



Manhattan Center for Science and Math High School

Science Department Curriculum

Content/Discipline LIVING ENVIRONMENT

<http://mcsportal.net>

Marking Period 1 /Unit 1

Topic and Essential Question; Scientific Method (Inquiry) and Tools of Scientists

Unit/Topics

- How do scientists conduct experiments?
- What are the steps of the scientific method?
- How do scientists write a lab report? –Connected with Lab #1
- What are different forms of observations that scientists undertake?
- How can we set up a controlled experiment?
- How can there be different experimental groups?
- How do you differentiate between an independent and dependent variable?
- How is collected data organized?
- How is experimental data analyzed?
- How do scientists handle conclusions, facts, and theories?
- How did scientific history lead to the discovery of the microscopic world?
- How can we use a compound light microscope? Also teach, how to prepare a wet-mount slide? Connect Lab
- How do scientists use the metric system?
- How can we measure specimens under the microscope?
- What are other tools that are used by biologists to observe nature?

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Translate quantitative or technical information expressed in words in a text into visual form (table, chart, graph)*
- *Follow precisely a complex multistep procedure when carrying out experiments*
- *Write arguments focused on scientific method, introduce precise claim, develop claim, supply data, provide a concluding statement*
- *Compare and contrast findings presented in a text to those from other sources*
- *Analyze the structure of the relationships amongst concepts in a text*
- *Analyze the author's purpose in providing an explanation describing a procedure or discussing an experiment in a text*
- *Draw evidence from informational text to support analysis, reflection, and research*

Vocabulary/Key Terms

Inquiry, Independent Variable, Dependent Variable, Control Group, Experimental Group

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

CCLS:

- **CCSS.ELA-Literacy.RST.9-10.2** Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- **CCSS.ELA-Literacy.RST.9-10.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- **CCSS.ELA-Literacy.RST.9-10.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- **CCSS.ELA-Literacy.RST.9-10.7** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

NYS Standards:

- **1.1a** Scientific explanations are built by combining evidence that can be observed with what people already know about the world.
- **1.1b** Learning about the historical development of scientific concepts or about individuals who have contributed to scientific knowledge provides a better understanding of scientific inquiry and the relationship between science and society.
- **1.1c** Science provides knowledge, but values are also essential to making effective and ethical decisions about the application of scientific knowledge.
- Hone ideas through reasoning, library research, and discussion with others, including experts.
- **1.2a** Inquiry involves asking questions and locating, interpreting, and processing information from a variety of sources.
- **1.2b** Inquiry involves making judgments about the reliability of the source and relevance of information.
- **1.3a** Scientific explanations are accepted when they are consistent with experimental and observational evidence and when they lead to accurate predictions.
- **1.3b** All scientific explanations are tentative and subject to change or improvement. Each new bit of evidence can create more questions than it answers. This leads to increasingly better understanding of how things work in the living world. Coordinate explanations at different levels of scale, points of focus, and degrees of complexity and specificity, and recognize the need for such alternative representations of the natural world.
- **1.4a** Well-accepted theories are ones that are supported by different kinds of scientific investigations often involving the contributions of individuals from different disciplines.
- **2.1** Devise ways of making observations to test proposed explanation
- **2.2a** Development of a research plan involves researching background information and understanding the major concepts in the area being investigated. Recommendations for methodologies, use of technologies, proper equipment, and safety precautions should also be included.
- **2.3a** Hypotheses are predictions based upon both research and observation.
- **2.3b** Hypotheses are widely used in science for determining what data to collect and as a guide for interpreting the data.
- **2.3c** Development of a research plan for testing a hypothesis requires planning to avoid bias (e.g., repeated trials, large sample size, and objective data-collection techniques).
- **2.4** Carry out a research plan testing explanations, including selecting and developing techniques, acquiring and building

apparatus, and recording observations as necessary.

- **3.1** Use various methods of representing and organizing observations (e.g., diagrams, tables, charts, graphs, equations, matrices) and insightfully interpret the organized data.
- **3.1a** Interpretation of data leads to development of additional hypotheses, the formulation of generalizations, or explanations of natural phenomena.
- **3.2** Apply statistical analysis techniques when appropriate to test if chance alone explains the results.
- **3.3** Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported.
- **3.4a** Hypotheses are valuable, even if they turn out not to be true, because they may lead to further investigation.
- **3.4b** Claims should be questioned if the data are based on samples that are very small, biased, or inadequately controlled or if the conclusions are based on the faulty, incomplete, or misleading use of numbers.
- **3.4c** Claims should be questioned if fact and opinion are intermingled, if adequate evidence is not cited, or if the conclusions do not follow logically from the evidence given.
- **3.5** Develop a written report for public scrutiny that describes the proposed explanation, including a literature review, the research carried out, its result, and suggestions for further research.
- **3.5a** One assumption of science is that other individuals could arrive at the same explanation if they had access to similar evidence. Scientists make the results of their investigations public; they should describe the investigations in ways that enable others to repeat the investigations.
- **3.5b** Scientists use peer review to evaluate the results of scientific investigations and the explanations proposed by other scientists. They analyze the experimental procedures, examine the evidence, identify faulty reasoning, point out statements that go beyond the evidence, and suggest alternative explanations for the same observations.

