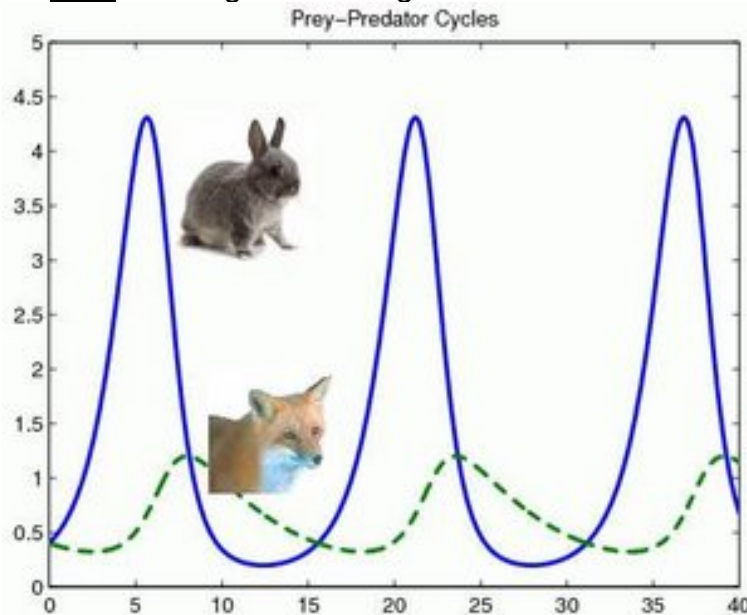


Ecology and Human Impact Review

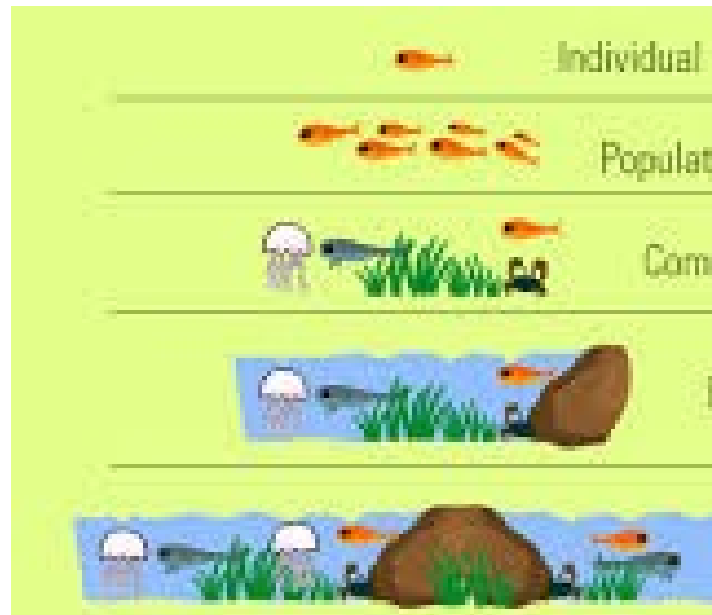
Ecology Vocabulary

- Abiotic: nonliving things in an ecosystem (like water, oxygen temperature, etc)
- Biotic: living things in an ecosystem
- Autotrophs: same as producers, organisms that make their own food through photosynthesis (photosynthetic organisms)..... plants
- Heterotrophs: also a consumer, organisms that need to obtain food from their environment
 - Herbivores: eat only plants
 - Omnivores: eat everything
 - Carnivores: eat only other animals
 - Scavengers: feed on organisms that are dead and decaying (carrion)
 - Decomposers: feed on dead or decaying organisms and recycle nutrients back into the environment
 - Predator: organisms that hunt food
 - Prey: the organism being hunted

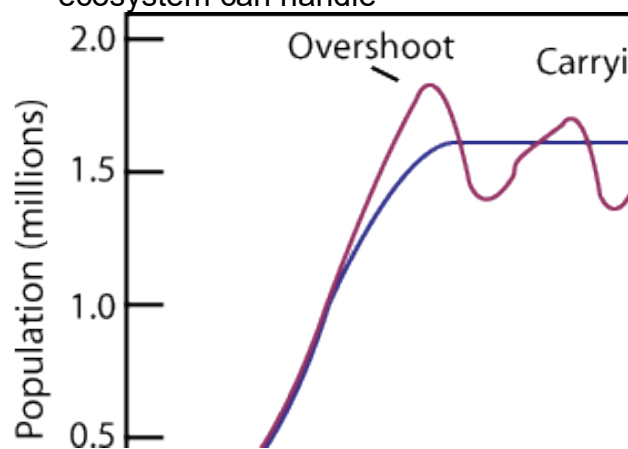


typical predator prey graph

- Parasite: organism that feeds off of or causes harm to another organism
- Host: organism that is being hurt by the parasite
- Population: a bunch of the same species found in the same place
- Community: all of the living things found in a given environment
- Ecosystem: all of the living and nonliving (biotic and abiotic) factors found in a given area
- Biosphere: the part of the planet that carries life



