

DIRECTIONS: Use your notes, warm-ups, activities, and/or labs to answer the following questions

1. What is **ecology**? **The study of living things and their interactions with the environment.**

2. What is the **biosphere**? Where is the **biosphere** located?

The parts of the earth that sustain life. Mostly on the surface of the planet but also can be found in the oceans.

3. Explain the difference between a **population**, **community**, and **ecosystem**.

Population = Group of the same type of organism living in the same area.
Community = A collection of populations that live in a defined area.
Ecosystem = A community and its nonliving surroundings.



4. Explain the difference between **biotic** and **abiotic**.

Biotic = Describes something living.
Abiotic = Describes something nonliving.

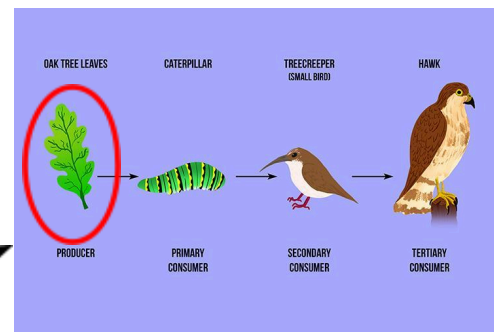
5. List **two biotic** and **two abiotic factors** affecting the ducks in this pond.

Biotic Factors = Fish, Dragonfly, fish, Frogs, Plants, Eels
Abiotic Factors = Rocks, Water, Weather, Air, Pond dirt/debris

6. Explain in what direction the **energy** flows from organism to organism in this food chain.

The energy flows from the oak tree, to the caterpillar, to the tree-keeper, to the hawk.

7. Circle the **autotroph** in the food chain. What **process** do most **autotrophs** use to create their own energy? **Photosynthesis**



8. Which organism in the diagram receives the **most energy** from the Sun?

The oak tree

9. What is the role of a **decomposer** in a food chain/web?

They break down dead/decaying matter.

10. As **energy** moves through the food chain above, the **amount of energy** _____.

Decreases by 90% as it passes at each trophic level.

11. Explain the difference between an **energy pyramid**, **biomass pyramid**, and **pyramid of numbers**.

Energy = Shows the amount of energy that is available at each trophic level.
Biomass = Shows the amount of living tissue (amount of food available) at each trophic level.
Numbers = Shows the numbers of living things present at each trophic level.

12. Describe how the **number of organisms** in each trophic level generally changes going **UP** a **pyramid of numbers**.

Generally, the numbers of organisms decrease going up through the trophic levels of an ecosystem.
This is due to the available food/energy.

13. What is **symbiosis**?

Symbiosis describes any relationship that forms between two different organisms that live near one another.

14. Explain the difference between **mutualism**, **commensalism**, and **parasitism**. Give an example of each.

Mutualism = Both organisms benefit from the relationship. Example: Insects and Flowering Plants

Commensalism = One organism benefits from the relationship while the other organism neither benefits nor is harmed. Example: Barnacles and Whales

Parasitism = One organism benefits from the relationship while the other is harmed. Example: Tape worms and grazing mammals like cows.

15. _____ (energy or **matter**) is recycled in an ecosystem, but _____
(**energy** or **matter**) is transferred to other forms and does not recycle.

16. Explain the difference between the **habitat** and **niche** of an organism.

Habitat = Where an organism lives (its address).

Niche = The organism's role in the ecosystem (its occupation).

17. What is **succession**?

The change in an ecosystem's diversity of species over time. The evolution of an ecosystem.

18. What is the difference between a **pioneer species** and a **climax community**?

Pioneer species = The first species present in an ecosystem. They colonize and establish an ecosystem.

19. What types of organisms make good **pioneer species** when there is **no soil**, only **bare rock**?

Organisms that do not require soil, like lichens and moss.

