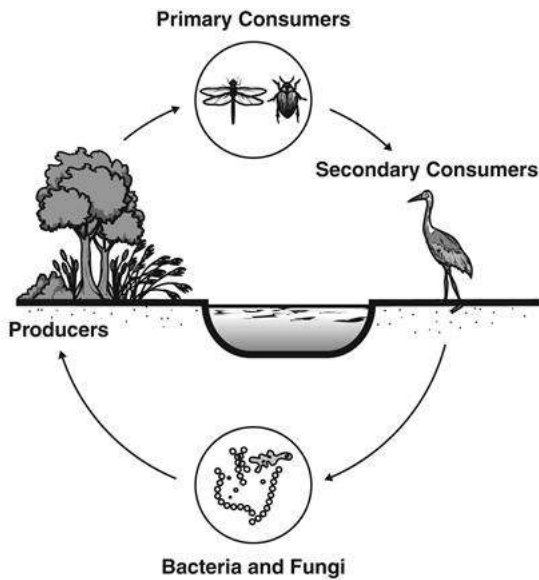


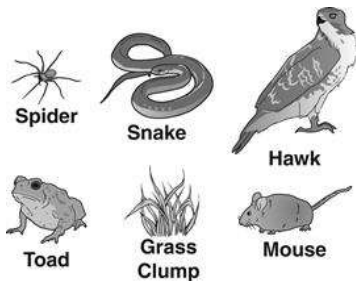
Ecology Benchmark Study Guide April 2013

1. The diagram shows components of a natural wetland habitat.



Which process is best demonstrated by this diagram?

- In an ecosystem, not all of the energy that is available is used by the organisms. Some energy becomes unavailable before it can be transferred to organisms in the next trophic level. How does the energy most likely become unavailable?
- Construct a diagram that best describes the way energy would transfer up through the levels of this food chain. Start with a producer that provides 1000 J of energy and. Then place the consumers in order with the correct amount of available energy at each level.
- The organisms shown live in the same habitat.

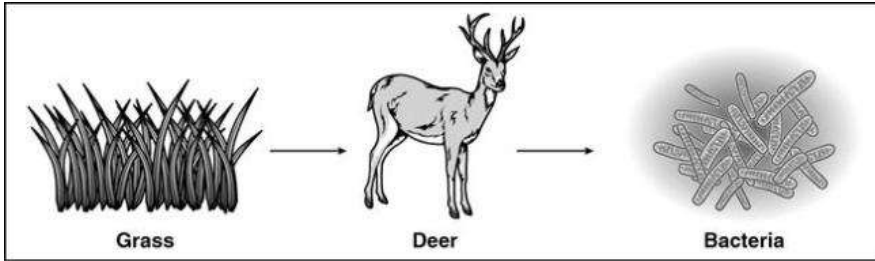


Describe the exchange of energy between the organisms.

- Which type of organism is at the lowest level of the food chain?
- In an energy pyramid, the total energy available for consumption from one trophic level to the next one above it is _____.
- In the interaction between plants and animals, plants provide animals with _____ and animals provide plants with _____.
- What is the initial source of energy for most ecosystems?
- Most of the atmosphere is made up of nitrogen. However, plants must rely on what type of organism to supply most of their nitrogen requirements?
- In natural settings, dead trees remain on the forest floor until decomposed by various

organisms. Which of the following statements *best* explains how dead trees are important to an area?

11. At which level of an energy pyramid is the least amount of energy available?
12. Food webs are used to model _____ within ecosystems.
13. A simple food chain is shown. Label the organisms according to their feeding levels.