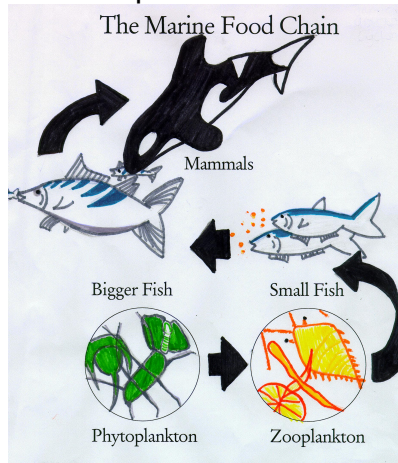
- Environment: an organisms surroundings
- Biodiversity: variety of life (this means there is a healthy stable ecosystem if there is a lot of biodiversity..... decrease in biodiversity is bad)
- Carrying capacity: maximum number of one kind of organism an ecosystem can handle



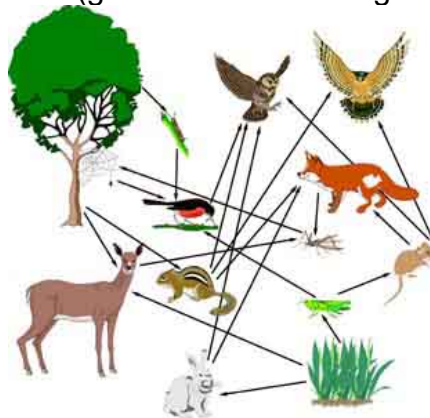
Typical carrying capacity graph

- Ecological niche: the role that an organism plays in its environment (how one organism relates to another organism and its environment)
- Interdependence: the concept that all living things are dependent (need) on other living things and on their environment
- Habitat: where an animal lives
- Competition: the fight for survival based on limited resources
- **Limited resources=finite resources=selecting agents=limiting factor**: biotic and abiotic things in the environment that have a set amount and will cause competition to happen

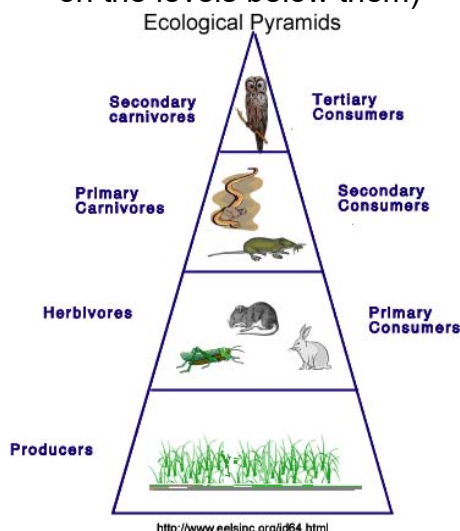
- Food chain: shows relationship between one set of organisms



