Overview of Year

9th Grade Living Environment Curriculum

SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE
Unit 1 Evolution	Unit 2 Maintaining Dynamic Equilibrium		Unit 3 Energy, Matter, Organizations		Unit 4 Continuity	Unit 5 Development			Unit 6 Ecology

Unit 1	**Understanding**	**Essential Question**
Evolution	• Scientific inquiry can be used to study questions about living systems • Science is a part of many aspects of life outside the science classroom • Humans are both similar to and distinct from other organisms • Evolution explains the unity and diversity of life • Evidence is used to develop explanations about the living world NYS Standards: 1.1a, 1.1b, 1.1c, 1.3a, 1.3b, 1.4a, 2.2a, 2.3a, 2.3b, 2.3c	*Why do scientists believe that I am related to other living things?*

Key Idea 3	Individual organisms and species change over time.
Perf Ind 3.1	Explain the mechanisms and patterns of evolution.
3.1a	The basic theory of biological evolution states that the Earth's present-day species developed from earlier, distinctly different species.
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.
2.2a	For thousands of years new varieties of cultivated plants and domestic animals have resulted from selective breeding for particular traits.
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.
6.2a	This diversity of species increases the chance that at least some will survive in the face of large environmental changes. Biodiversity increases the stability of the ecosystem.

Performance Task:

First Encounter with the Critter (pg. 2**01)**

Evaluates students' understanding of evolution by adopting a "critter", describing it, make hypotheses about some of its adaptations, and illustrate how it is related to other organisms.

Unit 2	**Understanding**	**Essential Question**
Homeostasis	• All organisms, organ systems, and cells are affected by interactions between their internal and external environments • Organisms' internal systems maintain a dynamic balance called homeostasis • Stressors may overwhelm the ability of organisms to maintain homeostasis • Behaviors and physiological responses help maintain homeostasis Key Idea 1: Living things are both similar to and different from each other and from nonliving things.	How do you stay healthy?

Perf Ind 1.2	Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).
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.
1.2h	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).
1.2e	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.
Perf Ind 1.3	Explain how a one-celled organism is able to function despite lacking the levels of organization present in more complex organisms.
1.3a	The structures present in some single-celled organisms act in a manner similar to the tissues that systems found in multicellular organisms, thus enabling them to perform all of the life processes needed to maintain homeostasis.
Key Idea 5	Organisms maintain a dynamic equilibrium that sustains life.
Perf Ind 5.2	Explain disease as a failure of homeostasis
5.2a	Homeostasis in an organism is constantly threatened. Failure to respond effectively can result in disease or death.
Perf Ind 5.3	Relate processes at the system level to the cellular level in order to explain dynamic equilibrium in multicelled organisms.
5.3a	Dynamic equilibrium results from detection of and response to stimuli. Organisms detect and respond to change in a variety of ways both at the cellular level and at the organismal level.

	5.3b	Feedback mechanisms have evolved that maintain homeostasis. Examples include the changes in heart rate or respiratory rate in response to increased activity in muscle cells, the maintenance of blood sugar levels by insulin from the pancreas, and the changes in openings in the leaves of plants by guard cells to regulate water loss and gas exchange.	
	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.	

Performance Task:

Health care grant proposal (p. 331): "entrepreneur to fund worthy health care programs"--choose one option and address:

- overview of program and whether there are other choices for participants
- which organ or regulatory system is most involved and describe anatomy, physiology, and roles of immune system
- nature of homeostatic disruption that your program will correct
- how common the illness/injury is
- how the population will be informed about the program
- how behavior affects a person's likelihood of experiencing the risks the proposal addresses
- how controllable the risks are and how a person can change their behavior to minimize the risks
- how your program will intervene to reduce the risk of the health condition
- ethical dilemma that could be associated with proposal
- use the 6 steps of ethical analysis (p. 330) to analyze the dilemma

Unit 3	Understanding	Essential Question
Energy, Matter, Organization	• Human performance and physical fitness depend on diet and exercise • The conservation and transformation of energy and matter are found in all living systems • Organisms release energy by breaking the chemical bonds of food molecules, forming different molecules that have lower amounts of energy • Photosynthesis transforms light energy into chemical energy, with dramatic effects on all living systems • Energy flows through ecosystems, and matter cycles in ecosystems • Well-designed investigations collect data, compare results to controls, draw conclusions, and report findings	How do you get energy? What can you do without energy? Where does energy come from? How do you get energy and what do you use it for? What drives us? How do you do what you do? What keeps us going? why do I need energy?