**Differentiated
Instruction:**

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings
- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs :

ELLs: Spanish Bilingual Program, non-Spanish ELLs receive extended time and glossaries/dictionaries during assessments.

SWDs:

SWDs: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Have students design an experiment by shining a lamp at varying distances with the Elodea placed inside a test tube clamped onto a ring stand or a flask. Students can measure the amount of oxygen the plant produces either by counting the air bubbles or attaching an oxygen gas probe to a computer.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt

Homework: Per Teacher



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Science Department Curriculum

Content/Discipline LIVING ENVIRONMENT

<http://mcsportal.net>**Marking Period 1 Unit 2****Topic and Essential Question; Chemistry of Life, Cells and Organelles****Unit/Topics**

- What are the characteristics of living things?
- What are the life functions?
- What are the different themes of science?
- How was the cell theory formulated?
- How is the cell the basic unit and function of life?
- How do plant cells differ from animal cells? Connect Lab
- What are the exceptions to the cell theory?
- How are the organelles connected to life functions?
- How do cells maintain homeostasis?

SWBAT/Objectives**Common Core Standards Objectives for this unit:**

- *Follow safety rules in the laboratory*
- *Make observations of biological processes*
- *Collects, organizes and analyzes data, using a computer and/or other laboratory equipment*
- *Organizes data through the use of data tables and graphs*
- *Analyzes results from observations /expressed data*
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- *Compare and Contrast a plant and animal cell.*

- *Analyze the Cell Theory*
- *Analyze characteristics of all living things*

Vocabulary/Key Terms

Animal Cell, Plant Cell, Cell Membrane, Cell Wall, Nucleus, Cytoplasm, Mitochondria, Chloroplast, Ribosome, DNA

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

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- **CCSS.ELA-Literacy.RST.9-10.7** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

NYS Standards:

- **1.2a** Important levels of organization for structure and function include organelles, cells, tissues, organs, organ systems, and whole organisms.
- **1.2f** 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.
- **1.2g** 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.
- **1.2i** 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).
- **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.

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings
- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

Differentiated Instruction:

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SWDS: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

ELLs :

SWDs:

High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Create a chart to compare and contrast a unicellular to multicellular animal body functions.
- Students can create a Cell Travel Brochure or use food ingredients, such as gelatin, to create a 3-D model (like a diorama) of a plant or animal cell.
- Students can create diagrams where they illustrate where each of the three major types of organic molecules are broken down and absorbed inside the human body. They can create a 3-D model to illustrate each of these processes.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 1 / Unit 3

Topic and Essential Question; Biochemistry

Unit/Topics

- How do organic compounds differ from inorganic compounds?
- What are some examples of organic compounds and how are they the chemicals of life? Connect Lab
- How does hydrolysis differ from dehydration synthesis?
- What is the relationship between bonds and energy?
- What is the relationship between food molecules and our body make up?
- Why can't an enzyme perform multiple tasks?
- What do enzymes do?
- How does an enzyme resemble a "lock?" How does a substrate resemble a key?

- If I add an enzyme to break down protein to a steak, what would happen to the protein in the steak? What would happen to the steak eventually even if the enzyme was not added?
- How do enzymes speed up reactions?

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- *Make observations of biological processes*
- *Collects, organizes and analyzes data, using a computer and/or other laboratory equipment*
- *Organizes data through the use of data tables and graphs*
- *Analyzes results from observations /expressed data*
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- *Analyze how enzymes perform and facilitate chemical reactions that sustain life.*
- *Distinguish what nutrients are present by performing nutrient tests using indicators.*
- *Recognize organic and inorganic molecules.*

Vocabulary/Key Terms

Organic, Inorganic, Enzymes, Substrates, Active Site Nutrients, Carbohydrates, Starch, Proteins, Lipids, Benedicts Solution, Lugol's Solution, Biuret Solution

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

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NYS Standards:

- **1.2a** Important levels of organization for structure and function include organelles, cells, tissues, organs, organ systems, and whole organisms.
- **1.2f** 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.
- **1.2h** 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.
- **1.2i** 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).