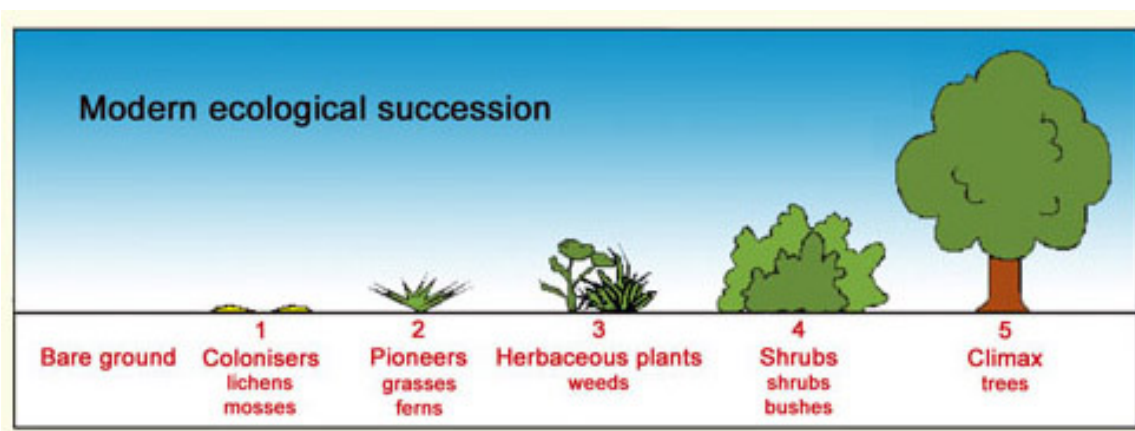
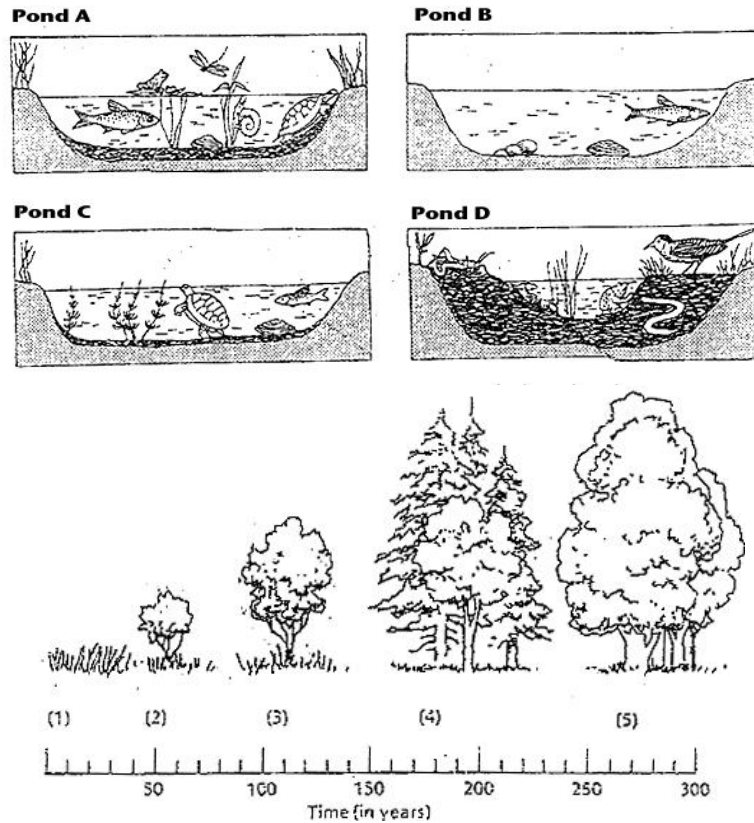
- Food web: shows feeding relationships between many organisms in an ecosystem (bunch of food chains together). Arrows show the flow of energy in the ecosystem (go from what is being eaten by what)



- Energy pyramid: a diagram that shows the transfer of energy from one level of feeding to another (producers have the most available energy because there is the most of them on Earth and then the next level feeds on the levels below them)



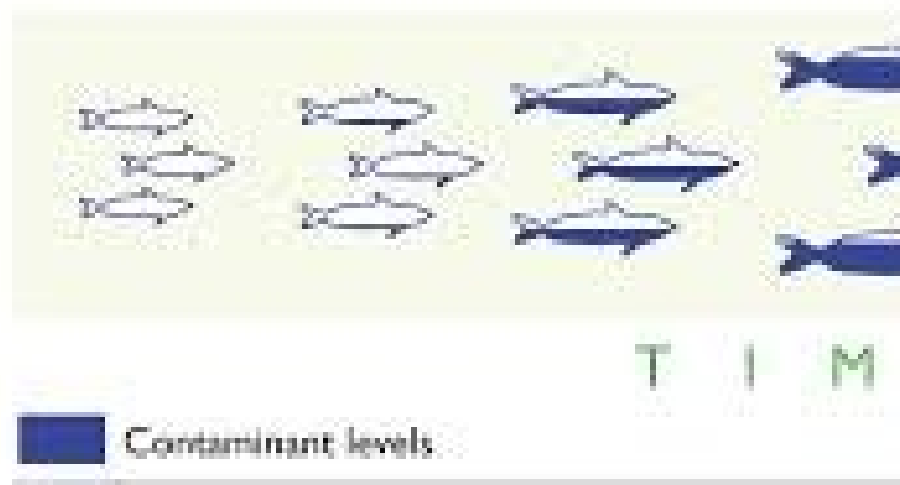
- Ecological succession: the recovery of an area after a natural disaster. Primary succession happens when there is a complete wipe out of life needing to start over (like a volcano erupting) and secondary succession is when there is damage done but some organisms (like plants) are left behind (like a forest fire)



Biomagnification (bioaccumulation): This is a concept related to food webs: the higher the organism in the food chain, the more toxins will be collected in them. When pollutants (anything put into an ecosystem that does not naturally belong there) enter an ecosystem, plants are the first to soak them up. When small

animals eat the plants, they receive the toxins, and since they eat several plants, their toxic levels are higher. When the larger animal eats the smaller animal, they receive the toxins and since they eat several of the small animals that ate the plants, they have an even higher level of toxicity.

