ANSWER KEY - Ecology Review Packet

OBJECTIVE 1: Ecosystem Structure

1. What is the definition of an abiotic factor? Give one example. ***A nonliving part of an ecosystem. Example: water***
2. What is the definition of a biotic factor? Give one example. ***A living part of an ecosystem. Example: plant***
3. Write the **definition and draw a picture** for each of the following words:

population - ***Groups of individuals that belong to the same species and live in the same area***

community - ***All the different populations (groups of different species) that live together in a defined area***

ecosystem - ***A collection of all the organisms that live in a particular place, together with their nonliving environment***

OBJECTIVE 2: Ecosystem Interactions

4. Write the **definition and draw a picture** for each of the following words:

carnivore - ***eats herbivores, omnivores, or other carnivores***

herbivore - ***eats producers***

omnivore - ***eats producers and consumers***

detritivore- ***an organism that feeds on detritus (organic waste)***

decomposer - ***consumes waste and dead organisms***

producer - ***organism that makes its own food, autotroph***

consumer - ***organism that cannot make own food, a heterotroph***

What are the four processes of the Water Cycle? Define them.

1. **precipitation** - ***water released from clouds in the form of rain, freezing rain, sleet, snow, or hail***
2. **evaporation** - ***process by which water changes from a liquid to a gas or vapor***
3. **transpiration** - ***process by which plants release water vapor***
4. **condensation** -***process by which water vapor in the air is changed into liquid water - condensation is responsible for the formation of clouds***

Label this diagram of the Water Cycle:

1. Condensation
2. Run-off
3. Evaporation
4. Transpiration

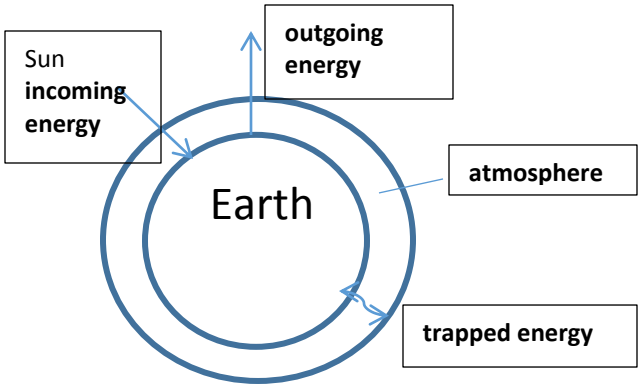
The Journey of Carbon

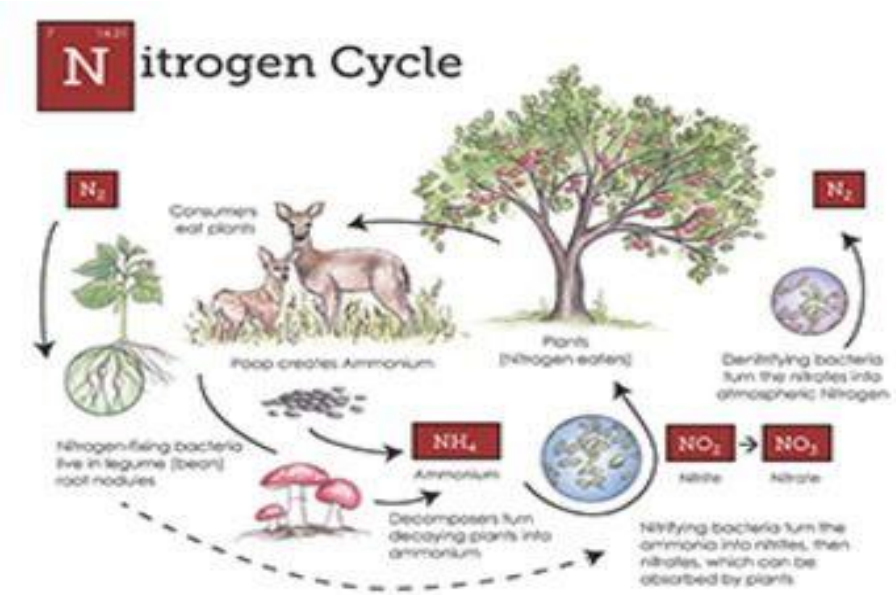
7. carbon dioxide is released into the atmosphere and plants take in and use it to build carbohydrates during photosynthesis. Carbohydrates are passed along food webs to animals and others consumers that eat them.