- **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.
- **5.1f** Biochemical processes, both breakdown and synthesis, are made possible by a large set of biological catalysts called enzymes. Enzymes can affect the rates of chemical change. The rate at which enzymes work can be influenced by internal environmental factors such as pH and temperature.
- **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.

Differentiated Instruction:

DIFFERENTIATED:

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High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Students can create diagrams where they illustrate where each of the three major types of organic molecules are broken down and absorbed inside the human body. They can create a 3-D model to illustrate each of these processes.
- Students can create a log of the different types of food they eat over a span of three days and calculate the number of calories they consume compared to the recommended daily caloric intake. They can also record the types of physical activities they perform utilize these calories.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 2 / Unit 4

Topic and Essential Question; Transport

Unit/Topics

- How does the structure of the cell membrane aid in transport?
- Why are receptors and other proteins so critical for transport?
- How do substances move in and out of the cell? Connect Lab
- How does passive transport differ from active transport?

SWBAT/Objectives

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- *Make observations of biological processes*
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- *Organizes data through the use of data tables and graphs*
- *Analyzes results from observations /expressed data*
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- *Analyze comparisons and differences between passive transport and active transport*
- *Recognize which molecules go through passive transport*
- *Prove the type of transport occurring in a solution*
- *Apply Concepts to Passive Transport occurring in body systems (Circulatory/Respiratory/Digestive)*
- *Explain phenomena in terms of osmosis*
- *Analyze why some substances are able to cross the lipid bilayer while others cannot*

Vocabulary/Key Terms

Passive Transport, Diffusion, Facilitated Diffusion, Osmosis, Active Transport, Adenosine Triphosphate, Lipid Bilayer, Fluid Mosaic Model

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

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NYS Standards:

- **1.2g** 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.
- **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.

Differentiated Instruction:

DIFFERENTIATED:

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- Concept Maps
- Manipulative
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- Gallery / Station walks

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SWDs:

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High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Teachers can offer students an opportunity to learn about the Fluid Mosaic Model by teaching the fundamentals of phospholipid molecules. Then have the students figure out how these molecules are arranged to create the bilipid membrane.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 2 / Unit 5

Topic and Essential Question; Respiration/Photosynthesis

Unit/Topics

- How does the structure of the cell membrane aid in transport?
- Why are receptors and other proteins so critical for transport?
- How do substances move in and out of the cell? Connect Lab
- How is the human body adapted for nutrition?
- How does surface area aid in digestion?
- How do enzymes function and how are they affected by different environmental conditions?
- How does autotrophic nutrition differ from heterotrophic nutrition? What are the diseases of the human digestive system?

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- **Make observations of biological processes**
- **Collects, organizes and analyzes data, using a computer and/or other laboratory equipment**
- **Organizes data through the use of data tables and graphs**
- **Analyzes results from observations /expressed data**
- **Formulates an appropriate conclusion or generation from the results of an experiment**
- **Recognizes assumptions and limitations of the experiment**
- **Craft an argumentative essay examining claims and counter-claims on possible environmental threats to photosynthesis, cell respiration, and homeostasis in plants and animal using text-based evidence.**
- **Identify patterns present in the cellular respiration and photosynthesis equations.**
- **Draw conclusions as to what would happen if one reactant or product is missing in either equation.**
- **Analyze photosynthesis and cellular respiration in terms of how energy is stores, released and transferred within and between these systems**
- **Explain ways that organisms use/release energy for maintaining homeostasis**

Vocabulary/Key Terms

Photosynthesis, Carbon Dioxide, Water, Sunlight, Glucose, Oxygen, Autotrophs, Heterotrophs, Cellular Respiration, ATP

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

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- **CCSS.ELA-Literacy.RST.9-10.7** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- **CCSS.ELA-Literacy.RI.9-10.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- **CCSS.ELA-Literacy.RI.9-10.8** Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.

NYS Standards:

- 5.1a The energy for life comes primarily from the Sun. Photosynthesis provides a vital connection between the Sun and the energy needs of living systems.
- 5.1b 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.
- 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.
- 5.1d In all organisms, the energy stored in organic molecules may be released during cellular respiration. This energy is temporarily stored in ATP molecules. In many 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.
- 5.1e The energy from ATP is used by the organism to obtain, transform, and transport materials, and to eliminate wastes.

Differentiated Instruction:

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ELLs :

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SWDs:

SWDs: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Students can conduct an inquiry-based yeast fermentation experiment where they investigate the optimal temperature for anaerobic respiration to occur.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 3 / Unit 6

Topic and Essential Question; Body System 1

Unit/Topics

- How is the human body adapted for respiration?
- Structure and Function of the human respiratory system
- How does breathing occur in humans?
- What are the diseases of the human respiratory system?
- Structure and Function of the human circulatory system
- What are the diseases of the human circulatory system?
- How is the human body adapted for excretion?
- How do organisms maintain homeostasis? Connect Lab
- How are cellular/metabolic wastes removed by the body?
- How does a nephron aid in the removal of metabolic waste?
- How do diseases from the excretory system disrupt homeostasis?
- What are hormones?
- How are the endocrine system and circulatory system connected
- Function , location and secretions of the endocrine glands

- How does the endocrine system maintain homeostasis?
- How is diabetes an excellent example of a malfunction in negative feedback?

