

## Science 20F – Ecosystems Review

### Multiple Choice

- An ecosystem includes
  - all the members of one species.
  - all the living and nonliving factors in an environment.
  - all parts of the Earth where life exists.
  - all members of a species in the same area.
- Which of the following would be an abiotic factor for a polar bear?
  - extreme cold, floating ice
  - eating only live prey
  - large body size
  - paws with thick fur
- Organisms that use the sun's energy to make food are called
  - herbivores.
  - autotrophs
  - decomposers.
  - heterotrophs.
- The portion of the Earth that supports life, which extends from the atmosphere to the ocean bottom is called
  - biosphere.
  - biome.
  - ecosystem.
  - community.
- Living plants are essential in the biosphere because
  - they are a major source of molecular nitrogen.
  - they are a major source of carbon dioxide and water.
  - they are a major source of carbohydrates and water.
  - they are a major source of molecular oxygen and glucose.
- Which of the following is a food chain?

A) grasshopper	grass		
B) leaves	fungi	hawks	snake
C) grain	mice	cat	
D) mushroom	tree	owl	rabbit

7. Formation of fossil fuels is part of the
- A) water cycle.
  - B) carbon cycle.
  - C) nitrogen cycle.
  - D) phosphorus cycle.
8. Which of the following would decrease the amount of carbon dioxide in the air?
- A) a maple tree growing
  - B) a dog running
  - C) a person driving a car to work
  - D) a forest burning
9. Nutrient cycles may involve
- A) movement of nutrients from the organism to the atmosphere.
  - B) movement of nutrients into the soil.
  - C) limitations on the number of organisms in the ecosystem due to shortage of some nutrients.
  - D) all of the above.
10. Carbon, hydrogen, and oxygen will never likely run out on the Earth's surface because they
- A) are being continuously recycled.
  - B) are so abundant in concentration.
  - C) are used very little.
  - D) are constantly being produced.
11. All the organisms living in a given area make up a(n)
- A) population.
  - B) biosphere.
  - C) ecosystem.
  - D) community.
12. A species that no longer exists in one part of Canada, but can be found in another area is called
- A) extinct.
  - B) threatened.
  - C) endangered.
  - D) exterminated.
13. Farmers will add fertilizers to a field to
- A) decrease competition amongst species.
  - B) increase the carrying capacity of the field.
  - C) reduce organic carbon in the field.
  - D) all of the above.

14. Different species **do not** compete for

- A) food resources.
- B) light.
- C) mates.
- D) none of the above.

15. All of the same species within a given area comprise a(n)

- A) population.
- B) abiotic factor.
- C) community.
- D) ecosystem.

16. A lack of food prevents further growth in a deer population. This is an example of

- A) range of tolerance.
- B) disease.
- C) limiting factor.
- D) biome depletion.

17. Which of the following would **least** likely act as a density-dependent factor limiting the size of a population of mice?

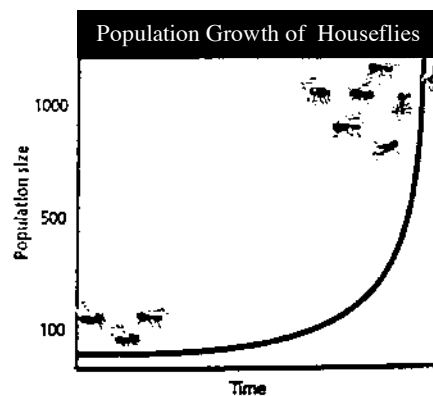
- A) parasitism
- B) build-up of waste products
- C) predation
- D) unfavorable climate

18. Density-independent limiting factors include

- A) predation.
- B) crowding.
- C) droughts.
- D) parasitism.

19. According to the graph, the growth rate of a house fly population

- A) increases, then drops suddenly.
- B) increases at a steady rate.
- C) increases rapidly.
- D) levels off after a certain amount of time.



20. After a fat soluble pesticide like DDT has been used for a long period of time, it begins to accumulate in the bodies of the top carnivores. This process is called

- A) nitrogen fixation
- B) bioaccumulation.
- C) emigration.
- D) limiting factor.

21. During population growth

- A) birthrate increases.
- B) birthrate decreases.
- C) birthrate equals death rate.
- D) death rate equals birth rate.

22. If a population exceeds the carrying capacity of the environment

- A) it will evolve adaptations to avoid a population crash.
- B) the average number of young per individual will increase.
- C) its food supply will increase in the next generation.
- D) its numbers will probably decrease rapidly.

23. A population will begin to increase if the birth rate remains the same and the death rate

- A) increases.
- B) decreases.
- C) remains the same.
- D) none of the above.