8. respiration

9. traps heat in the Earth's atmosphere and increases the overall temperature of the Earth

10. Global warming





N_2= Nitrogen gas

NH_4= Ammonium

NO_2= Nitrite

NO_3= Nitrate

<u>Nitrogen Cycle</u>:

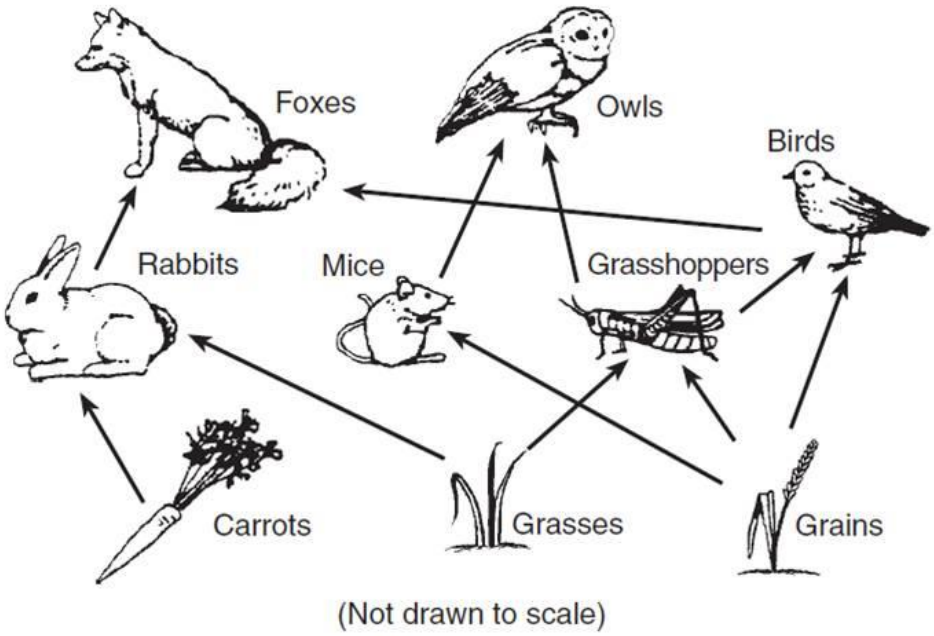
- All organisms require nitrogen to make amino acids which are used to build proteins.
- N_2 (nitrogen gas) makes up 78% of Earth's atmosphere.
- Nitrogen containing substances (NH_4) ammonium and nitrate ions (NO_3^-) and nitrite ions (NO_2^-) are found in wastes produced by many organisms and in dead and decaying organic matter.
- Human activity adds nitrogen to the biosphere in the form of nitrate (a major component in plant fertilizers)
- Although nitrogen gas is abundant only certain types of bacteria that live in soil and on roots of plants can use this form directly. They convert nitrogen gas to ammonia through nitrogen fixation.
- Other bacteria in soil convert ammonia to nitrates and nitrites so producers can use them to make proteins. Consumers eat the producers and reuse nitrogen to make their own proteins.
- When organisms die, decomposers return nitrogen to the soil as ammonia that may be taken up again by producers. Other soil bacteria convert nitrates into nitrogen gas in a process called denitrification and releases nitrogen into the atmosphere once again.

13. Symbiosis is a close and permanent **relationship** between **two (2)** organisms of different species.

List and define 3 examples of symbiotic relationships that we discussed:

- **mutualism -** ***both species benefit from the relationship***
- **commensalism -** ***one organism benefits and the other is unharmed***
- **parasitism - one organism benefits and the other is harmed**

In this food web:



Which organisms are producers? ***carrots, grasses, grains***

Which organisms are secondary consumers? ***foxes, owls, birds***

In this example, is the owl an herbivore, carnivore or omnivore? ***carnivore***

OBJECTIVE 3: Ecological Changes

limiting factor ***- a factor that causes population growth to decrease***

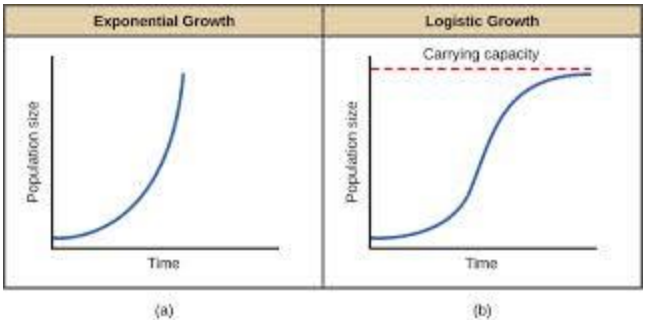
density-dependent factor ***- a limiting factor that depends on population size; examples are: competition, predation, parasitism and disease.***

exponential growth ***- occurs when individuals reproduce at a constant rate, J-shape population growth***

logistic growth ***- as resources become less available, the growth of the population slows or stops, S-shaped curve***

carrying capacity ***- when population growth levels off, this is the horizontal line through this region of the graph; the largest number of individuals a given environment can support***

16. What can cause a population to grow? ***birthrate higher than death rate, immigration higher than emigration***



17. Which graph curve shows a J-curve population growth curve? ***Exponential Growth***

18. What can cause a population to show this type of curve? ***J-curve population growth curve happens when a population experiences exponential growth and has unlimited food, water, space, and resources.***

19. Which graph curve shows a S-curve population growth curve? ***Logistic Growth***

20. What can cause a population to show this type of curve? ***An s-curve population growth curve happens when a population experiences logistic growth and reaches carrying capacity (the total number of a species the ecosystem can support) based on the amount of resources available.***

Define and give examples of each of the following:

21. Ecological succession - *a series of predictable changes that occur in a community over time.*

22. Pioneer species are important in ecological succession because *they are the first species to populate the area (example: lichens and moss growing on bare rock) and create soil for other plants to grow in.*

23. Which number represents the beginning of the succession process? *1*

24. Which number represents the climax community in this succession pattern? *5*

OBJECTIVE 4:Human Impact

Which gas is the number one cause of global warming? **carbon dioxide**

As toxins move up the trophic levels in food chains, what happens to their concentration? **Biomagnification - the increasing concentration of a substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain.**

Define ***Global Warming*** - **the term used to describe the increase in the average temperature of the biosphere. Human activities add carbon dioxide and other greenhouse gases to the atmosphere faster than the carbon cycle removes it. Recent models show that global temperatures will increase by 1 to 2 degrees celsius by the year 2050 leading to rising sea levels, coastal flooding, droughts, climate change and ecosystem changes**

Identify ***3 factors*** that contribute to the declining health of the Chesapeake Bay?

1. ***Increased nitrogen in water***
2. ***Overfishing***
3. ***it has a very large watershed***

List 3 threats to an ecosystem's biodiversity:

1. using **plenty** of fertilizer.
2. Industrial **development** (cities and suburbs)
3. selling **things made of wildlife**

Chesapeake Bay Dead Zones

30. What is a Chesapeake Bay "dead zone"? Excessive nitrogen and phosphorus pollution from human activities cause "dead zones"—or areas with low amounts of oxygen in the Bay. With little or no oxygen, fish, crabs, oysters, and other aquatic animals literally suffocate.

31. How do dead zones occur? An excess of these nutrients also fuels the growth of dense algae blooms that block sunlight that underwater grasses need to grow in order to continue providing food for waterfowl, and eliminate shelter for blue crabs and juvenile fish.

32. Using the data, draw a graph showing the change or growth of a population.

- **x-axis "Months" - write months along the x-axis from Jan – Nov excluding the month of May**
- **y-axis "# of mice" – write numbers along the y-axis in evenly spaced increments**
- **Add TITLE "Number of Mice Over Time"**
- **Plot data and connect the dots**

33. Explain two things happening in this graph and where this is happening?

- **This population shows a carrying capacity of approximately 125 mice**
- **This population shows a logistic (s-curve) population growth curve**