Key Idea 5	Organisms maintain a dynamic equilibrium that sustains life.
Perf Ind 5.1	Explain the basic biochemical processes in living organisms and their importance in maintaining dynamic equilibrium.
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.
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.
6.1b	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.	
		6.1a	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.	
		6.1c	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.	

Performance Task:

Ch. 9 “Being an experimental scientist” p. 514

- Preparation: which processes of science took place in “science all around you” p. 512? Identify 3-4 specific times when you used processes (in diagram provided); obtain rubric
- Identify and record a testable question, write down what is already known and why the question is interesting or important
- Write down the hypothesis you plan to test
- Record which of the 6 unifying principles of biology [unit titles] is most related to your hypothesis
- Gather more info using appropriate resources
- Design an experiment--rationale, hypothesis, procedure, data analysis
- Write safety plan (chemicals, equipment, biological hazards)
- Get approval and carry out experiment
- Organize data
- Formulate an explanation of data that includes a claim, evidence, and reasoning
- Describe limitations and unexpected results
- Explain what your explanation indicates about the testable question and hypothesis
- Describe how your work connects to broader questions in biology and to the unifying principle
- Assemble a presentation of your full inquiry--what you did, why you did it, what you found out
    - ID connections between your full inquiry and the unifying principles, tech, culture, history, and ethics
- Listen and participate in class discussion of the projects

Unit 4	**Understanding**	**Essential Question**

Continuity	• Different organisms possess different strategies for reproduction • The continuity of a species depends on the transfer of genetic information • Sexual reproduction and mutation increase genetic variation which is important for the evolution of a species • Technology currently and potentially has an impact on our lives	How have we survived?

Key Idea 2	Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.
Perf Ind 2.1	Explain how the structure and replication of genetic material result in offspring that resemble their parents
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.
2.1c	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.
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.
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.
Perf Ind 4.1	Explain how organisms, including humans, reproduce their own kind.
4.1a	Reproduction and development are necessary for the continuation of any species.
4.1b	Some organisms reproduce asexually with all the genetic information coming from one parent. Other organisms reproduce sexually with half the genetic information typically contributed by each parent. Cloning is the production of identical genetic copies.
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.
4.1d	The zygote may divide by mitosis and differentiate to form the specialized cells, tissues, and organs of multicellular organisms.
4.1e	Human reproduction and development are influenced by factors such as gene expression, hormones, and the environment. The

	reproductive cycle in both males and females is regulated by hormones such as testosterone, estrogen, and progesterone.
4.1f	The structures and functions of the human female reproductive system, as in almost all other mammals, are designed to produce gametes in ovaries, allow for internal fertilization, support the internal development of the embryo and fetus in the uterus, and provide essential materials through the placenta, and nutrition through milk for the newborn.
4.1g	The structures and functions of the human male reproductive system, as in other mammals, are designed to produce gametes in testes and make possible the delivery of these gametes for fertilization.
4.1h	In humans, the embryonic development of essential organs occurs in early stages of pregnancy. The embryo may encounter risks from faults in its genes and from its mother's exposure to environmental factors such as inadequate diet, use of alcohol/drugs/tobacco, other toxins, or infections throughout her pregnancy.
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 the sperm). Sexually produced offspring often resemble, but are not identical to, either of their parents.
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

Performance Task:

Ch. 12: "Human genetic disorders" p. 666- Genetic disorder brochure as end of "genetic counseling clinic"

- Choose a genetic disorder (hemophilia, Tay-Sachs, neurofibromatosis, Duchenne muscular dystrophy, Marfan syndrome
- Create a brochure:
    - Symptoms
    - # of people affected
    - Pattern of genetic inheritance
    - Description of sample family who might be affected
    - Pedigree from sample family
    - Punnett square with cross of two members