Bioaccumulation



Ecology Hints:

Usually the questions they are asking you will be done through pictures and diagrams. Make sure to study those that are on this paper.

The focus of ecology questions is based on relationships: how does one organism's fate affect another's fate. (for example, if you take away all of the plants, what happens to the carnivores at the top of the food web?)

Remember catch all answers like a change in the environment leads to an increase in competition, a decrease in biodiversity, and natural selection, sometimes shifting a population and this ends in evolution.

Human Impact Review

Vocabulary

- Invasive species: organisms that are brought to a new environment that do not originally belong there and they displace the native species. (remember catchall answer: invasive species usually reproduce quickly and have no natural predators so they eat all of the food of the native species (increase competition!) and the native species die. You can also use the introduction of diseases as an answer for invasive species)

- Greenhouse gases: gases like carbon dioxide (CO₂), carbon monoxide (CO), CFC's , methane (CH₄) that get caught in the Earth's atmosphere and trap the Sun's energy, leading to global warming
- Global warming: steady rise in the Earth's temperature each year
- Deforestation: cutting down trees in mass amounts
- Direct harvesting: taking a species from their original habitat (overfishing would be an example of this)
- Renewable resource: source of energy that can be used over and over again (running water, sun(solar), nuclear, wind, geothermal)
- Non-renewable resources: source of energy that cannot be used again (fossil fuels like oil, natural gas, gasoline)
- Industrialization: creation of factories and other technology conveniences that pollute our planet
- Trade-off: when you consider the positive and negative impacts and make a decision (a compromise)
- Pollution: putting things into the environment that cause damage to the environment

Negative Impacts

Human Activity	Product	Impact
Deforestation	Reduce oxygen production	Destroy habitats, decrease in biodiversity
Burning fossil fuels (factories, cars, etc)	Carbon dioxide, carbon monoxide, methane, CFC	Increase greenhouse gases which leads to global warming and decrease in biodiversity. Carbon monoxide destroys the ozone removing protection from UV radiation of the sun
Using fertilizers	Nitrogen	Rain will wash fertilizers into bodies of water, causing plants to grow fast which kills animals in the water, decrease in biodiversity
Using pesticides	DDT, CFC, other toxic chemicals	Biomagnification.... This will lead to poisons building up in the environment and decreasing stability and biodiversity

Positive Impacts of People

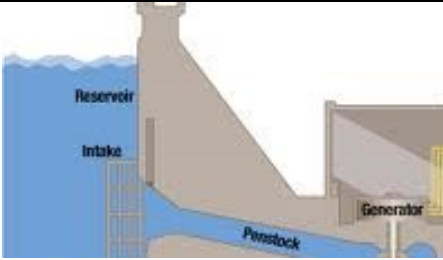


Creation of wildlife Refuges or parks: helps to protect threatened and endangered species through protected pieces of lands (a refugee camp for animals)



Reduce, Reuse, Recycle!

Pass laws that outlaw killing animals, polluting the environment (Clean Air Act, Clean Water Act, Reclamation Act, Endangered Species Act) and creating community awareness campaigns to help our environment

Renewable Energy Sources

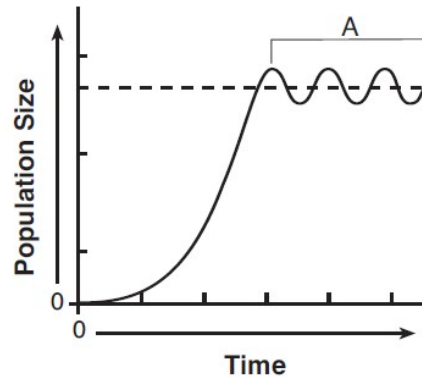
Since burning fossil fuels is so damaging to the environment, there are alternative energy resources available that are being developed and trying to find lower cost ways to make them more readily available. All of these have the same advantages: they are clean resources that reduce pollution (except for biomass it just makes different pollution) and they are renewable so they will not go away like fossil fuels

Energy Source	What is it	Picture
Running water, hydroelectric power Disadvantages: costly to build and often changes the natural habitat around the dam	Using running water to generate mechanical energy turning a turbine that can be converted into electricity	
Sun, solar power Disadvantages: expensive, delicate (break easy) and not reliable if the sun is not out	Energy harnessed from the sun in cells (solar panel) that convert light energy to electricity	
Wind energy Disadvantages: expensive to build, ugly to see in a landscape, loud, and not reliable if the wind is not blowing	Using the power of the wind to turn a turbine and convert it to electrical energy	