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- **Follow safety rules in the laboratory**
- **Make observations of biological processes**
- **Collects, organizes and analyzes data, using a computer and/or other laboratory equipment**
- **Organizes data through the use of data tables and graphs**
- **Analyzes results from observations /expressed data**
- **Formulates an appropriate conclusion or generation from the results of an experiment**
- **Recognizes assumptions and limitations of the experiment**
- Graph the effects of exercise on oxygen and carbon dioxide levels.
- Apply Concepts/Connect Transport with Gas Exchange
- Analyze how the human body is adapted for excretion.
- Prove how the human body maintains homeostasis
- Investigate how diseases of the excretory system disrupt homeostasis.
- Interpret how the endocrine and circulatory system are connected.
- Hypothesize and assess how diabetes is an excellent example of a malfunction in negative feedback
- Prove how the endocrine system is able to maintain homeostasis once it is disrupted.

Vocabulary/Key Terms

Respiratory, Circulatory, Heart, Lungs, Oxygenated, Deoxygenated, Excretory, Excretion, Metabolic Waste, Nephron, Endocrine, Glands, Hormones, Diabetes, Insulin

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

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- **CCSS.ELA-Literacy.RI.9-10.8** Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.

NYS Standards:

- **1.1.3:** Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported.
- **1.3.2** Apply statistical analysis techniques when appropriate to test if chance alone explains the results.
- **1.3.4** Based on the results of the test and through public discussion, revise the explanation and contemplate additional research.
- **1.2b** 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.
- **1.2c** 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.
- **1.2e** 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.
- **5.2a** Homeostasis in an organism is constantly threatened. Failure to respond effectively can result in disease or death.
- **5.2h** 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.
- **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.
- **5.2j** Biological research generates knowledge used to design

Differentiated Instruction:

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings
- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs : ELLS: Spanish Bilingual Program, non-Spanish ELLs receive extended time and glossaries/dictionaries during assessments.

SWDs: SWDS: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Students can create a small project using different types of materials such as balloons or wooden blocks to illustrate the concept of surface area: volume ratio.
- Students can create models using marbles, rocks, sand, or other sources of material to represent the chemical compositions of normal urine versus someone who is diabetic or pregnant.
- Ask students to create line graphs that best represent how they'd expect different hormones such as adrenaline, noradrenaline, insulin and glucagon to change throughout a school day. Encourage students to research real scientific data online to create their own charts.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 3 / Unit 7

Topic and Essential Question; Body System 2**Unit/Topics**

- How is the human body adapted for regulation?
- How do living things respond to changes in the environment?
- How does the human brain function?
- How do neurons transmit impulses?
- How do reflexes differ from voluntary actions? Connect Lab
- How does the endocrine system differ from the nervous system?
- How do receptors play a crucial role in the nervous and endocrine systems?
- How is the human body adapted for immunity?
- How do infectious diseases differ from non-infectious diseases, and how are pathogens involved?
- How do the 3 lines of defense and vaccines protect us against diseases?
- How does active immunity differ from passive immunity?
- What are the diseases of the human immune system?
- How is the human body adapted for reproduction?
- How does asexual reproduction differ from sexual reproduction?
- How does asexual reproduction occur in plants? Connect LAB

- How does sexual reproduction take place in plants? Connect LAB
- How do cells make copies of themselves?
- How does the process of mitosis occur?
- How does the process of meiosis occur?
- How does mitosis differ from meiosis?
- How is the human male adapted for reproduction?
- How is the female adapted for reproduction?
- How do hormones contribute to secondary sex characteristics?
- How is the menstrual cycle an example of negative feedback?
- How does internal fertilization differ from external fertilization?
- How does internal development differ from external development?
- How do environmental factors affect fetal development?

