Ecology review

LIVING WORLD

LIVING WORLD

Biodiversity

*I understand and can use the definition of **biodiversity of a community** as **'the relative abundance of species it comprises'***

Explanation of Concept:

The number of species varies from one community to another. To determine the variety of a community, the distribution of the number and types of species are studied. The relative abundance of species that it comprises refers to a community's biodiversity.

Questions:

Short Answer:

1. Which of the following communities demonstrates the greatest biodiversity? Explain your answer.

   a) 50 bears, 100 hares and 60 beavers live in a forest in the Abitibi region. Fir (25) and birch (15) are the tree species.

   b) Sparrows and thrushes frequently visit my small urban back yard. The birds feasted on the grapes from a vine.

   c) 4 bears, 30 hares and 7 beavers live in a forest in the Laurentian region. Fir (5) and birch (7) are the tree species.

Answers:

1. *C*
2. *Community A has greater biodiversity. Each tree species is more evenly distributed.*

Biodiversity

I would be able to explain and interpret factors that affect the biodiversity of a given community

Explanation of Concept:

Biodiversity describes the variety of species living in a community.

A community's biodiversity depends on: species richness (number of species) and the relative abundance of species that it comprises (the more evenly distributed, the better).

Example:

		Community A	Community B
Relative Abundance	Daisies	6 %	12.5 %
	Roses	16 %	37.5 %
	carnations	52 %	12.5 %
	sunflowers	26 %	37.5 %
Species Richness		Low	High

Questions:

Multiple Choice:

1. Which statement is true about biodiversity?
   a) The biodiversity of a community is high when all species in the community are equally distributed.
   b) The biodiversity of a community is low when all species in the community are equally distributed.
   c) The biodiversity of a community is high when the number of species is low.
   d) The biodiversity of a community is low when the number of species is high.

Short Answer:

2. Park A has 10 pine trees, 8 fir trees, and 12 birch trees. Park B has 5 pine trees, 24 fir trees and 1 birch tree. Using the relative abundance of each park, determine which park has greater biodiversity.

Answers:

1. *A*
2. *Park A has greater biodiversity. Each tree species is more evenly distributed.*

	Park A	Park B
Pine Trees	33 %	17 %
Fir Trees	27 %	80 %
Birch Trees	40 %	3 %

Disturbances

*I understand and can use the definition of a **disturbance in a community***

Explanation of Concept:

An ecosystem can undergo a series of events that could lead to an alteration in the pre-existing biotic of abiotic factors. This in turn could lead to change in the relative abundance of species in that ecosystem. In such an event the ecosystem would be described as having been **disturbed.**

Questions:

Multiple Choice:

1. Which of the following events would lead to the disturbance of an ecosystem?
   a) Planting trees
   b) Mud slide
   c) Composting
   d) Fog

Short Answer:

2. Apply your understanding of the definition of a disturbance to explain how the construction of a hydroelectric dam is detrimental to an ecosystem.

Answers:

1. *B*
2. *Ecosystems are often affected by the construction of dams because the need to flood the land to control the flow, level, etc of water. In this process of flooding many habitats are destroyed and contaminants dissolved in the water may be toxic. In addition, to build a hydroelectric dam, forests must be cleared for the construction of the power plant. This in turn destroys more habitats.*

Disturbances

I would be able to explain and interpret how certain factors can disturb the ecological balance of a community (e.g. human activity, natural disasters)

Explanation of Concept:

The impact of a disturbance is dependant on the type of disturbance, and how often the disturbance occurs.

Types of disturbances:

Natural	Human
A natural disturbance is an event triggered by environmental phenomena that can damage an ecosystem. Examples: Earthquakes, volcanic eruptions, floods, droughts, forest fires, storms	Human activity can/ severely effect the environment. Human disturbances are a major source of environmental damage to ecosystems. Examples: Oil spills, mining, logging operations, construction of hydroelectric dams, large scale burning fossil fuels

Questions:

Multiple Choice:

1. Which of the following statements is false?
   a) Drought is a natural disturbance.
   b) An oil spill is a natural disturbance.
   c) Flood from heavy rain is a natural disturbance.
   d) The fishing industry is a human disturbance.

2. Which is an example of a human disturbance?

a) 
b) 
c) 
d) 

Short Answer:

3. Which is a major source of environmental disturbance, natural or human? Explain your answer.

Answers:

1. *B*
2. *B*
3. *Humans are a major source of environmental disturbances. Humans have a damaging effect on ecosystems, whether small or large scale, more frequently (a daily occurrence compared to a more random occurrence of natural disturbances).*

Trophic Relationships

I understand and can describe the trophic levels (producers, autotrophs), consumers (heterotrophs), and decomposers in an ecosystem.