<p>Geothermal energy</p> <p>Disadvantages: very expensive to put in and up keep and not available everywhere</p>	<p>Using energy from the mantle of the earth (heat) and turning it into electrical energy</p>	
<p>Biomass</p> <p>Disadvantages: makes just as much pollution as fossil fuels</p>	<p>Burning left over organic materials (dead things and animal wastes) to make electrical energy</p>	<p>Types of Bio</p> 

Practice Questions, Ecology and Human Impact Unit

1. The graph below indicates the size of a fish population over a period of time.



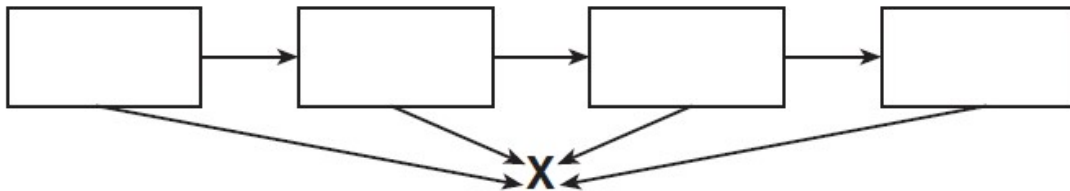
The section of the graph labeled A represents

- (1) biodiversity within the species
- (2) nutritional relationships of the species
- (3) a population becoming extinct
- (4) a population at equilibrium

2. Which factor would have the greatest effect on the flow of energy into an ecosystem?

- (1) a large decrease in the amount of sunlight available
- (2) a large increase in the number of carnivores
- (3) a small increase in the number of decomposers
- (4) a small decrease in the amount of minerals available

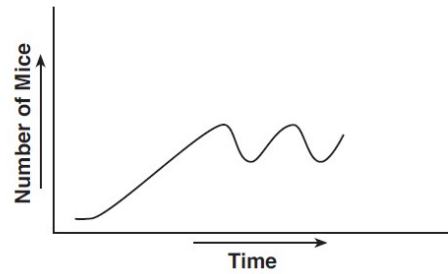
3. The diagram below represents some energy transfers in an ecosystem.



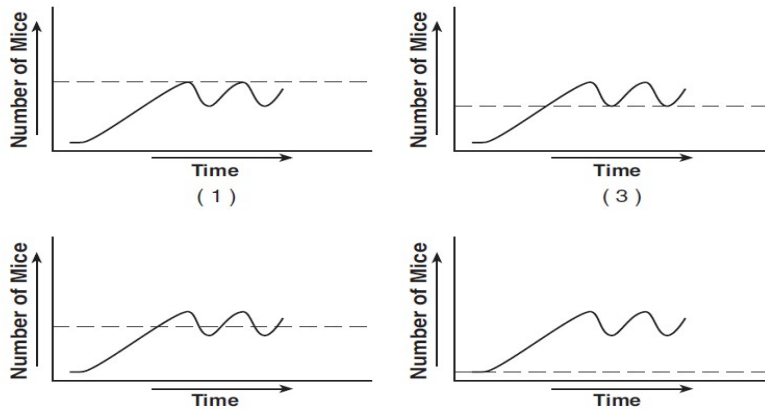
Which type of organism is most likely represented by letter X?

- (1) decomposer
- (2) autotroph
- (3) producer
- (4) herbivore

4. The graph below shows the growth of a field mouse population in an ecosystem over time.



5. The dashed line indicating the carrying capacity for the mouse population is correctly shown on which graph?



6. A stable ecosystem is characterized by having

- (1) predators that outnumber their prey
- (2) a continual input of energy
- (3) limited autotrophic nutrition
- (4) no competition between species

7. Which pair of organisms would most likely compete for the same ecological niche?

- (1) bacteria and fungi
- (2) deer and wolf
- (3) tree and fungi
- (4) deer and bacteria

8. Rabbits introduced into Australia over one hundred years ago have become a serious pest. Rabbit populations have increased so much that they have displaced many native species of herbivores. Which statement best explains the reason for their increased numbers?

