**Unit 1: Sustainable Ecosystems Review**

 1. Define the following:

a) environmental stewardship: taking care or management of resources so to ensure they are used in a sustainable way for future generations

b) sustainability: populations of organisms that can continue to interact and reproduce indefinely

c) biodiversity: number of different types of organisms in an area.

d) ecosystem: a self-regulating system in which living things interact with each other and non-living things.

 2. What are the characteristics of a sustainable ecosystem:

 -All populations can continue to interact and reproduce indefinitely.

-A sustainable ecosystem is able to withstand surrounding pressure while maintaining support to the variety of organisms.

-It also means that biodiversity is preserved.

 3. Explain why biodiversity is important in sustaining an ecosystem.

Hi levels of biodiversity are associated with a healthy sustainable environment.

 4. Examine the picture below:

 a) Identify a species, a population, a community and an ecosystem:

 -species: a deer

 -population: turtle

 -community: pond

 -ecosystem: everything in the pond – abiotic and biotic factors

 b) List the abiotic and biotic components from the picture below:

 abiotic: water, air, rocks; all non-living things

biotic: deer, plants, turtle, birds, fish, insect, all the leaving things.

 c) Write a food chain and identify the producer, primary and secondary consumer and decomposer.

 Answer vary

 Example: white spruce-spruce grouse-red fox-Canadian lynx

 d) Suppose the frog were removed from a food chain. Describe two ways in which the food chain would be

 affected.

 There will be an overpopulation of damselfly nymph and shortage of water flea.

 e) List three possible interactions between the deer and its environment.

 -deer eats grass

 -deer drinks from the pond

 -deer is decomposed by fungi

 f) How is this pond ecosystem sustained?

 It is sustained by the large amount of biodiversity in the ecosystem.

 

5. What is one abiotic factor that can limit a population?

 -amount of sunlight, water, soil, and air

 -natural disturbances: storms, fires, and droughts

 -human disturbance such as logging

What is one biotic factor that can limit a population?

 -competition among organisms for resources

 -presence of predators

 -presence of disease-causing organisms

6. What are the 5 terrestrial biomes of Canada? How is each biome defined by its vegetation?

1) Deciduous Forests-maple trees/oak trees

2) Boreal-spruce trees and fir

3) Tundra-shrubs, hardy grasses, mosses, lichens

4) Grasslands-grasses and shrubs

5) Temperate Coniferous Forests-Douglas fir, spruce, western hemlock

7. Component of a biosphere: atmosphere, lithosphere, hydrosphere

8. Give an example of how water moves from the biotic to the abiotic part of the atmosphere:

 -evaporation

 -transpiration

 See: Water Cycle textbook: p. 25 Figure 1.22

9. A farm that uses large volumes of fertilizer to increase crop yields is situated beside a lake. What could happen to the lake if the fertilizer ran off into the lake without first being treated?

 Contaminates the fresh water and this will affect the living organisms in the water and also the organisms that use the lake to drink from.

10. Explain the significant role of bacteria in the nitrogen cycle.

 Bacteria and fungi in the soil break down ammonia in wastes and dead organisms into nitrates🡪nitraies and then release them into soil so that is can be absorbed by plants.

11. a) Write the word equation for photosynthesis and cellular respiration.

 Photosynthesis:

 sunlight

 carbon dioxide + water :: glucose + oxygen

 Cellular respiration:

 glucose + oxygen carbon dioxide + water + energy

b) Explain the relationship between photosynthesis and cellular respiration and its significance to an ecosystem.

Photosynthesis is a process that produces glucose. Cellular respiration is the process that breaks down glucose to produce energy. All organisms carry out cellular respiration.

12. Explain what happens to the energy that is transferred from a producer all the way to a decomposer.

Only about 10 % energy gets transferred. Refer to Energy Pyramid on p. 32 figure 1.32

13. Match the vocabulary words in Column 1 with the choices in Column 2.

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| Column 1Vocabulary Words | Column 2Choices |
| 1. Competition |  | A. Equal number of births and deaths.  |
| 2. predation  |  | B. Maximum number of individual that can be supported by an ecosystem without affecting its ability to support future generations of the same species.  |
| 3. mimicry  |  | C. When one species benefits at the expense of another. |
| 4. symbiosis  |  | D. An environmental factor that prevents an increase in the number of organisms in a population. |
| 5. mutualism  |  | E. When one species benefits from the relationship with another species but without benefit or harm to the other species.  |
| 6. commensalism |  | F. Both species benefit from the relationship. |
| 7. parasitism  |  | G. An organism looks like its predator to avoid getting eaten. |
| 8. limiting factors |  | H. One organism eats another organism. |
| 9. carrying capacity |  | I. Close interaction between two species.  |
| 10. equilibrium  |  | J. Interaction between species fighting for the same resource |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. |
| J | H | G | I | F | E | C | D | B | A |

14. What caused the demise of Easter Island? Easter Island shows what can happen when resources are not used in a sustainable way.

The people in the island did not have long-term plan to use their resources wisely. They used up the resources way too fast which caused the population to crash because the island was no longer sustainable.