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- *Make observations of biological processes*
- *Collects, organizes and analyzes data, using a computer and/or other laboratory equipment*
- *Organizes data through the use of data tables and graphs*
- *Analyzes results from observations /expressed data*
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- *Analyze how the living things respond to changes in the external environment.*
- *Investigate how the brain functions.*
- *Draw conclusion on what would happen is neurons failed to function properly.*
- *Compare and contrast voluntary actions and reflexes.*
- *Compare how the bodies 3 lines of defense protect the human body against pathogen*
- *Investigate diseases that impact the immune system*
- *Analyze how hormones contribute to secondary sex characteristics*
- *Compare and contrast the female and male reproductive system.*
- *Create male and female reproductive system diagrams.*
- *Draw conclusions on how internal and external fertilization differ.*
- *Investigate how environmental factors impact fetal development*

Vocabulary/Key Terms

Nervous, Neurons, Synapse, Axons, Brian, Spinal Cord, Endocrine, Receptors, Immune, Infectious Diseases, Non-Infectious Diseases, Active Immunity, Passive Immunity, HIV, Reproduction, Asexual, Sexual, Negative Feedback, Positive Feedback

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

CCLS:

- **CCSS.ELA-Literacy.RST.9-10.2** Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- **CCSS.ELA-Literacy.RST.9-10.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- **CCSS.ELA-Literacy.RST.9-10.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- **CCSS.ELA-Literacy.RST.9-10.7** Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
- **CCSS.ELA-Literacy.RI.9-10.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- **CCSS.ELA-Literacy.RI.9-10.8** Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.

NYS Standards:

- **1.1.3:** Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported.
- **1.3.2** Apply statistical analysis techniques when appropriate to test if chance alone explains the results.
- **1.3.4** Based on the results of the test and through public discussion, revise the explanation and contemplate additional research.
- **1.2b** 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.
- **1.2c** 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.
- **1.2e** 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.
- **5.2a** Homeostasis in an organism is constantly threatened. Failure to respond effectively can result in disease or death.
- **5.2b** Viruses, bacteria, fungi, and other parasites may infect plants and animals and interfere with normal life functions.
- **5.2c** The immune system protects against antigens associated with pathogenic organisms or foreign substances and some cancer cells.
- **5.2d** 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.
- **5.2e** 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.
- **5.2f** Some viral diseases, such as AIDS, damage the immune system, leaving the body unable to deal with multiple infectious agents and cancerous cells.
- **5.2g** 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.
- **5.2h** 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.

- **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.
- **5.2j** Biological research generates knowledge used to design ways of diagnosing, preventing treating, controlling, or curing diseases of plants and animals.

Differentiated Instruction:

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings
- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs: Spanish Bilingual Program, non-Spanish ELLs receive extended time and glossaries/dictionaries during assessments.

ELLs :

SWDS: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

SWDs:

High Achievers:

High-Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Students can receive extra credit for suggesting ways in which they can improve the validity and reliability of their experimental methods during the “Reaction Time” lab.
- Students can use paper mache to illustrate the relative size of different animal brains, paying special attention to the anatomical differences in the cerebrum, cerebellum and medulla.
- Teachers can provide a list of diseases to students where they can pick one or two to study their different modes of transmission, symptoms, treatments and methods of prevention.
- Perform the AIDS transmission lab and have students identify the source of disease.
- After students learn about meiosis and mitosis, have work in teams of 2 to figure out how nondisjunction can lead to various types of aneuploidy.
- Provide students with data for the different number of offspring animals such as whales, goldfish, frogs, and monkeys produce. Have them decipher which of these animals reproduce internally or externally, and the types of development they use.



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Marking Period 4 / Unit 8

Topic and Essential Question; Mitosis/ Meiosis

Unit/Topics

- How do cells make copies of themselves?
- How does the process of mitosis occur?
- How does the process of meiosis occur?
- How does mitosis differ from meiosis?
- How does asexual and sexual reproduction differ?

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- *Make observations of biological processes*
- *Collects, organizes and analyzes data, using a computer and/or other laboratory equipment*
- *Organizes data through the use of data tables and graphs*
- *Analyzes results from observations /expressed data*
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- *Describe and differentiate between asexual and sexual reproduction in terms of chromosome number, relation to parent, frequency, and genetic variation.*
- *Describe and differentiate between mitosis and meiosis in terms of divisions, chromosome number, and number of daughter cells.*
- *Explain how cancer is a malfunction in mitosis.*
- *Identify mitosis or meiosis by visual elements such as number of daughter cells or divisions*
- *Describe relatedness of each type of reproduction*
- *Identify reproduction type in the lab setting by viewing different organisms reproduce (both living and images of living organisms)*
- *Compare and contrast both asexual and sexual reproduction and mitosis and meiosis.*
- *Describe how mitosis and meiosis and necessary (or not) for both types of reproduction*