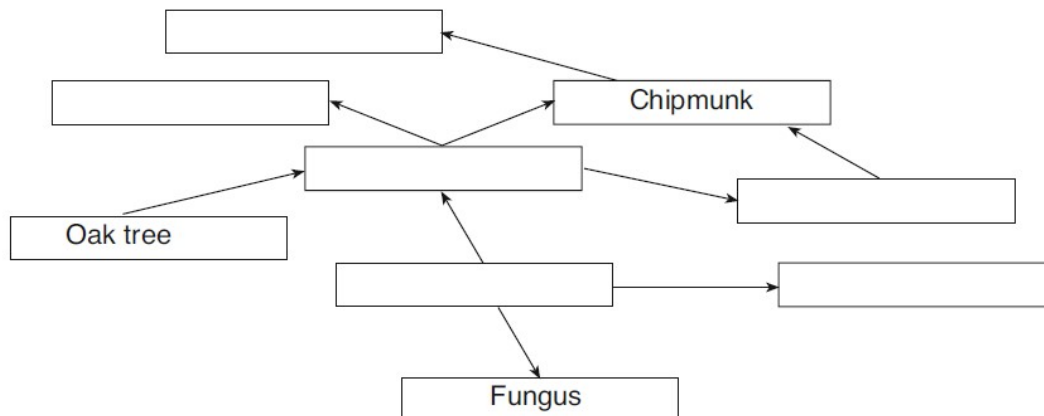
- (1) Rabbits have a high metabolic rate.
- (2) There are few native predators of rabbits.
- (3) Additional rabbit species have been introduced.
- (4) There is an increase in rabbit competitors.

9. An ecologist made some observations in a forest ecosystem over a period of several days. Some of the data collected are shown in the table below.

Observations in a Forest Environment

Date	Observed Feeding Relationships	Ecosystem Observations
6/2	<ul style="list-style-type: none"> • white-tailed deer feeding on maple tree leaves • woodpecker feeding on insects • salamander feeding on insects 	<ul style="list-style-type: none"> • 2 cm of rain in 24 hours
6/5	<ul style="list-style-type: none"> • fungus growing on a maple tree • insects feeding on oak trees 	<ul style="list-style-type: none"> • several types of sedimentary rock are in the forest
6/8	<ul style="list-style-type: none"> • woodpecker feeding on insects • red-tailed hawk feeding on chipmunk 	<ul style="list-style-type: none"> • air contains 20.9% oxygen
6/11	<ul style="list-style-type: none"> • chipmunk feeding on insects • insect feeding on maple tree leaves • chipmunk feeding on a small salamander 	<ul style="list-style-type: none"> • soil contains phosphorous

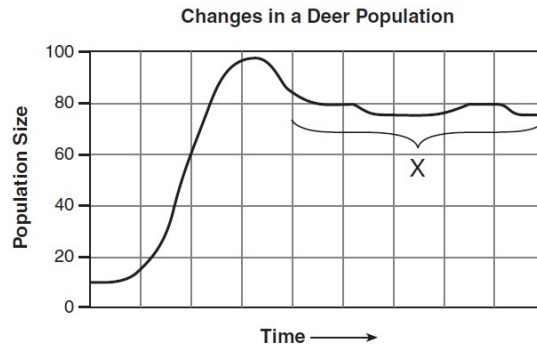
On the diagram below, complete the food web by placing the names of *all* the organisms in the correct locations. [1]



10. The greatest number of relationships between the organisms in an ecosystem is best shown in

- (1) a food chain
- (2) an energy pyramid
- (3) a food web
- (4) an ecological succession diagram

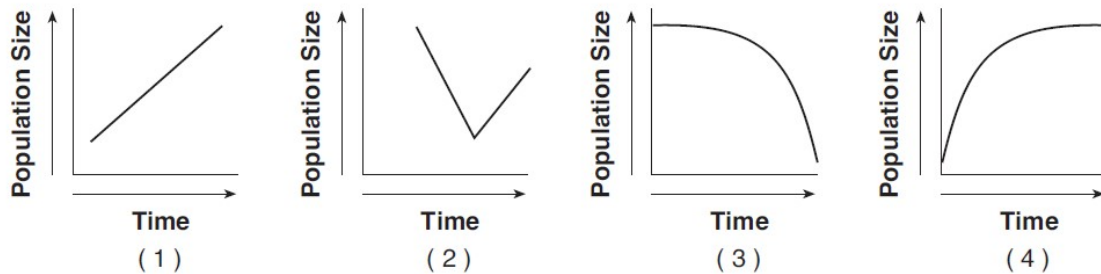
11. Changes in a deer population are shown in the graph below.



Which statement best explains section X?

- (1) The population has reached the carrying capacity of its environment.
- (2) Energy is used for interbreeding between members of different species.
- (3) A predator recycles the remains of dead organisms.
- (4) Competition does not occur between members of different species in the same habitat.

