

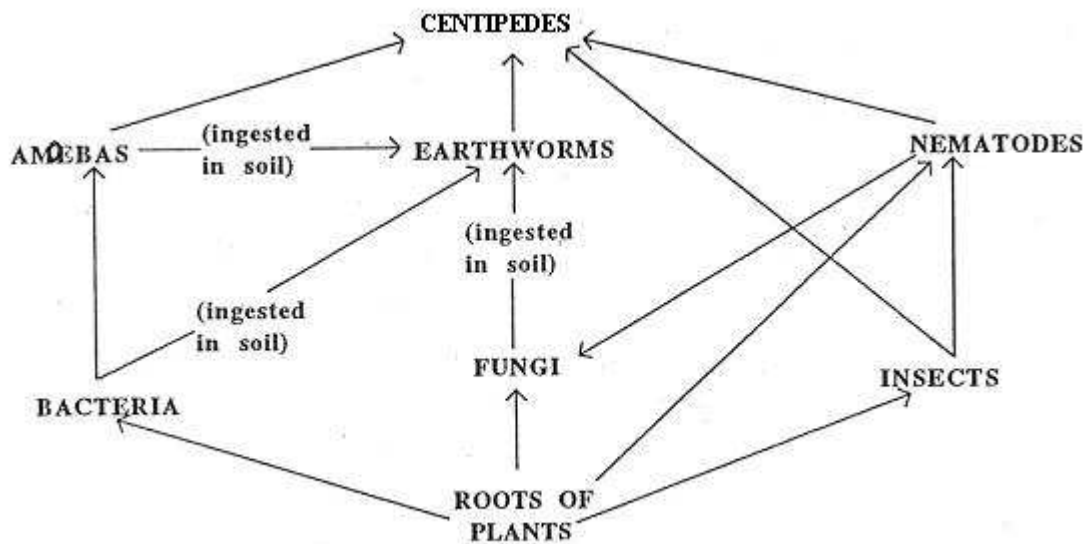
Honors Biology
Test – Ecosystems

1. Which of these sequences describes the pathway of energy through living things in their environment?
 - A. chemical energy → light energy → heat
 - B. heat → chemical energy → light energy
 - C. heat → light energy → chemical energy
 - D. light energy → chemical energy → heat
2. Which of the following ecological units or relationships is the least related to abiotic factors?
 - A. community
 - B. symbiosis
 - C. ecosystem
 - D. population
3. Which of the following pairs is an ecosystem?
 - A. a biotic environment and a community
 - B. a community and its abiotic environment
 - C. a niche and a community
 - D. a population and a community
4. Which of these is a community relationship?
 - A. river turtles and snails eat tape grass
 - B. snails are concealed among rocks in a river
 - C. tape grass clogs the water current in a river
 - D. turtle eggs are buried on the river bank
5. A biome characterized by permafrost and located immediately north of the timberline and south of the permanent ice sheet would best be characterized as
 - A. savanna
 - B. coniferous forest
 - C. arctic tundra
 - D. taiga

6. Your friend comes to you with a problem. It seems his shrimp boats aren't catching as much shrimp as they used to. He can't understand it because originally he caught all the shrimp he could handle. Each year, he added a new boat, and for a long time, each boat caught tons of shrimp. As he added more boats, there came a time when each boat caught a little less shrimp, and now, each boat is catching a lot less shrimp. Which of the following topics might help your friend understand the source of his problem?

- A. density dependent population regulation
- B. logistic growth and intrinsic characteristics of population growth
- C. density independent population regulation
- D. Both A and B

Questions 7-9 refer to the diagram below.



7. What pair of organisms both are in competition with nematodes?

- A. earthworms and insects
- B. amoebas and bacteria
- C. insects and centipedes
- D. fungi and earthworms

8. Which of these pairs of organisms represent a predator-prey relationship?

- A. amoebas and nematodes
- B. bacteria and fungi
- C. centipedes and earthworms
- D. insects and bacteria

9. How many producers are shown in this diagram?

- A. 1
- B. 2
- C. 3
- D. 4

Questions 10 and 11 refer to the following choices:

- A. competition
- B. symbiosis
- C. parasitism
- D. predator-prey

10. Termites eat wood, but cannot digest it. Microorganisms that live in the termites' digestive tracts digest the wood. The microorganisms cannot live outside the termites' bodies.

11. A lamprey eel attaches itself by a sucker to a fish and feeds on blood from the fish.

12. In a tide pool, 15 species of invertebrates were reduced to 8 after 1 species was removed. The species removed was likely a(n)

- A. keystone predator
- B. herbivore
- C. community facilitator
- D. mutualistic organism

13. Which is the most important in limiting the size of a community?

- A. amount of energy entering it
- B. biomass of decomposers
- C. number of consumers
- D. size of an individual producer

14. Which of the following events might you predict to occur if the tilt of Earth's axis relative to its plane of orbit was increased beyond 23.5 degrees (our current tilt)?