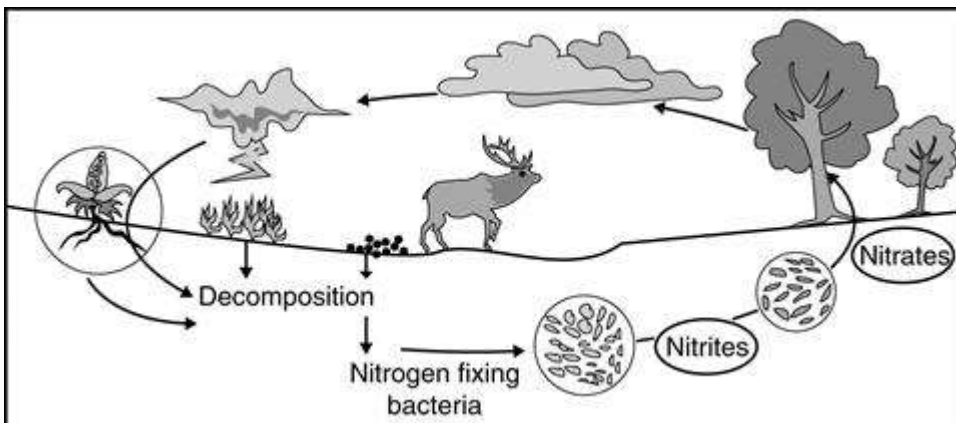


14. Energy is transferred from organism to organism in a food web. What populations of organisms provide the greatest amount of energy as a food source?
15. The arrows in food chains and food webs show the direction of the flow of _____.
16. Which are two processes involved with the carbon cycle?
17. Why does the top of a food pyramid always contain less biomass than the bottom of a food pyramid?
18. Producers are responsible for releasing which gas into the atmosphere?
19. The diagram shows some organisms in an Antarctic food chain.

Sun → Algae → Krill → Cod → Seal → Whale

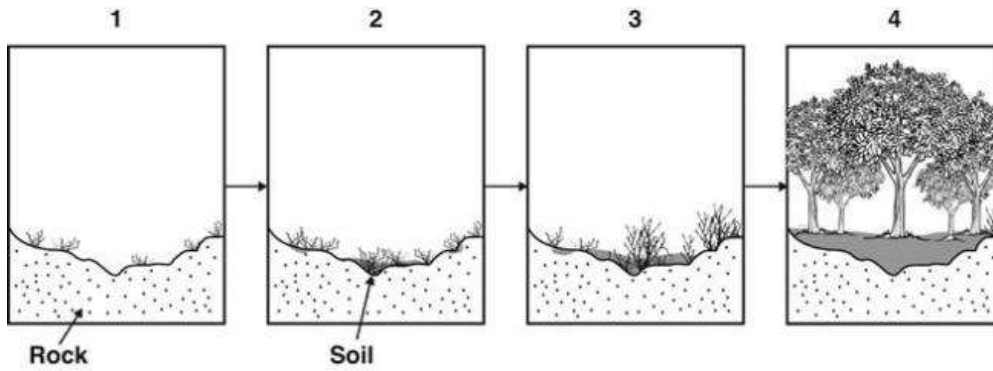
What is the role of krill in this food chain?

20. Matter cycles between the environment and living organisms in a complex web of interactions. Which organisms provide the important link from dead organic matter to matter from the environment?
21. The nitrogen cycle is shown below.

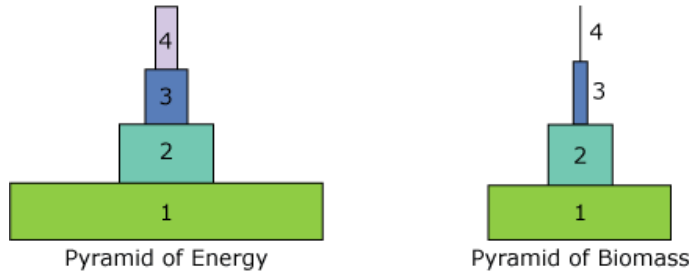


If the nitrogen-fixing bacteria were destroyed by a virus, the most likely result would be _____.

22. The series of diagrams shown represents ecological succession. Compare diagrams 1 and 4. Which is a pioneer community? Which is a climax community?

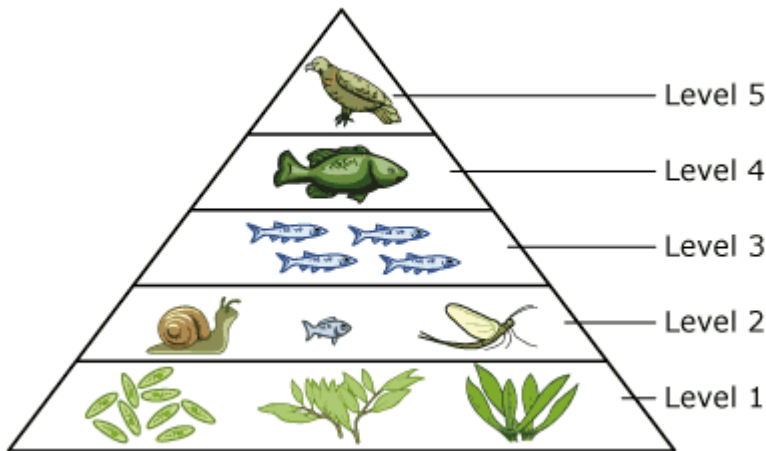


23. The following drawings show pyramids of both energy and biomass.



In a grassland, what organism is most likely to be in position 2 in these pyramids?

