to fight subsequent invasions by the same microbes. Some viral diseases, such as AIDS, damage the immune system, leaving the body unable to deal with multiple infectious agents and cancerous cells. Some allergic reactions are caused by the body's immune responses to usually harmless environmental substances. Sometimes the immune system may attack some of the body's own cells or transplanted organs. Disease may also be caused by inheritance, toxic substances, poor nutrition, organ malfunction, and some personal behavior. Some effects show up right away; others may not show up for many years. Biological research generates knowledge used to design ways of diagnosing, preventing, treating, controlling, or curing diseases of plants and animals.</p>	<p><b>LAB THEMES</b></p> <ul style="list-style-type: none"> <li>❖ Plant Structure, Flower,</li> <li>❖ Root, Stem</li>   <li>❖ Senses</li>   <li>❖ Circulatory/Respiratory</li> <li>❖ Heart rate vs. exercise</li>   <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Identify flower reproductive structures</li>   <li>❖ Understand sensory pathways</li>   <li>❖ Understand relationship between exercise and body systems</li> </ul> </ul>



MONTH	CONTENT	NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR 4.5.1g, 4.5.2a-j, 1.1.1a, 4.6.1a-g	LAB THEMES/SKILLS
<b>April</b>	<p><b>Immune System and Disease</b></p> <p><b>The Biosphere</b></p>	<p>___ 5.1g Enzymes and other molecules, such as hormones, receptor molecules, and antibodies, have specific shapes that influence both how they function and how they interact with other molecules.</p> <p>___ 5.2a-j Homeostasis in an organism is constantly threatened. Failure to respond effectively can result in disease or death. Viruses, bacteria, fungi, and other parasites may infect plants and animals and interfere with normal life functions. The immune system protects against antigens associated with pathogenic organisms or foreign substances and some cancer cells. Some white blood cells engulf invaders. Others produce antibodies that attack them or mark them for killing. Some specialized white blood cells will remain, able to fight off subsequent invaders of the same kind. Vaccinations use weakened microbes (or parts of them) to stimulate the immune system to react. This reaction prepares the body to fight subsequent invasions by the same microbes. Some viral diseases, such as AIDS, damage the immune system, leaving the body unable to deal with multiple infectious agents and cancerous cells. Some allergic reactions are caused by the body's immune responses to usually harmless environmental substances. Sometimes the immune system may attack some of the body's own cells or transplanted organs. Disease may also be caused by inheritance, toxic substances, poor nutrition, organ malfunction, and some personal behavior. Some effects show up right away; others may not show up for many years. Gene mutations in a cell can result in uncontrolled cell division, called cancer. Exposure of cells to certain chemicals and radiation increases mutations and thus increases the chance of cancer. Biological research generates knowledge used to design ways of diagnosing, preventing, treating, controlling, or curing diseases of plants and animals.</p> <p>___ 1.1a Scientific explanations are built by combining evidence that can be observed with what people already know about the world.</p>	<p><b>LAB THEMES:</b></p> <ul style="list-style-type: none"> <li>❖ Antigen/antibody reactions</li> <li>❖ Food Webs/Food Chains</li> </ul> <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Understand relationships between antigens and antibodies</li> <li>❖ Understand body's response to disease</li> <li>❖ Interpret Graphs and tables</li> </ul>

MONTH	CONTENT	NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR 4.1.1a-j, 4.6.1a-g, 4.6.3b 4.7.1a,c, 4.7.2a-c, 4.7.3b	LAB THEMES/SKILLS
<b>May</b>	<p><b>Ecosystems/Community</b></p> <p><b>Populations</b></p> <p><b>Humans in Biosphere</b></p>	<p>____1.1a-j Populations can be categorized by the function they serve. Food webs identify the relationships among producers, consumers, and decomposers carrying out either autotrophic or heterotrophic nutrition. An ecosystem is shaped by the nonliving environment as well as its interacting species. The world contains a wide diversity of physical conditions, which creates a variety of environments. In all environments, organisms compete for vital resources. The linked and changing interactions of populations and the environment compose the total ecosystem. The interdependence of organisms in an established ecosystem often results in approximate stability over hundreds and thousands of years. For example, as one population increases, it is held in check by one or more environmental factors or another species. Ecosystems, like many other complex systems, tend to show cyclic changes around a state of approximate equilibrium. Every population is linked, directly or indirectly, with many others in an ecosystem. Disruptions in the numbers and types of species and environmental changes can upset ecosystem stability.</p> <p>____6.1a-e Energy flows through ecosystems in one direction, typically from the Sun, through photosynthetic organisms including green plants and algae, to herbivores to carnivores and decomposers. The atoms and molecules on the Earth cycle among the living and nonliving components of the biosphere. For example, carbon dioxide and water molecules used in photosynthesis to form energy-rich organic compounds are returned to the environment when the energy in these compounds is eventually released by cells. Continual input of energy from sunlight keeps the process going. This concept may be illustrated with an energy pyramid. The chemical elements, such as carbon, hydrogen, nitrogen, and oxygen, that make up the molecules of living things pass through food webs and are combined and recombined in different ways. At each link in a food web, some energy is stored in newly made structures but much is dissipated into the environment as heat. The number of organisms any habitat can support (carrying capacity) is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle the residue of dead organisms through the activities of bacteria and fungi. In any particular environment, the growth and survival of organisms depend on the physical conditions including light intensity, temperature range, mineral availability, soil/rock type, and relative acidity (pH).</p> <p>____6.3b Through ecological succession, all ecosystems progress through a sequence of changes during which one ecological community modifies the environment, making it more suitable for another community. These long-term gradual changes result in the community reaching a point of stability that can last for hundreds or thousands of years.</p>	<p><b>LAB THEMES:</b></p> <ul style="list-style-type: none"> <li>❖ Predator/Prey relationships</li> <li>❖ Population growth</li> <li>❖ Limiting factors</li> </ul> <p><b>SKILLS:</b></p> <ul style="list-style-type: none"> <li>❖ Understand relationships between organisms</li> <li>❖ Graphing</li> <li>❖ Evaluate how humans affect the ecosystem</li> </ul>

Text: Biology: New York State, Prentice Hall

MONTH	CONTENT	NYS STANDARD/KEY IDEA/PERFORMANCE INDICATOR	LAB THEMES/SKILLS
<b>June</b>	<b>REGENTS REVIEW</b>	ALL	ALL