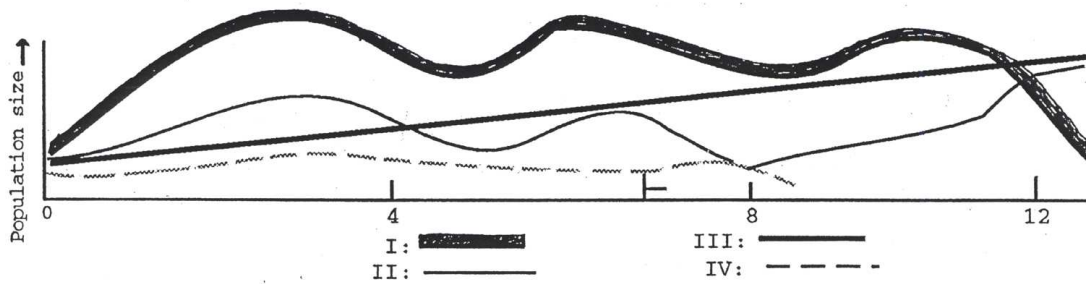
- A. summers in the United States might become warmer
- B. winters in Australia might become more severe
- C. seasonal variation at the equator might decrease
- D. Both A and B are correct

15. When is carbon dioxide NOT being released into the atmosphere?
- A. as plants break sugars down
 - B. as decomposers are active
 - C. as fossil fuels are burned
 - D. as producers perform photosynthesis
16. A snake eats frogs, which eat grasshoppers. The snake is an example of
- A. primary consumer
 - B. secondary consumer
 - C. producer
 - D. tertiary consumer
17. Scientists studied a field and found numerous types of grasses and insects. Fifteen years later, the grasses had been replaced by several shrub species and young trees had begun growing. This is the result of
- A. primary succession
 - B. secondary succession
 - C. tertiary succession
 - D. speciation
18. Which of the following is NOT part of the nitrogen cycle?
- A. nitrogen fixation
 - B. photosynthesis
 - C. decomposition
 - D. ammonification
19. In the nitrogen cycle, the bacteria that replenish the atmosphere with N_2 are
- A. methanogenic protozoans
 - B. denitrifying bacteria
 - C. nitrogen fixing bacteria
 - D. nitrifying bacteria
20. In a pond community, the greatest mass present would consist of
- A. algae
 - B. insects
 - C. frogs
 - D. fungi

21. A farmer started colonies of rats and mink hoping to feed the rats to the mink and the skinned mink to the remaining rats, thereby getting mink skins for nothing. Is this possible?

- A. Yes, because the system would be in balance
- B. Yes, because energy lost feeding rats to mink would be recovered by feeding mink to rats
- C. No, because carnivores cannot feed on each other
- D. No, because much of the food energy is lost as heat

Questions 22-24 refer to the graph below.



22. Which species is the producer?

- A. I
- B. II
- C. III
- D. IV

23. Which species probably is a decomposer?

- A. I
- B. II
- C. III
- D. IV

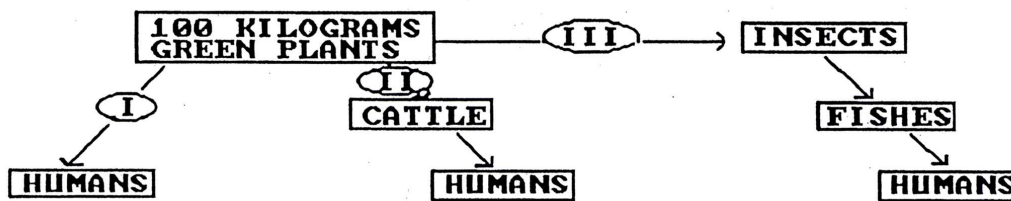
24. Which species is the least affected by the population size of the other three species?

- A. I
- B. II
- C. III
- D. IV

25. A population of deer have existed for several decades on a large island. The owners of the island would like to introduce a new species of herbivorous mammal, such as elk, to the island. The landowners would like for the species to coexist. What characteristics of the new species would prevent this from happening?

- A. it specializes on a different part of the habitat
- B. it occupies the same niche as the deer
- C. it has food needs that make it a generalist
- D. it is not a competitor with the deer

Questions 26 and 27 refer to the following diagram. The arrows indicate three possible pathways the energy within the green plants could be transferred.



26. Through which pathway would the least energy be available to humans?

- A. III
- B. II
- C. II or III
- D. I

27. Which pathway will be favored more if the world human population doubles in size?

- A. III
- B. II
- C. II or III
- D. I

28. In a mature forest of oak, maple, and hickory trees, a disease causes a reduction in the number of acorns produced by oak trees. Which of the following would **LEAST** likely be a result of this?

