NAME _____

NAME _____

Key Idea 7:

Human decisions and activities have had a profound impact on the physical and living environment. Population growth has placed new strains on the environment—massive pollution of air and water, deforestation and extinction of species, global warming, and alteration of the ozone shield. We are engaging in the greatest uncontrolled experiment in human history and the outcome is far from clear. Some are reassured by those economists who are confident that there will be a technological fix for such problems. Others, concerned with the accelerating pace of change and the ecological concept of finite resources, are far less optimistic. What is certain, however, is that resolving these issues in a democratic society will require increasing the scientific sophistication of elected officials and the public.

Since the students of today will be the elected officials and informed public of tomorrow, the teacher should encourage a diversity of activities that will allow students to explore, explain, and apply conceptual understandings and skills necessary to be environmentally literate.

Performance Indicator 7.1

Describe the range of interrelationships of humans with the living and nonliving environment.

Major Understandings

7.1a The Earth has finite resources; increasing human consumption places severe stress on the natural processes that renew some resources and deplete those resources that cannot be renewed.

List two reasons human consumption of natural resources has increased.

a.) _____

b.) _____

Explain the difference between renewable and nonrenewable resources.

_____

_____

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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.

List a way humans have adversely influenced the following:

- generation of soils
- control of the water cycle
- forestation of the planet
- energy flow
- recycling of nutrients

_____

_____

_____

Why has runoff of agricultural wastes and fertilizers been harmful?

_____

What is the controversial situation involving GE in the upper Hudson Valley and why is it a problem?

_____

The increase in the concentration of a poison as we move up the food chain is called _____.

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.

List an example of increased human consumption modifying an ecosystem.

_____

NAME _____

How have human technologies harmed the ecosystem?	
Human Technology	**Harmful Influence**
nuclear power	
burning fossil fuels	
using coal to power electric plants in the US Midwest	
some modern farmers	
industries around rivers	
runoff from sewage	
use of CFC's	
cutting and burning the rain forest	

Other Problems:

1.) The increasing amounts of carbon dioxide in the atmosphere appears to be causing a _____ of the Earth's atmosphere. This carbon dioxide is coming from increased burning of _____ such as gasoline, coal, and oil.

-- This may be bad because it is changing _____ levels and climate/_____ patterns. It may also lead to more _____ borne diseases.

2.) Sulfur dioxide (also nitrogen oxides) from coal burning sources + rain = _____
-- most of the acid rain damaging New York State comes from the _____ U.S.
-- Acid rain kills aquatic _____, crumbles buildings, and has many other effects, etc.

3.) _____ Layer Destruction in the Stratosphere

-- ozone brings about a reduction of _____ rays associated with skin cancer
-- our use of chlorofluorocarbons (_____) is destroying the ozone layer

CFC sources: _____

Problems caused by ozone depletion:

a.)

b.)

c.)

Performance Indicator 7.2

Explain the impact of technological development and growth in the human population on the living and nonliving environment.

Major Understandings

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.

List three ways building a mall in St. Lawrence County could damage the ecosystem.

a.

b.

c.

7.2b When humans alter ecosystems either by adding or removing specific organisms, serious consequences may result.

What is an exotic species? _____

List two examples of exotic or non-native invading species in NNY.

_____

List two reasons non-native species may damage the ecosystem.

_____

_____

7.2c The demand and search for additional energy resources also impact ecosystems in a negative way. Industrialization brings an increased demand for and use of energy. Such usage also leads to more rapid depletion of the Earth's energy resources and to environmental risks associated with the use of fossil and nuclear

fuels.

List two problems associated with the increased use of fossil fuels.

_____

_____

List two problems associated with the use of nuclear energy for fuel.

_____

_____

7.2d Many factors influence environmental quality. These include: population growth and distribution, resource use, capacity of technology to solve problems, as well as the role of economic, political, ethical, and cultural views.

List two examples of religious and/or cultural views contributing to the problem of population growth and or distribution.

_____

_____

Performance Indicator 7.3

Explain how individual choices and societal actions can contribute to improving the environment.

Major Understandings

7.3a Through a greater awareness and application of ecological principles, each individual can help to assure that there will be suitable environments for succeeding generations of life on our planet.

List two ways humans have helped improve our ecosystems.

_____

_____

Why can an understanding of ecology help limit human damage in

the environment?

_____

7.3b Individuals in society 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. Members of our society should understand the appropriateness and value of raising basic questions such as, What can happen? What are the odds? How do scientists and engineers know what will happen?"

Potsdam, NY is a proposed location for a new Walmart store. Name two positive aspects of building this store in the community and two negative environmental aspects of such a project.

Positive Aspects	Negative Aspects
1.	1.
2.	2.

Key Idea 6:

Plants and animals depend on each other and their physical environment. The fundamental concept of ecology is that living organisms interact with and are dependent on their environment. Interactions of organisms with each other and nonliving parts of the environment result in a flow of energy and a cycling of materials that are essential for life.

Performance Indicator 6.1

Explain factors that limit growth of individuals and populations.

Major Understandings

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.