24. If 35 organisms are born, 50 organisms die, 10 organisms leave the population, 6 organisms enter the population, and the initial population size is 300, the population growth pattern that would result is

$$\text{Population Growth} = \frac{(\text{Birth Rate} + \text{Immigration}) - (\text{Death Rate} + \text{Emigration})}{\text{Initial Population Size}}$$

- A) an increase in growth.
- B) a decrease in growth.
- C) an unchanged growth rate.
- D) a growth rate increase, then a decrease.

## Fill in the Blank

1. The buildup of nitrogen in lakes produces \_\_\_\_\_.
2. The process of \_\_\_\_\_ uses oxygen and produces carbon dioxide.
3. The process of photosynthesis combines water with \_\_\_\_\_ gas to produce carbohydrates.
4. \_\_\_\_\_ bacteria convert nitrates into nitrogen gas.
5. Nitrogen-containing gases dissolve in water vapor in the atmosphere to produce \_\_\_\_\_.
6. Primary consumers are animals that eat \_\_\_\_\_.
7. The largest population of a species that an environment can support over the long term is called the \_\_\_\_\_ of the environment for this species.
8. Competition among members of the same species is called \_\_\_\_\_ competition.

## Matching

Each term in column B may be used once, more than once, or not at all.

- | A   | B   |
|---|---|
| <ul style="list-style-type: none"><li>• process used by green plants to make carbohydrates</li><li>• role of green plants in an ecosystem</li><li>• role of animals in an ecosystem</li><li>• network of links that channel energy and materials through the organisms in an ecosystem</li><li>• continual movement of elements between the living and non-living parts of the environment</li><li>• process by which pollutants become more concentrated as they move along</li><li>• total area of land that is required to support a human population at a given level if resource consumption</li></ul> | <ul style="list-style-type: none"><li>• consumers</li><li>• cellular respiration</li><li>• producers</li><li>• photosynthesis</li><li>• food web</li><li>• trophic level</li><li>• nutrient cycle</li><li>• carrying capacity</li><li>• bioaccumulation</li><li>• succession</li><li>• ecological footprint</li></ul> |

## Extended Answer

1. Write an equation that summarizes the process of photosynthesis.
2. How does the combustion of fossil fuels affect the carbon cycle?
3. Describe one way in which human activities have an impact on the nitrogen cycle.
4. Describe two factors that affect the carrying capacity of an area.
5. List three ways in which you depend on areas of land outside the area where you actually live.
6. Define carrying capacity. List three factors that limit population size.
7. How can a change in the population size of one organism affect a food web?
8. Suppose that you wanted to increase the rate of growth of plants in a greenhouse. Explain how you could do this by changing the air in the greenhouse. Suggest one other method of increasing plant growth.
9. To control populations of insects that eat crops, some farmers use insect predators instead of chemical sprays. Explain the advantages of using predators for pest control.
10. Using the classification system for at-risk species (found in your notes), classify each of the following species as extinct, endangered, extirpated, threatened, or vulnerable.
  - a) The wood turtle is found in pockets throughout southern Ontario, southern Quebec, New Brunswick, and Nova Scotia. The number of wood turtles in Canada seems to be stable, but in the United States their numbers are decreasing as many are being taken from the wild into homes as pets.
  - b) Furbish's lousewort is a tall herb that grows on riverbanks. In Canada, it grows only on a 200 km stretch of the Saint John River in New Brunswick. Forestry, farming, and flooding caused by hydroelectric dams all affect the area in which it lives.
  - c) The greater prairie chicken has not been seen in Ontario, Manitoba, or Alberta for many years. It was last seen in Saskatchewan in 1977. It can still be found in the prairie states of the U.S.
11. Explain how each of the following factors could lead to the extinction of a species.
  - a) poor reproductive success
  - b) competition from a species newly introduced into an ecosystem
  - c) hunting by humans
12. In your own words, explain the term biodiversity.
13. The figure to the right shows changes in the size of the populations of paramecia (single-celled organisms) placed in three different beakers.
  - a) Compare the growth of Species 1 in Beaker A with the growth of Species 2 in Beaker B.
  - b) What evidence suggests that the populations of paramecia affect each other (Hint: Examine the graph of Beaker C)?
  - c) Suggest a conclusion that can be drawn from the population changes in Beaker C.

14. Yellow-headed blackbirds are common in marshes from the Great Lakes to the Pacific Ocean. The table below indicates the yellow-headed blackbird population and the amount of rainfall in two marshes from 1992 to 1999.
- Graph the changes in the blackbird population.
  - According to the evidence, one study site consistently had more birds. Provide a possible reason.
  - Based on the evidence, create a hypothesis that explains the changes in population of the blackbird.

<b>Year</b>	<b>Number of birds (site 1)</b>	<b>Number of birds (site 2)</b>	<b>Amount of rainfall (cm)</b>
1992	24	28	13
1993	80	88	38
1994	75	86	35
1995	55	74	30
1996	70	98	43
1997	105	186	62
1998	90	130	50
1999	21	22	16