- A. there might be fewer squirrels because they feed on acorns
- B. there might be fewer mice and seed-eating birds because squirrels would eat more seeds and compete with mice and birds
- C. there might be an increase in the number of hickory trees because the competition between hickory nuts and acorns for germination sites would be reduced or eliminated
- D. there might be a decrease in the number of maple seeds as the disease spreads to other trees in the forest

29. Consider a field plot containing 200 kg of plant material. How many kg of carnivore production can be supported?

- A. 2
- B. 10
- C. 20
- D. 200

30. The concept that energy cannot cycle through an ecosystem is best explained by

- A. the law of conservation of energy
- B. the principle of biomagnification
- C. the competitive exclusion principle
- D. the second law of thermodynamics

31. Generally speaking, deserts are located in places where air masses are usually

- A. cold
- B. humid
- C. rising
- D. falling

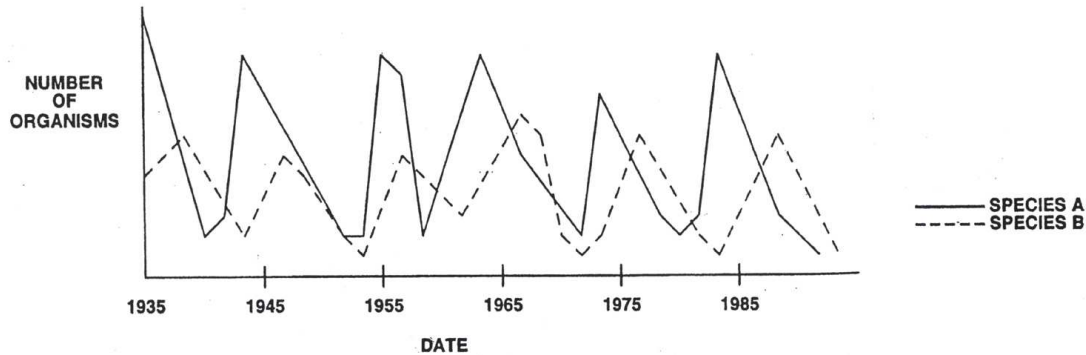
32. If a population exceeds the carrying capacity of the ecosystem, the most likely outcome would be

- A. an increase in resources to meet its needs
- B. extinction of the species
- C. an eventual decline in population size
- D. maintenance of the current population size for a significant period of time

33. After a Douglas fir forest is logged, beekeepers frequently keep their beehives on the logged land. The most reasonable explanation for this is

- A. the climax community included a major competitor of bees
- B. the pioneer species and the bees have a mutualistic relationship
- C. the bees are best kept away from people
- D. the cleared forest is more accessible than the forest

Question 34 refers to the following diagram.



34. Species A and species B are members of the same community. From this graph, we can conclude that

- A. species A eats species B
- B. species B eats species A
- C. species A increases in number every 5 years
- D. both species are competing for the same food source

35. The table below indicates the number of individuals of each of the five species listed that are found in four separate communities. Which has the highest biodiversity?

Community	Purple loosestrife	Swamp milkweed	Red fox	Cattail	Cattail Moth
A	18	21	0	14	19
B	150	0	0	75	5
C	26	3	5	4	5
D	6	0	6	0	0

36. Which organism would likely contain the greatest concentration of mercury in its tissue (the main source of mercury is atmospheric deposition).

- A. minnow
- B. algae
- C. aquatic insect
- D. bass

37. In which community would organisms most likely have evolved to respond to different photoperiods (daylengths)?

- A. coral reef
- B. temperate forest
- C. savanna
- D. tropical forest

38. An area in which different terrestrial biomes grade into each other is known as a(n)

- A. ecotone
- B. abyssal zone
- C. littoral zone
- D. limnetic zone

39. Which of the following statements about succession is correct?

- A. primary succession occurs in areas where soil remains after a disturbance
- B. secondary succession can occur where a disturbance has left soil intact
- C. secondary succession occurs where no soil exists
- D. primary succession only occurs when new volcanic islands form

40. Which of the following terrestrial biomes is (are) adapted to frequent fires?

- A. savanna
- B. chaparral
- C. temperate grasslands
- D. A, B, and C

Name:

Period:

Honors Biology

Test – Ecosystems

Multiple Choice (2 points each)

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	A	B	C	D
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Essays – Answer both questions below (10 points each):

1. Using what you have learned about atmospheric circulation, explain why tropical rainforests are generally found at or near the equator, while deserts are generally found around 30° North or South of the equator. Be sure to explain the relevant circulation cell(s) and patterns of rainfall.

2. A class of biology students conducted a field survey of the organisms living around their school. Students collected data and organized it into a table as follows:

Total number of organisms observed around the school

Red-tailed hawk	2	Monarch butterfly	42
Coyote	1	Gypsy moth	71
Crow	10	Norway maple	151
Opossum	7	Goldenrod	223
Raccoon	9	White clover	334
Grasshoppers	56	Milkweed	129
Japanese beetle	72	Common plantain	189
Milkweed bug	64	Cattail	134

Draw a pyramid of energy in the space below and label each level in your pyramid (by category, you do not need to add each species).

Use the Second Law of Thermodynamics to explain why there could not be many more trophic levels in this ecosystem.

Name: Key

Period:

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Multiple Choice (2 points each)

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