12. Which graph represents a population that grew and is maintained at the carrying capacity of its ecosystem?



13. A serious threat to biodiversity is

- (1) habitat destruction
- (2) maintenance of food chains
- (3) competition within a species
- (4) a stable population size

14. Which action will result in the greatest *decrease* in rain forest stability?

- (1) removing one species of plant for medicine
- (2) harvesting nuts from some trees
- (3) cutting down all the trees for lumber
- (4) powering all homes with wind energy

15. Abandoned railroad tracks are overgrown with weeds. Ten years later there are small aspen trees growing in the middle of the tracks. This change is an example of

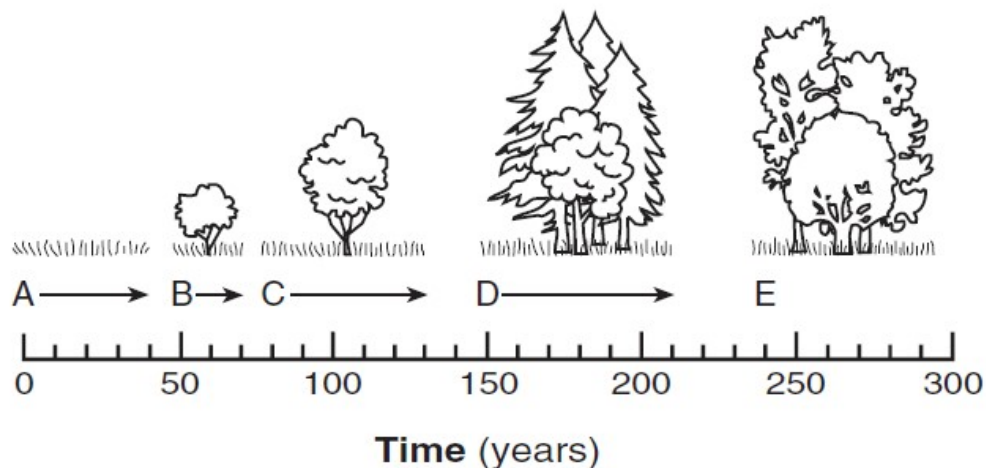
- (1) ecological succession
- (2) biological evolution
- (3) genetic variation
- (4) heterotrophic nutrition

16. Researchers have reported that the number of different species of fish found in certain areas of the ocean has been greatly reduced over the past 50 years.

This situation is an example of

- (1) a loss of biodiversity
- (2) an increase in ecological succession
- (3) a lack of differentiation
- (4) an increased carrying capacity

17. The diagram below shows various ecological communities that occupied an area over a period of 300 years.



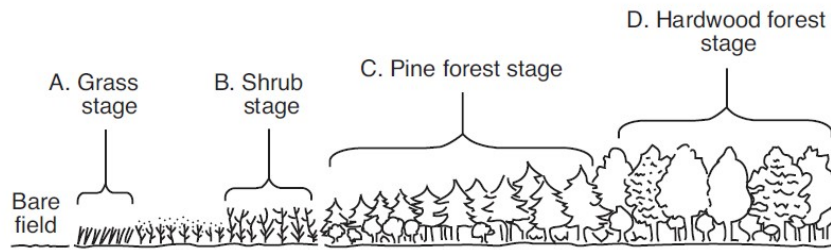
Which statement best describes the diagram?

- (1) Community A is the most stable community.
- (2) Community B replaced community C after a period of 100 years.
- (3) Community C developed into community A after a period of 75 years.
- (4) Community D modified the environment, making it more suitable for community E.

18. Some of the energy taken in by an organism is not available to other organisms in a food web. Energy that is *not* available to other organisms in a food web is energy that is

- (1) stored in the remains of a dead animal
- (2) lost to the environment as heat
- (3) stored in eggs produced during sexual reproduction
- (4) produced in muscle tissue during the growth of an organism

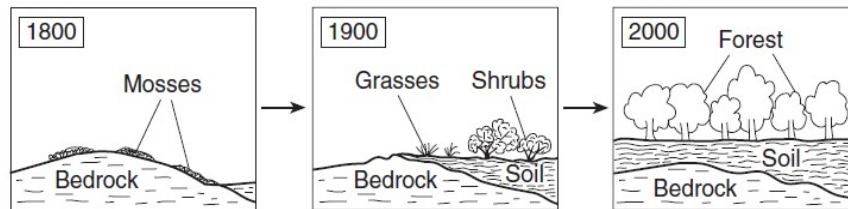
19. The diagram below represents the various stages of ecological succession in New York State.



If the ecosystem is not altered, which stage would be the most stable?

- (1) grass
- (2) shrub
- (3) pine forest
- (4) hardwood forest

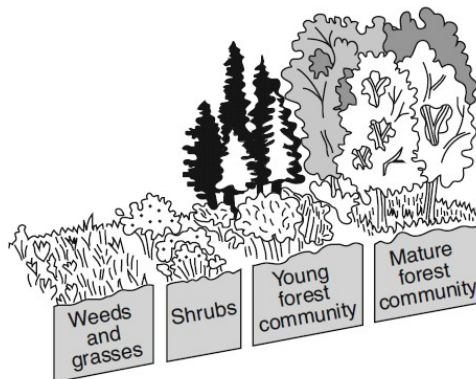
20. The diagram below represents a process that occurs in nature.