The head of the arrow in a food chain points toward _____

Organisms which carry on _____ such as green plants or algae are called _____ or _____.

_____ or heterotrophs depend on other organisms for their food.

_____ -- eat predominantly plant matter

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_____ -- eat predominantly animal matter

_____ -- eat both plant and animal matter

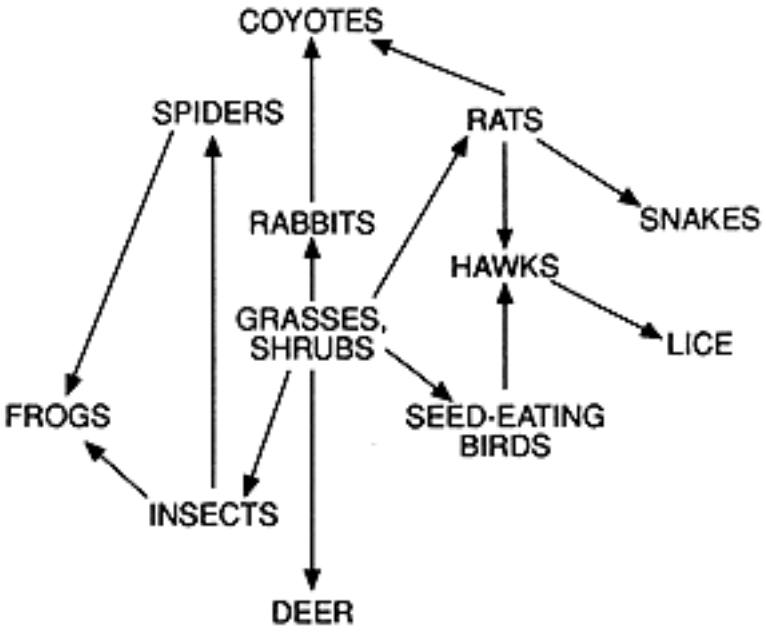
List two reasons decomposers are needed in any ecosystem.

a.) _____

b.) _____

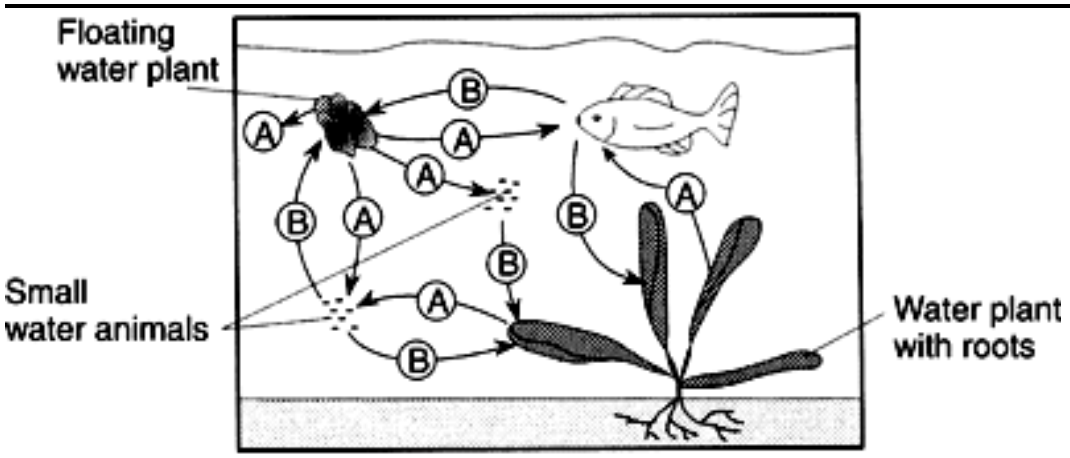
The graphic below is that of a food web. Explain the difference between a food chain and a food web.

_____



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.

NAME _____



1. What gas is being given off that is represented by arrow A and what life process is responsible for its release?

_____

2. What gas is being given off represented by arrow B and what life process is responsible for its release?

_____

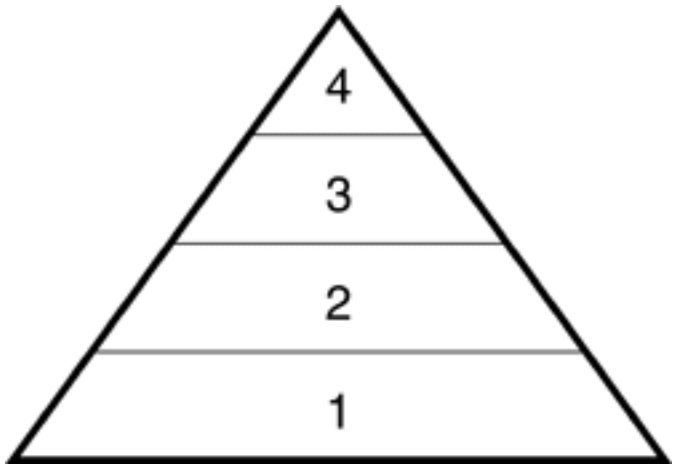
3. When do plants carry on cell respiration?