Vocabulary/Key Terms	Mitosis, Meiosis, Sexual Reproduction, Asexual Reproduction, Chromosomes, Cancer, Spindle Fibers
Assessments:	Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function
Common Core Standards:	<p>CCLS:</p> <ul style="list-style-type: none"> ● CCSS.ELA-Literacy.RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. ● CCSS.ELA-Literacy.RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. ● CCSS.ELA-Literacy.RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 9–10 texts and topics</i>. ● CCSS.ELA-Literacy.RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. <p>NYS Standards:</p> <ul style="list-style-type: none"> ● 1.1.3: Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported. ● 1.3.2 Apply statistical analysis techniques when appropriate to test if chance alone explains the results. ● 1.3.4 Based on the results of the test and through public discussion, revise the explanation and contemplate additional research. ● 2.1b Every organism requires a set of coded instructions for specifying its traits. For offspring to resemble their parents, there must be a reliable way to transfer information from one generation to the next. Heredity is the passage of these instructions from one generation to another. ● 2.1d In asexually reproducing organisms, all the genes come from a single parent. Asexually produced offspring are normally genetically identical to the parent. ● 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 sperm). Sexually produced offspring often resemble, but are not identical to, either of their parents. ● 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 of the offspring. ● 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.
Differentiated Instruction:	<p>DIFFERENTIATED:</p> <ul style="list-style-type: none"> ● Heterogeneous versus Homogeneous groupings ● Visuals Aids / Models ● Assisted Labs

- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs :

ELLs: Spanish Bilingual Program, non-Spanish ELLs receive extended time and glossaries/dictionaries during assessments.

SWDs:

SWDs: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Allow students to work in teams of 2 to figure out how nondisjunction can lead to various types of aneuploidy.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 4 / Unit 9

Topic and Essential Question; Genetics

Unit/Topics

- How did Mendel's research on pea plants give rise to the law of dominance?
- How did Mendel's research on pea plants give rise to the law of segregation?
- How many of our traits are dominant and recessive? Connect Lab
- How do Punnett squares help us understand the law of chance? Connect Lab
- How is the structure of DNA organized?
- How does the double helix model explain replication?
- How does DNA helicase and polymerase contribute to replication?
- What happens if DNA polymerase makes an error?

- How does DNA contribute to transcription?
- How does RNA contribute to translation?
- What happens if RNA polymerase makes an error?
- How can mutations be good, bad, or neutral?
- Did a genetic mutation contribute to the “elephant man’s” disease? Show video
- How are mutations related to sickle cell anemia?
- How can protein differences and similarities contribute to relating organisms? Connect Lab
- How does artificial selection work?
- How was Dolly cloned?
- What are the advantages and disadvantages of cloning flocks?
- How are plasmids used to in genetic engineering?
- How do restriction enzymes help in biotechnology?
- How can genetic engineering benefit agriculture?
- How can genetic engineering to vaccines?
- How is RFLP analysis used in identifying individuals?
- How does stem cell therapy work?
- What are other techniques that are involved in biotechnology?

This is the hardest unit to learn. Many visuals work for the ELLs, project-based assessments, and field trips to the DNA lab – Title I-free.

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- Make observations of biological processes
- Collects, organizes and analyzes data, using a computer and/or other laboratory equipment
- Organizes data through the use of data tables and graphs
- Analyzes results from observations /expressed data
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- Describe and differentiate between structural and molecular evidences.
- Explain how genetic engineering plays a role in medicine.
- Identify the steps of protein synthesis
- Describe relatedness of each type of genetic information

Vocabulary/Key Terms

Traits, DNA, RNA, amino acids, gene expression, genetic engineering

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

CCLS:

- CCSS.ELA-Literacy.RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text’s explanation or

depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

- CCSS.ELA-Literacy.RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- CCSS.ELA-Literacy.RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- CCSS.ELA-Literacy.RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

NYS Standards:

- **1.1.3:** Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported.
- **1.3.2** Apply statistical analysis techniques when appropriate to test if chance alone explains the results.
- **1.3.4** Based on the results of the test and through public discussion, revise the explanation and contemplate additional research.
- **2.1b** Every organism requires a set of coded instructions for specifying its traits. For offspring to resemble their parents, there must be a reliable way to transfer information from one generation to the next. Heredity is the passage of these instructions from one generation to another.
- **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.
- **2.1f** 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.
- **2.1g** 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.
- **2.1h** 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.
- **2.1i** The work of the cell is carried out by the many different types of molecules it assembles, mostly proteins. Protein molecules are long, usually folded chains made from 20 different kinds of amino acids in a specific sequence. This sequence influences the shape of the protein. The shape of the protein, in turn, determines its function.
- **2.1j** Offspring resemble their parents because they inherit similar genes that code for the production of proteins that form similar structures and perform similar functions.
- **2.1k** The many body cells in an individual can be very different from one another, even though they are all descended from a single cell and thus have essentially identical genetic instructions. This is because different parts of these instructions are used in different types of cells, and are influenced by the cell’s environment and past history.

