

Ecosystems and Ecology
Practice Test

1. The energy and biomass decrease from lower to higher levels so there are rarely more than _____ trophic levels in a food chain.
a. 4
b. 2
c. 3
d. 1
2. What is a trophic level?
a. The position an organism occupies in a food chain.
b. A level in a rainforest
c. The level of water in an ecosystem.
d. How much biomass an object has.
3. _____ percent of energy is lost from the immediate food chain as it is transferred to the next energy level.
a. Sixty
b. Forty
c. Ten
d. Ninety
4. About how much energy would be transferred to tertiary consumers if the producer started with 25,000 kcal?
a. 25000 kcal
b. 25 kcal
c. 250 kcal
d. 2500 kcal
5. Which of the following statements best explains why most ecosystems will not have quaternary consumers?
a. An environment cannot support that many organisms and will have reached its carrying capacity.
b. Tertiary consumers are already very large animals and their predators would have to be extremely large.
c. There would be too much competition for any animals to survive as quaternary consumers.
d. There would not be enough energy to sustain a quaternary level consumer.
6. Why doesn't all of the energy available in a primary producer transfer up the food chain?
a. Some energy is destroyed
b. Some of the energy is released as heat
c. Some of the energy is used at each level by cellular and metabolic processes
d. B and C
7. Which of these trophic levels has the least chance to exist in a food chain?
a. Second
b. Fifth
c. Third
d. First
8. Which is NOT an example of a primary consumer?
a. An osprey that eats mostly fish
b. A mouse that eats mostly seeds
c. A deer that eats mostly grass
d. A squirrel that eats mostly acorns
9. The biomass is the _____ mass of the organisms present at a given trophic level/
a. Half
b. Main
c. Total
d. Quarter
10. Only _____ percent of the energy present at one level is available to the next trophic level.
a. 5
b. 10
c. 15
d. 6
11. Net Primary Productivity (NPP) is the total amount of energy fixed in an ecosystem by
a. Photosynthesis minus the amount used by producers and consumers in respiration
b. Photosynthesis
c. Photosynthesis minus the amount used by producers in respiration
d. Herbivores

12. Which of the following combinations is typical of r-selected organisms?
- i. A high number of offspring
 - ii. A tendency to be associated with temporary habitats
 - iii. Completion of the life-cycle in a relatively short period
 - iv. A low number of offspring
 - v. A high level of parental care
 - vi. A rapid rate of growth
- b. IV and V only
 - c. I, II and III only
 - d. I, II, III and VI only**
 - e. II, IV and V only

13. In the list below, how can the role of lichen be best described?
- rock → lichen → moss → grass → shrub → trees → oak hickory forest
- a. A part of the second trophic level
 - b. A part of the pioneer community**
 - c. A part of the decomposer community
 - d. A part of the climax community
14. An increase in parasitism, causing reduced survival in a host population as that population increases in size, is an example of
- a. **an internal regulating factor.**
 - b. a density independent factor.
 - c. positive feedback.
 - d. **a density dependent factor.**

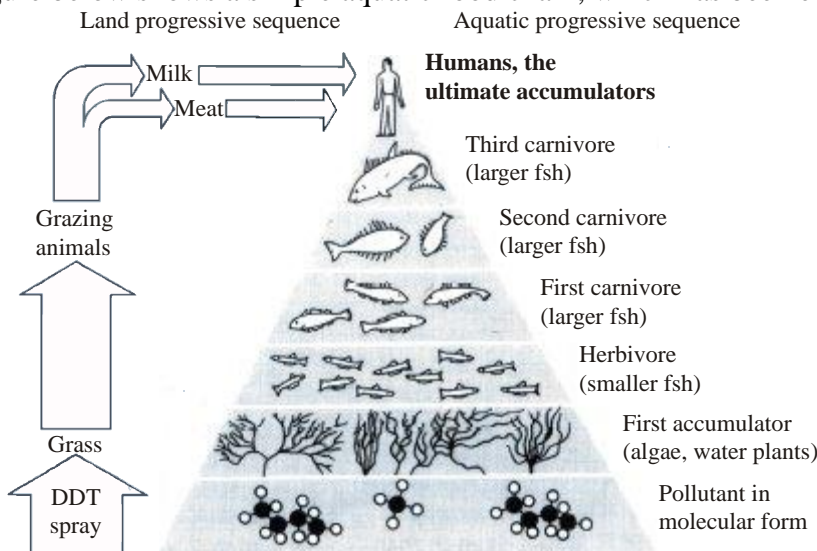
15. For a named ecosystem, draw a food chain with named species showing three appropriately labeled trophic levels.