- Probability of offspring being affected
- Description of how the results of meiosis are used to make a Punnett square
- ID gene that contains a mutation and the result of the mutation
- Treatments

- Prepare to share with class

<table>
<tr><th>Unit 5</th><th>Understanding</th><th>Essential Question</th></tr>
<tr><td>Development</td><td>

Cells divide through a process called mitosis
Embryonic development involves processes of growth and differentiation
Humans grow and develop in different ways through life (physically, cognitively, emotionally, and socially)
Culture influences how human life stages are interpreted and experienced
As scientists answer specific questions, knowledge accumulates to address larger questions

<table>
<tr><td>Perf Ind 1.2</td><td>Describe and explain the structures and functions of the human body at different organizational levels (e.g., systems, tissues, cells, organelles).</td></tr>
<tr><td>Key Idea 2</td><td>Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.</td></tr>
<tr><td>Perf Ind 2.2</td><td>Explain how the technology of genetic engineering allows humans to alter genetic makeup of organisms</td></tr>
<tr><td>2.2e</td><td>Knowledge of genetics is making possible new fields of health care; for example, finding genes which may have mutations that can cause disease will aid in the development of preventive measures to fight disease. Substances, such as hormones and enzymes, from genetically engineered organisms may reduce the cost and side effects of replacing missing body chemicals.</td></tr>
<tr><td>2.1a</td><td>Genes are inherited, but their expression can be modified by interactions with the environment (mutations)</td></tr>
<tr><td>3.1d</td><td>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</td></tr>
<tr><td>5.2i</td><td>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.</td></tr>
</table>
</td><td>What makes you who you are?</td></tr>
</table>

	4.1f	The structures and functions of the human female reproductive system, as in almost all other mammals, are designed to produce gametes in ovaries, allow for internal fertilization, support the internal development of the embryo and fetus in the uterus, and provide essential materials through the placenta, and nutrition through milk for the newborn.		
	4.1h	In humans, the embryonic development of essential organs occurs in early stages of pregnancy. The embryo may encounter risks from faults in its genes and from its mother's exposure to environmental factors such as inadequate diet, use of alcohol/drugs/tobacco, other toxins, or infections throughout her pregnancy.		
	4.1b	Cloning is the production of identical genetic copies.		

Performance Task:

Ch. 14: "Cultural diversity in the human lifespan" p. 746--Reflect on similarities and differences in the process of development as it takes place in different cultures and explain the characteristics of biological development that underlie them

focus question: "How do developmental processes interact with cultural factors to affect the physical, cognitive, social, and emotional growth of humans?"

- Identify a culture for the multicultural fair and join a group based on what culture you want to research
- Study the culture on your own then work with a team to create a fair entry--make a list of information you want to find out, focusing on the focus question
- Assemble resources then divide among team members; share with team
- Look at/discuss rubric
- Develop a specific design for your entry in the multicultural fair, prepare entry, practice presentation
    - Overview of culture, including where they live or lived and description of way of life
    - Information about each life stage: infancy and childhood, adolescence, adulthood, old age--
        - Physical and social setting that is predominant at each stage
        - Cultural practices for individuals at each stage
        - Cultural values surrounding each stage (how are they perceived)
    - Explore some aspect of cognitive development that seems significant to the culture--explain why you think it's highly valued and describe the underlying biology that allows for this aspect of development
    - Choose and complete each of the following
        - Describe the forms of cultural expression that seen to be significant during any life stage (such as music, art, dance, mythology, religion, or dress)
        - Describe the celebration of at least one of the following rites of passage: birth, puberty, marriage, death

        - Describe the differences in growing up male from growing up female in the culture you are studying
    - Some part of entry should be a presentation
- Analysis: individual questions:
    - Write 2-3 paragraphs about how a person from the culture would view modern American culture--which aspects would seem similar and different?
    - Reflect on focus questions with respect to all the cultures you learned about--what have you learned about biological development in humans that may help explain both the similarities and differences between different human cultures?