Explanation of Concept:

Living organisms need energy. Organisms at the same position in a food chain are known as a ***trophic level***. Organisms in various trophic levels interact with each other which results in ***trophic relationships***.

Producers:
- Convert inorganic matter (carbon dioxide, water) into organic matter (glucose) through photosynthesis;
- are ***autotrophs***;
- They introduce energy and matter to ecosystems.
- E.g. Plants, Algae, etc.

Consumers:
- These are organisms that get their energy by eating other living organisms.
- They are also known as ***Heterotrophs*** because they cannot make their own food;
- Primary consumers or First-Order Consumers consume producers.
- Second, Third or Fourth level consumers are usually carnivores as they consume animals that precede them in a food chain. Some animals are also omnivores as they eat both plants and animals.

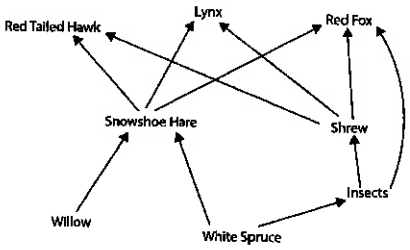
Decomposers:
- Convert organic matter into inorganic matter
- Are connected to all trophic levels.
- They feed off of dead organic matter like leaves and carcasses.
- They are ***heterotrophs***.
- E.g. Worms, bacteria, insects, etc.

Questions:

Multiple Choice:

A food web is shown below.

Food Web



1. Based on the diagram, which organism can be classified as a Primary Consumer?

   a) Red Tailed Hawk
   b) Shrew
   c) Willow
   d) Snowshoe Hare

2. Based on the diagram, which organisms act both as a secondary and tertiary consumer depending on the individual food chain they are involved in?
   a) Shrew and Red Fox
   b) Lynx and Red Fox
   c) Lynx and Snowshoe Hare
   d) Red Tailed Hawk and Insects

Short Answer Questions:

1. Create a Food chain using the following organisms and label each organism based on its trophic level.

   Owl – Frog - Grass - Snake – Grasshopper - Bacteria

2. Using the Food web provided in questions 1 and 2 of the multiple choice questions indicate an example of a producer. Explain why producers can also be called autotrophs.

Answers:
Multiple Choice:
1. D
2. B

Short Answer Questions:
1. *Producer: Grass, Primary Consumer: Grasshopper, Secondary Consumer: Frog, Tertiary Consumer: Snake, Fourth-Level Consumer: Owl, Decomposer: Bacteria (This level is linked to all levels of this food chain as it is responsible for the decomposition of the dead organic matter).*
2. *Example of a Producer: Willow or White Spruce*
   Producers are called autotrophs because they can produce their own food using the sunlight, water and Carbon Dioxide. They are therefore, self sufficient and are considered to be the first level in the food chain because they are the first organisms to introduce food into the ecosystem.

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Trophic Relationships

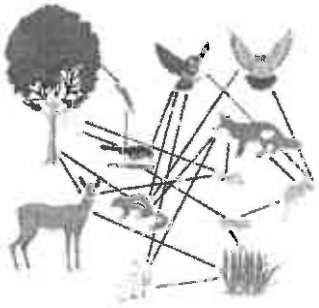
I would be able to explain and interpret the relationships between the trophic levels of a food web.

Explanation of Concept:

Producers, Consumers and Decomposers can be arranged in a FOOD CHAIN. Several Food Chains can be interconnected and combined to form a FOOD WEB.

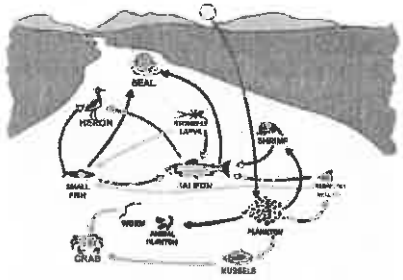
The direction of the arrows in a food web indicates the direction of energy flow (The energy of the eaten organism).

A disturbance at any point of the Food Web will produce other effects/inbalances in the Food web and lower trophic level.



Questions:

Multiple Choice:



1. Using the food web above, indicate which of the statements below is true:

   a) If the shrimp were to decrease in number, the salmon would die off because it is the only source of food available for them.
   b) The crab has no predators.
   c) Small fish consume salmon.
   d) The increase of plankton would be devastating to this food web because it would consume many of the organisms at the lower trophic levels.

2. The Sun is linked to the plankton because:
   a) Plankton gives the Sun energy.
   b) Plankton uses the Sun's energy to grow.
   c) The Sun does not affect the Plankton.
   d) The Sun is considered an organism.

Answers:
Multiple Choice:
1. B
2. B