****Make sure to have a named ecosystem and named organisms. Be as specific as possible****

16. Explain the role of decomposers in an ecosystem.

Cycle nutrients, break down organisms, prevent the spread of disease, create soil, etc

17. The figure below shows a simple aquatic food chain, which has been exposed to a pesticide called DDT.

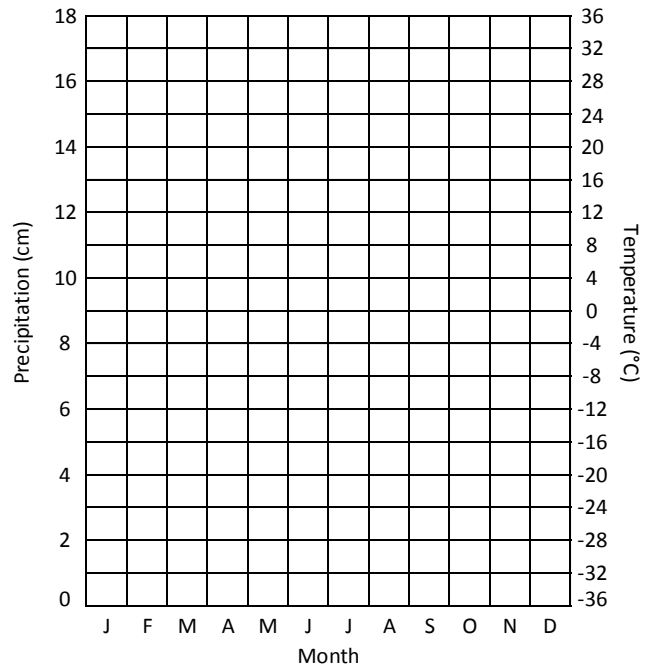


- a. State how many trophic levels are shown in the figure above.
- b. Identify which trophic level represents:
 - i. the producers *level 1*
 - ii. the top carnivores *level 5/6 depending on fish or human*
- c. An estimated 1000 kg of plant plankton are needed to produce 100 kg of animal plankton. The animal plankton is in turn consumed by 10 kg of fish, the amount needed by a person to gain 1 kg of body mass.
 - i. Explain why the amount of biomass declines at each successive trophic level.
10% rule
 - ii. Distinguish between a pyramid of biomass and a pyramid of productivity.

Biomass is what is left over/available to the next trophic level (NPP/NSP), productivity is all of the energy in an ecosystem (GPP/GSP)

18. Create a climatogram using the data provided.

Month	Ave. Precip. (cm)	Ave. Temp. (°C)
Jan.	4.5	16.5
Feb.	3.8	16.5
Mar.	4.8	15
Apr.	6.2	12.5
May	7.8	11
Jun.	8.3	9
Jul.	10	8.5
Aug.	9.1	9
Sep.	7.6	10
Oct.	6.7	11.5
Nov.	5.7	12.5
Dec.	5.2	14.5



- a. What type of biome is this?

You are responsible for recognizing tundra, desert, and tropical rainforest

- b. What would the abiotic factors be in this biome?

19. Explain how interspecific competition leads to competitive exclusion within an ecosystem.

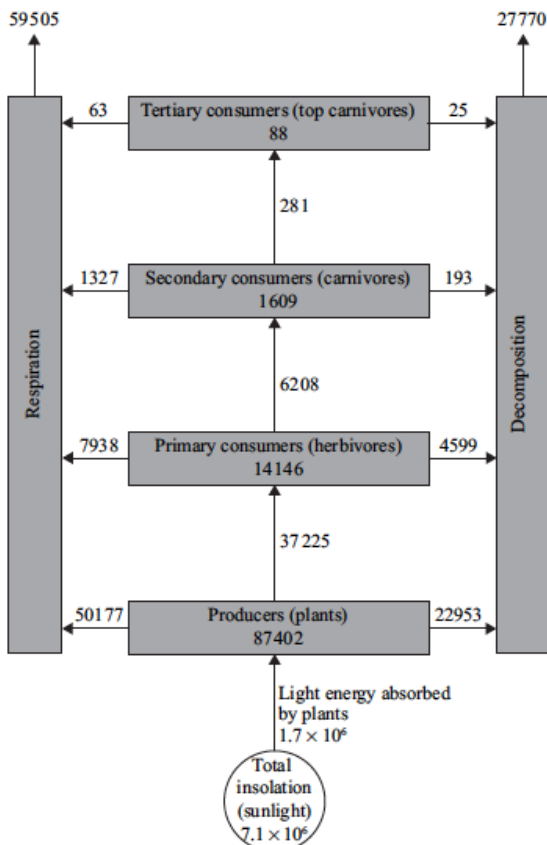
Competition between two different species will lead to one being outcompeted and dying out, migrating, or adapting

20. Explain the relationship between carrying capacity and population size for any given population within a defined ecosystem.

Carrying capacity defines population size

21. Construct a diagram to model the water cycle (hydrological cycle). Label flows, stores, and processes [3]

22. The figure below shows the flow of energy through a freshwater ecosystem in Florida, USA. The figures are given in kilojoules per square meter per year.



a. Define the term *gross secondary productivity* (GSP). [1]

b. Determine the NPP, GPP, and R values for the primary producers. Show your work [2]

d. Explain, giving **two** reasons, why the net primary productivity of secondary consumers is much smaller than that of primary consumers [2]

[Source: adapted from Odum H. T. (1985) Silver Springs Study in Ecology, ABAL series, CUP]