_____

_____

6.1c The chemical elements 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. Continual input of energy from sunlight keeps the process going. This concept may be illustrated with an energy pyramid.

NAME _____



Identify the levels on the energy pyramid at the left.

1 =

2 =

3 =

4 =

How much energy on average is lost between steps of this energy pyramid? _____ %

Where does this waste energy go?

_____

Why doesn't this energy pyramid run out of energy?

_____

There are always more _____ organisms than consumers in any stable ecosystem.

6.1d The number of organisms any environment 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.

_____ -- is the maximum number of organisms the resources of the environment can support

Explain how oxygen limits the number of organism that can live in an aquatic environment. _____

Why does the available water limit the number of organisms in an environment, even if all the animals have enough to drink?

NAME _____

_____

List two examples of decomposers. _____

6.1e In all environments organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter. 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).

What is competition? _____

What is the difference between a biotic and an abiotic factor which limits the growth of a population?

_____

** No ____ organisms can occupy the same ecological _____.

_____ -- is the place an organism lives

_____ --is the role of an organism in its ecosystem (especially its feeding role)

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.

Finite resources mean that population sizes can not _____ forever.

6.1g Relationships between organisms may be competitive or beneficial. 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.

List an example of a producer/consumer relationship.

_____

_____ -- an organism which kills and eats its food

_____ -- feeds on animals which have already been killed

_____ --- the organism devoured by a predator

NAME _____

_____ -- a close living association where one member of the association is helped while the other is harmed

_____ -- provides food for the parasite

List an example of a parasite/host relationship

_____

Explain the difference between mutualism and parasitism.

_____

_____

Performance Indicator 6.2

Explain the importance of preserving diversity of species and habitats.

Major Understandings

6.2a As a result of evolutionary processes, there is a diversity of organisms and a diversity of roles in ecosystems. Increased biodiversity increases the stability of the ecosystem.

_____ -- refers to the differences between species and the variations within species in an ecosystem

Why does increased biodiversity increase the diversity of an ecosystem?

_____

_____

6.2b 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. As diversity is lost, potential sources of these materials may be lost with it.

List three reasons humans should be concerned with preserving biodiversity.

a.) _____

b.) _____

c.) _____

6.2c A great diversity of species increases the chance that at least some living things will survive in the face of large changes in the environment.

How does increased biodiversity relate to Darwin's theory of natural selection?

_____

_____

Why are monocultures vulnerable to being wiped out and becoming extinct?

_____

Performance Indicator 6.3

Explain how the living and nonliving environments change over time and respond to disturbances.

Major Understandings

6.3a The interrelationships and interdependencies of organisms affect the development of stable ecosystems.

In order to have a stable ecosystem there must be:

a.) An input of _____

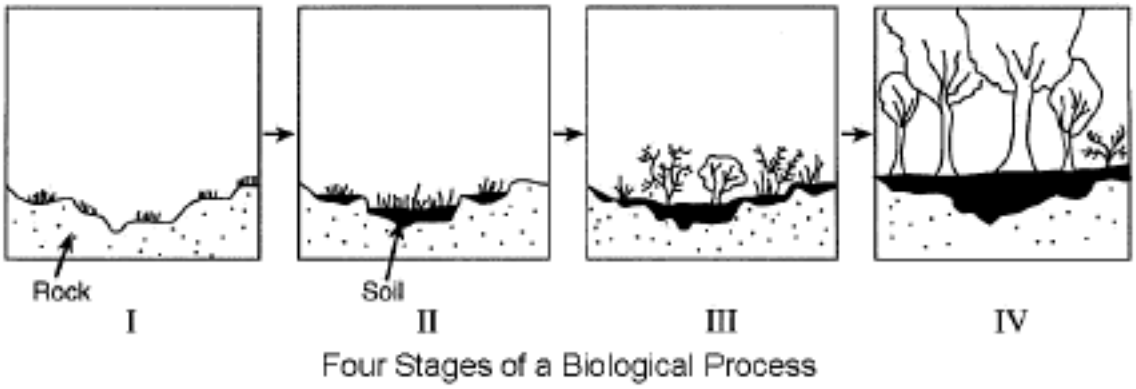
b.) A way of converting solar energy and inorganic to organic compounds. This process is usually called _____.

c.) A _____ of materials through the ecosystem.

6.3b The environment may be altered in substantial ways through the activities of organisms, including humans, or when climate changes. Although these alterations are sometimes abrupt (e.g., natural disasters), in most cases species replace others, resulting in long-term gradual changes in ecosystems.

_____ -- is a gradual change in an ecosystem over time

NAME _____



Four Stages of a Biological Process

6.3c Altered ecosystems may reach a point of stability that can last for hundreds or thousands of years.

_____ -- are the first organisms in a succession

_____ -- is the final stable plant community in a succession

List two things which can disrupt a stable ecosystem.

_____

6.3d If a disaster such as a flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a stable system similar to the original one.

If most of the Adirondack forest park forests burned down, what community of plants would like reestablish itself after 100 years.

List the stages of a New England old field succession

a.) _____

b.) _____

c.) _____

d.) _____

Name a common pioneer organism on bare rock. _____