Differentiated Instruction:

ELLs :

SWDs:

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings

High-Achievers:

- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs: Spanish Bilingual Program, non-Spanish ELLs receive extended time and glossaries/dictionaries during assessments.

SWDS: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Allow students to work in teams of 2 to figure out how to create new proteins.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 5 / Unit 10

Topic and Essential Question; Evolution

Unit/Topics

- What evidence is out there for evolution? Stress earth's age, Stanley Miller, heterotroph hypothesis, etc.
- How are prokaryotic cells different from eukaryotic cells?
- What does comparative anatomy show?
- What does comparative cytology show?
- What does comparative biochemistry show?
- How can mutations contribute to the theory of evolution?
- How are humans similar and different from other primates? Connect Lab

- How did Darwin contribute to the theory of evolution? Stress other scientists contributions as well
- How are Darwin's Finches related to the theory of evolution? Connect Lab
- What is the theory of Natural Selection all about?
- How can geographic isolation lead to speciation?
- How can reproductive isolation lead to speciation?
- What is adaptive radiation?
- What are the two different time frames for evolution? Stress Punctuated Equilibrium versus Gradualism
- What could've caused the mass extinction of Dinosaurs?
- How has industrial melanism contributed to the theory of evolution?
- How has antibiotic resistance affected the medical world?
- How has pesticide resistance affected agriculture?
- What is the difference between microevolution and macroevolution?
- How does cladistics help us understand evolution?

This is a controversial topic because of religion; however, it's all about EVIDENCE.

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- Make observations of biological processes
- Collects, organizes and analyzes data, using a computer and/or other laboratory equipment
- Organizes data through the use of data tables and graphs
- Analyzes results from observations /expressed data
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- Describe and differentiate between comparative sciences.
- Explain the points of Natural Selection .
- Describe antibiotic resistance

Vocabulary/Key Terms

Anatomy, Cytology, Biochemistry, Competition, Survival of the Fittest, Adaptations, Mutations

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

CCLS:

- CCSS.ELA-Literacy.RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- CCSS.ELA-Literacy.RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- CCSS.ELA-Literacy.RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- CCSS.ELA-Literacy.RST.9-10.7 Translate quantitative or technical information expressed in words in a text into

visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

NYS Standards:

- **1.1.3:** Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported.
- **1.3.2** Apply statistical analysis techniques when appropriate to test if chance alone explains the results.
- **1.3.4** Based on the results of the test and through public discussion, revise the explanation and contemplate additional research.
- 3.1a The basic theory of biological evolution states that the Earth's present-day species developed from earlier, distinctly different species.
- 3.1b New inheritable characteristics can result from new combinations of existing genes or from mutations of genes in reproductive cells.
- 3.1c Mutation and the sorting and recombining of genes during meiosis and fertilization result in a great variety of possible gene combinations.
- 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.
- 3.1e 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.
- 3.1f 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.
- 3.1g 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 will increase.
- 3.1h The variation of organisms within a species increases the likelihood that at least some members of the species will survive under changed environmental conditions.
- 3.1i Behaviors have evolved through natural selection. The broad patterns of behavior exhibited by organisms are those that have resulted in greater reproductive success.
- 3.1j Billions of years ago, life on Earth is thought by many scientists to have begun as simple, single-celled organisms. About a billion years ago, increasingly complex multicellular organisms began to evolve.
- 3.1k Evolution does not necessitate long-term progress in some set direction. Evolutionary changes appear to be like the growth of a bush: Some branches survive from the beginning with little or no change, many die out altogether, and others branch repeatedly, sometimes giving rise to more complex organisms.
- 3.1l Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival. Fossils indicate that many organisms that lived long ago are extinct. Extinction of

species is common; most of the species that have lived on Earth no longer exist.

Differentiated Instruction:

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings
- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs :

ELLs: Spanish Bilingual Program, non-Spanish ELLs receive extended time and glossaries/dictionaries during assessments.

SWDs:

SWDS: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

High-Achievers:

High Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Allow students to work in teams of 2 to figure out resistance plays a role in natural selection using Binky experiment.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt



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Marking Period 6 / Unit 11

Topic and Essential Question; Ecology

Unit/Topics

- What does an ecosystem entail?
- What is the difference between abiotic and biotic factors?
- What is the difference between a niche and a habitat?
- What do food chains, webs and trophic levels display?
- How do we connect energy pyramids to photosynthesis?
- How do limiting factors affect an ecosystem?

- How does carrying capacity affect an ecosystem?
- How does the water cycle work?
- How is the carbon-oxygen-hydrogen cycle connected to photosynthesis and respiration?
- How does the nitrogen cycle affect agriculture?
- What does a climatogram work?
- What are the different symbiotic relationships in nature?
- What are the different biomes identified on Earth?
- How does succession work?
- What are some growth patterns seen in nature?
- How does acid rain affect our ecosystem?
- How is global warming going to affect our future?