This diagram can be used to illustrate the

- (1) effects of reduced competition between different types of plant life
- (2) effect of human intervention on a stable ecosystem
- (3) ecological succession from bare rock to stable ecosystem
- (4) evolution of mosses to trees over 200 years

21. Which statement best describes one of the stages represented in the diagram below?



- (1) The mature forest will most likely be stable over a long period of time.
- (2) If all the weeds and grasses are destroyed, the number of carnivores will increase.

(3) As the population of the shrubs increases, it will be held in check by the mature forest community.

(4) The young forest community will invade and take over the mature forest community.

If farm fields in the Piedmont region of North Carolina are abandoned, there is a regular sequence of plant species that will inhabit the field. The data table below shows a typical sequence of dominant plant species.

Changes in Dominant Plant Species

Years After Last Cultivation	Dominant Plant Species
0	crabgrass
1	horseweed
2	aster
3	broomsedge
5–15	shortleaf pine
50–150	oak trees

22. This regular sequence of plant species over the 150-year period is known as

(1) degrading of the ecosystem

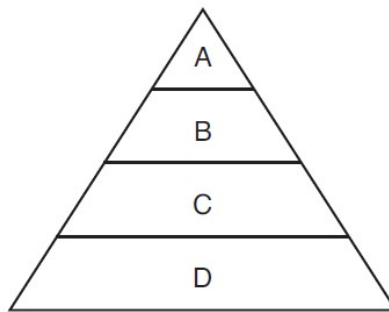
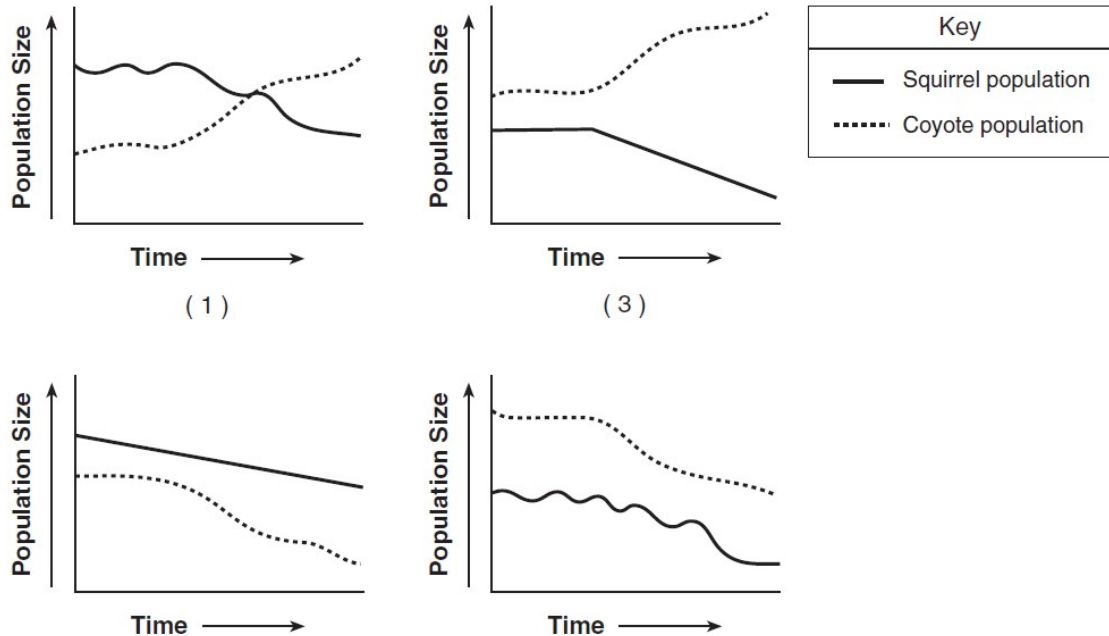
(2) loss of biodiversity

(3) ecological succession

(4) biological evolution

If the oak forest is destroyed by fire and no other disturbances occur, which dominant plant species would most likely be found in the region 70 years after the fire? [1]

23. In a particular ecosystem, squirrels make up a large portion of the diet of coyotes. A fatal disease in the squirrel population begins to reduce their population over a period of months. Which graph best represents the expected changes in population size of the coyotes and the squirrels?



24. Which level includes organisms that receive their energy from level *B*?

- (1) *A* (3) *C*
 (2) *B* (4) *D*

25. Which level includes organisms that get their energy exclusively from a source other than the organisms in this ecosystem?

- (1) *A* (3) *C*
 (2) *B* (4) *D*