15. What could have been done differently to maintain a sustainable environment?

Have a plan on how to replenish resources before they are all used up.

16. Explain the diversity within a species and the importance to its survival.

The differences among individuals of the same species are called genetic differences or genetic diversity. Lack of genetic diversity in a population can be a real threat to its survival and can even lead to extinction. Genetic diversity allows some member a population better suited to fight disease or handle water shortage. For example: in a wolf pack some wolves may better able to resist certain diseases than other members, and some may be better than other at tolerating a lack of water.

 17. What impact does overexploitation of a resource have on an ecosystem?

Overexploitation of a resource means using a resource faster than it can be replaced. This disrupts the food chain and causes other populations to decrease. It can lead to extinction. For example over fishing caused 90 % of large fish were removed from the seas since the 1950s.

18. a) Name an invasive species found in Ontario: Dog-strangling vine

 b) How has its presence affected the native species?

They outcompete native species. Their populations rise, while native populations decrease. Also affects the Monarch butterfly 🡪 the larvae cannot survive on the dog-strangling wine.

19. Differentiate between point source pollution and non-point source pollution.

 Point source of pollution: enters a body of water at a specific place from an identifiable source. Eg. Oil Spills

 Non-point source of pollution: enters a body of water from an unidentified source. Eg. Rain and snow travel over land and picks up pollutants from different sources.

20. What is habitat fragmentation? Give an example.

 Habitat fragmentation is the alteration of small areas within a large region, creating a patchwork of altered and original habitats. For example: Southern-Ontario’s forests were fragmented for farms, roads, suburs, and cities.

21. Discuss the impact of global warming on the Earth’s temperature.

 Global warming is an increase in Earth’s average temperature, caused partly by an increase in carbon dioxide in the atmosphere. For example, the Arctic is warming faster than at any time in recorded history. The ice packs are shrinking and breaking up🡪species such as polar bears, seals are losing their habitat🡪their populations are declining.

22. How is the Great Pacific Garbage Patch affecting the aquatic ecosystem?

 -Plastic debris kills more than a million sea birds every year. For example: sea birds, sea turtles mistake bits of plastic for food items. Cigarette lighters, syringes, and toothbrushes are just some of the items that have been found in the stomachs of dead sea birds.

 -Plastic pieces can last for over 50 years in the ocean.

23. What effect does acid rain have on the ecosystem?

 -damages waxy coating on plants

 -burns skin of earthworm

 -soil becomes more acidic

 -destroys shells of shellfish

 -water becomes more acidic killing organisms in the water

24. Describe the importance of crop rotation.

If the same type of crop is grown in the same soil year after year, the nutrients in the soil gets used up and the crops no longer grow well in the soil. Crop rotation lets the soil replenish its nutrients. For example: farmers will plant wheat or corn one year, and then plant soybean or alfalfa in the same field the following year. This replenishes some of the nutrients in the soil, especially nitrogen.

25. Mercury, a heavy metal, entered an ecosystem after a tanker truck crashed into a guardrail. Ecologists have been monitoring the organisms in the ecosystem and have noticed that the top consumers (owls and foxes) have very large concentrations of mercury in their systems. Using the correct terminology, explain why this has happened.

 Mercury in the atmosphere usually settles in water. Algae absorb very tiny amounts of mercury from water. Over time, mercury builds up in their tissues. The gradual build-up of a substance in an organism’s body is called bioaccumulation. This is not the end. The contaminated algae are consumed by zooplankton, and the mercury bioaccumulates in their tissues.

 In a process called biomagnification, the mercury becomes more and more concentrated in each link in the food chain as one animal eats many contaminated animals. For example: many predatory fish, including some salmon and trout, have levels of mercury high enough to be toxic if they are eaten by humans and other animals.

26. A farm that uses large volumes of fertilizer to increase crop yields is situated beside a lake. What could happen to the lake if the fertilizer ran off into the lake without first being treated?

 Eutrophication could occur as the amount of algae increases. As the algae dies and decomposes, a lot of oxygen is removed from the water. Many aquatic organisms die as a result.

27. What are some conservation strategies in place to protect biodiversity?

-allow populations to replenish

-plant vegetation where it is scarce

-create/maintain wildlife reserves and parks

-International treaties. A treaty is an agreement, usually between nations, in which they agree to do certain things to achieve a common goal. For example: The Convention on Biological Diversity has been signed by 161 countries, including Canada. The goals: protect species in human-made environments such as zoos; protect species in their native habitats.

28. Explain the significance of an environmental steward.

 Being and environmental steward means taking care of our natural resources to ensure that they are used in sustainable ways for current and future generations.

 -Reduce, reuse and recycle

 -Conserving existing ecosystem

 -Restoring damaged ecosystem

 To be successful, environmental stewardship requires governments, organizations, and communities to work to prevent or reduce threats to ecosystems

29. List two benefits from using sustainable building construction methods.

 -reduces different types of pollution

 -reduces water consumption

 -uses renewable energy sources

 -incorporate daylight