This is the topic they all relate to and for this unit, it is best to relate things to their surroundings, native countries, cultures and traditions. All in all, the Homework cover pages are the ones that express their understanding for most of these LE topics. Art is the way!

SWBAT/Objectives

Common Core Standards Objectives for this unit:

- *Follow safety rules in the laboratory*
- Make observations of biological processes
- Collects, organizes and analyzes data, using a computer and/or other laboratory equipment
- Organizes data through the use of data tables and graphs
- Analyzes results from observations /expressed data
- *Formulates an appropriate conclusion or generation from the results of an experiment*
- *Recognizes assumptions and limitations of the experiment*
- Describe and differentiate between positive and negative impact.
- Explain different forms of pollution.
- Describe ecosystems interdependence.

Vocabulary/Key Terms

Limited factors, abiotic, biotic, pollution, cycles, global warming, succession, risk, costs

Assessments:

Regents Based Questions, Lab Reports, Inquiry-based Learning, Fill-in-the-blanks Worksheets, Power Point Discussions, and Name & Function

Common Core Standards:

CCLS:

- CCSS.ELA-Literacy.RST.9-10.2 Determine the central ideas or conclusions of a text; trace the text’s explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
- CCSS.ELA-Literacy.RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- CCSS.ELA-Literacy.RST.9-10.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- CCSS.ELA-Literacy.RST.9-10.7 Translate quantitative or technical information expressed in words in a text into

visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

NYS Standards:

- **1.1.3:** Assess correspondence between the predicted result contained in the hypothesis and actual result, and reach a conclusion as to whether the explanation on which the prediction was based is supported.
- **1.3.2** Apply statistical analysis techniques when appropriate to test if chance alone explains the results.
- **1.3.4** Based on the results of the test and through public discussion, revise the explanation and contemplate additional research.
- **6.3a** The interrelationships and interdependencies of organisms affect the development of stable ecosystems.
- **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.
- **6.3c** A stable ecosystem can be altered, either rapidly or slowly, through the activities of organisms (including humans), or through climatic changes or natural disasters. The altered ecosystem can usually recover through gradual changes back to a point of long-term stability.
- **7.1a** The Earth has finite resources; increasing human consumption of resources places stress on the natural processes that renew some resources and deplete those resources that cannot be renewed.
- **7.1b** Natural ecosystems provide an array of basic processes that affect humans. Those processes include but are not limited to: maintenance of the quality of the atmosphere, generation of soils, control of the water cycle, removal of wastes, energy flow, and recycling of nutrients. Humans are changing many of these basic processes and the changes may be detrimental.
- **7.1c** Human beings are part of the Earth's ecosystems. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems. Humans modify ecosystems as a result of population growth, consumption, and technology. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors is threatening current global stability, and if not addressed, ecosystems may be irreversibly affected.
- **7.2a** Human activities that degrade ecosystems result in a loss of diversity of the living and nonliving environment. For example, the influence of humans on other organisms occurs through land use and pollution. Land use decreases the space and resources available to other species, and pollution changes the chemical composition of air, soil, and water.
- **7.2b** When humans alter ecosystems either by adding or removing specific organisms, serious consequences may result. For example, planting large expanses of one crop reduces the biodiversity of the area.
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- 7.2c Industrialization brings an increased demand for and use of energy and other resources including fossil and nuclear fuels. This usage can have positive and negative effects on humans and ecosystems.
- 7.3a Societies must decide on proposals which involve the introduction of new technologies. Individuals need to make decisions which will assess risks, costs, benefits, and trade-offs.
- 7.3b The decisions of one generation both provide and limit the range of possibilities open to the next generation.

Differentiated Instruction:

DIFFERENTIATED:

- Heterogeneous versus Homogeneous groupings
- Visuals Aids / Models
- Assisted Labs
- Modified Instruction and Assessments
- Concept Maps
- Manipulative
- Bodily Kinesthetic
- Gallery / Station walks

ELLs: Project based unit. ELLs receive extended time and glossaries/dictionaries during assessments.

ELLs :

SWDS: IEP Modifications, Vocabulary, Diagrams, Sentence Starters, Graphic Organizers, Pictures, Coloring, Multiple-Choice reduced assessments, Pull-out assessments

SWDs:

High Achievers:

High-Achievers:

- Extension Activities, Further Reading, and Extra Regents Questions
- Allow students to work in teams of 2 to figure out how nondisjunction can lead to various types of aneuploidy.

Resources/Books

Biology by Pearson/Prentice Hall and Biologia by Holt