<table>
<tr><th>Unit 6</th><th>Understanding</th><th>Essential Question</th></tr>
<tr><td>Ecology</td><td>

A community of organisms interacts with the abiotic environment to form ecosystems
Ecosystems are complex, but it is possible to analyze them
Populations are limited in size by the amount of available resources
Ecosystems can be modified by human actions
Human actions follow from decisions, which are made within a cultural context

<table>
<tr><td>Perf Ind 1.1</td><td>Explain how diversity of populations within ecosystems relates to the stability of ecosystems</td></tr>
<tr><td>1.1a</td><td>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.</td></tr>
<tr><td>1.1b</td><td>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.</td></tr>
<tr><td>1.1c</td><td>In all environments, organisms compete for vital resources. The linked and changing interactions of populations and the environment compose the total ecosystem.</td></tr>
<tr><td>1.1d</td><td>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.</td></tr>
<tr><td>1.1e</td><td>Ecosystems, like many other complex systems, tend to show cyclic changes around a state of approximate equilibrium.</td></tr>
<tr><td>1.1f</td><td>Every population is linked, directly or indirectly, with many others in an ecosystem. Disruptions in the numbers and</td></tr>
</table>
</td><td>How do relationships impact those involved?</td></tr>
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	types of species and environmental changes can upset ecosystem stability.
Key Idea 6	Plants and animals depend on each other and their physical environment.
Perf Ind 6.1	Explain factors that limit growth of individuals and populations.
6.1d	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.
6.1e	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).
6.1f	Living organisms have the capacity to produce populations of unlimited size, but environments and resources are finite. This has profound effects on the interactions among organisms.
6.1g	Relationships between organisms may be negative, neutral, or positive. Some organisms may interact with one another in several ways. They may be in a producer/consumer, predator/prey, or parasite/host relationship; or one organism may cause disease in, scavenge, or decompose another
Perf Ind 6.2	Explain the importance of preserving diversity of species and habitats.
6.2a (1st half)	As a result of evolutionary processes, there is a diversity of organisms and roles in ecosystems. This diversity of species increases the chance that at least some will survive in the face of large environmental changes. Biodiversity increases the stability of the ecosystem.
Perf Ind 6.3	Explain how the living and nonliving environments change over time and respond to disturbances
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.

7.2b (invasive species)	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.
Perf Ind 7.1	Describe the range of interrelationships of humans with the living and nonliving environment
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.
Perf Ind 7.2	Explain the impact of technological development and growth in the human population on the living and nonliving environment.
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.
7.2c	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.
Perf Ind 7.3	Explain how individual choices and societal actions can contribute to improving the environment
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.
6.2b (bridge	Biodiversity also ensures the availability of a rich variety of genetic material that may lead to future agricultural or medical discoveries with significant value to humankind.

	from Ecologist)	As diversity is lost, potential sources of these materials may be lost with it.	

Performance Task:

Ch. 16- "Tri-Lakes: Public Policy" p. 815

Letter to the Tri-Lakes association describing how the components in the Tri-Lakes system interact under normal conditions; state best explanation for the changes that have taken place; recommend policy decisions

- Discuss questions with your team:
  - Who are the stakeholders?
  - What should the community do about the declining bass population? (thinking about management options from ch. 15 and 16)
- Discuss rubric with partner
- Develop a response to the letter from the Tri-Lakes Association, including
  - Showing how complex interactions and interdependence are evident in the ecosystem
  - Explaining how a systems approach can assist in analyzing the problems
  - Identifying and explaining the causes of at least 2 problems in the ecosystem
  - Supporting your explanation with specific observations from lab work and data packet
  - Identifying missing info that would be valuable to the continued analysis of the problem or would better identify the initial causes of the problem
  - Showing an understanding of the different viewpoints within the community about how to manage the ecosystem
  - Specific policy recommendations based on your findings
- Exchange letters with another student and evaluate based on the rubric provide at least 4 specific constructive comments
- Revise letter
- Class discussion; reflect on lab investigations and write about changes in thinking after the activity
- Analysis:
  - Write a paragraph summarizing the difference between an explanation based on a single analysis and one based on a combination of related analyses; add 1-2 sentences explaining how this difference should affect the way you interpret scientific studies reported in the news
  - Write a general statement that assesses our ability to predict the consequences when humans introduce abiotic or biotic components into the environment; provide examples and reasons