20. Explain **primary succession**. When can **primary succession** happen?

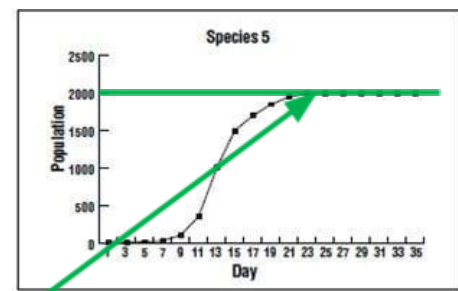
Primary succession is the establishment of a new ecosystem, starting with bare rock. This can happen after the formation of new, volcanic islands, after volcanic eruptions that destroy old ecosystems, or after the recession of glaciers.

21. Explain **secondary succession**. When can **secondary succession** happen?

Secondary succession is the rebuilding of a pre-existing ecosystem. This happens after an ecosystem is disturbed by an event, like a natural disaster such as a wildfire, flood, or hurricane.

22. What is **carrying capacity**? Draw a line to represent carrying capacity on this graph. What is the **carrying capacity** for this ecosystem according to the graph?

It is the maximum number of an organism that a habitat (ecosystem) can sustain indefinitely. According to the graph, the carrying capacity is 2000.



23. Explain the difference between **density-dependent** and **density-independent** limiting factors. Give an example of each.

Density-Dependent = These limiting factors have a larger impact the more closely packed a population of organisms are. Examples: Competition, Predatory/Prey, Disease, Parasites

Density-Independent = These factors have the same amount of impact regardless of how closely packed a population or organisms is. Examples: Natural disasters such as volcanic eruptions, wildfires, hurricanes, etc.

24. What **type of growth** happens organisms are **unrestricted** by **space** and **resources**?
Exponential growth
25. What is the **difference** between a **“J” shaped** and **“S” shaped** population growth graph?
J-Shaped = Shows unchecked (unlimited) growth which results in an exponential growth shaped graph.
S-Shaped = Initially shows exponential growth but then there is a leveling off due to limiting factors.
26. What is **demography**?
The study of all characteristics of a human population.
27. What are **two causes** of **acid precipitation** (rain)?
Sulfur Dioxides from the burning of fossil fuels and nitrogen dioxides from automobile (car) exhaust.
28. Which age structure diagram shows a **population** that is **growing**? Which age structure diagram shows a **mature/stable** population?
1 2 3
Diagram 1 shows a population that is growing; you can tell this by the large proportions of the population that are in the younger age brackets.
Diagram 2 shows a population that is stable (not-growing); you can tell this by the more even distribution of the population amongst the different age brackets.
29. What **greenhouse gas** is now in higher concentrations in our atmosphere due in part to human activities?
carbon dioxide oxygen methane nitrogen
30. What is an **invasive species**? List **two characteristics** of **invasive species** that make them so harmful to local food chains/webs.
Invasive species are species that are not native to an ecosystem that have been introduced and has established themselves. Invasive species usually reproduce faster than native species and also tend to lack competitors that the native species have naturally in their environment.
31. Look at the **Carbon Cycle** in the biogeochemical cycle portion of your notes. List **three processes** that **release** carbon dioxide into the atmosphere.
Burning of fossil fuels, plant respiration, and animal respiration
32. What is **biomagnification**?
The increasing concentration of a harmful substance in organisms at higher trophic levels in a food chain.
33. Look at the **Nitrogen Cycle** in the biogeochemical cycle portion of your notes. What is the difference between **nitrogen fixation** and **denitrification**?
They are opposite processes. Nitrogen fixation is the conversion of atmospheric nitrogen into compounds that contain nitrogen that plants can use. Denitrification is the process of converting nitrogen containing compounds into atmospheric nitrogen.
34. What **organisms** carry out **nitrogen fixation**?
Decomposers like bacteria and fungi.
35. What is **biodiversity**? Where on Earth is there the **most biodiversity**?
Biodiversity refers to the variety of species that live in a specific area. Tropical rainforests have the greatest biodiversity of any other biomes on the planet.