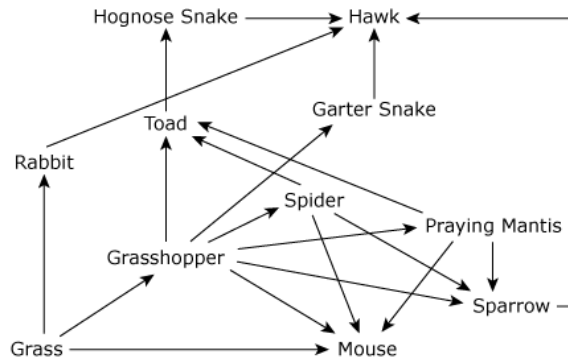
24. The diagram below shows an energy pyramid.



Some energy is lost as it is transferred from one level of the pyramid to the next. At what level will the total amount of usable chemical energy be approximately 10% of the amount found at Level 1?

25. The organisms that comprise the bottom layer of an energy pyramid MUST be _____.

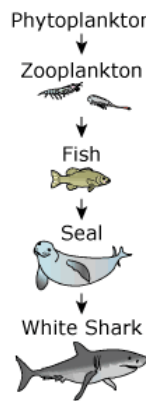
26. The diagram below shows a food web.



A town in Tennessee observes an increase in the praying mantis population during a certain year. Based on the diagram, how would you best explain this phenomenon?

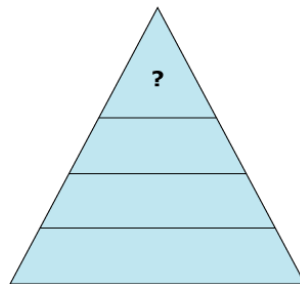
27. The drawing below shows an ocean food chain.

Ocean Food Chain



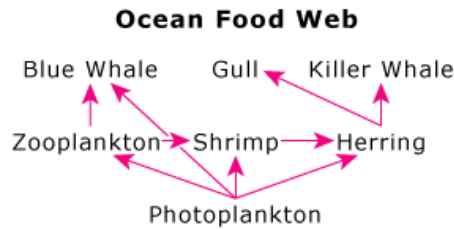
A student wants to use this food chain to draw an energy pyramid. The pyramid levels will be assigned numerically, with 1 at the bottom, 5 at the top, and levels 2, 3, and 4 in the middle. Correctly assign these ocean animals to their levels in an energy pyramid.

28. The diagram below shows an energy pyramid.



One level is marked with a question mark. Describe an organism that would be correctly assigned to this level.

29. The diagram represents an ocean food web.



Which of these organisms is not an omnivore?

30. Which of the following contains the greatest amount of stored energy in a forest ecosystem?
31. Why is a food web a more realistic representation of nutritional patterns than a food chain?
32. In the wild, wolves hunt moose for food. The relationship between the wolf and the moose is a form of _____.
33. The role of each organism in its environment is described as the organism's _____.
34. Which situation tends to allow a population to grow?
35. When members of the same species of bird eat the same food, what would happen if there was a lack of rain?
36. What happens when a population grows larger than the carrying capacity of its environment?
37. Provide an example of symbiosis.
38. Provide an example of mutualism.
39. Provide an example of commensalism.
40. Provide an example of parasitism.
41. Draw and explain the logistic growth curve.
42. A volcano erupted, covering the plant life in the area with lava. Over time, pioneer plants began growing on the lava rock. Which term describes the new growth?
43. After mining removes layers of rock from a hillside, new plants begin to grow in the cracks of the bare rock. The plants beginning to grow are an example of which type of succession?
44. When a plowed field is abandoned, a new habitat becomes available to be colonized by plants and animals. What would be the first plants to emerge after the plowing?
45. This food chain shows the interactions between organisms.

grass → mouse → snake → hawk

Which organism would be affected first if grass was removed from the ecosystem?

46. Cameron's family traveled frequently by road. On a trip he noticed that a large forest area appeared to have burned a few weeks ago. Along the burned area, new pine trees were sprouting. Their cones release seeds when heated. How will this affect the future vegetation of the forest?
47. What do tropical rainforests and savannas have in common?
48. Tundra biomes are found in the northern polar region. The ground is frozen from deep underground nearly to the surface. The thin layer of soil allows only small plants with shallow roots to grow. However, it is believed that global warming might cause tundra ground to thaw to a greater depth, allowing larger plants to grow. If this occurs, animal populations in the tundra could be expected to increase. Explain why animal populations could increase.
49. Draw an exponential growth curve and explain the conditions under which a population would experience exponential growth.
50. A short plant with a thick, fleshy stem, deep and extensive roots, and a short blooming period would most likely be found in which environment?
51. The Arctic tundra is covered by a thick frozen layer called permafrost. The surface of the ground thaws during the summer in which a few microorganisms and some plants with shallow

roots are able to survive. Which factor most limits the diversity of life in the Arctic tundra during the summer?

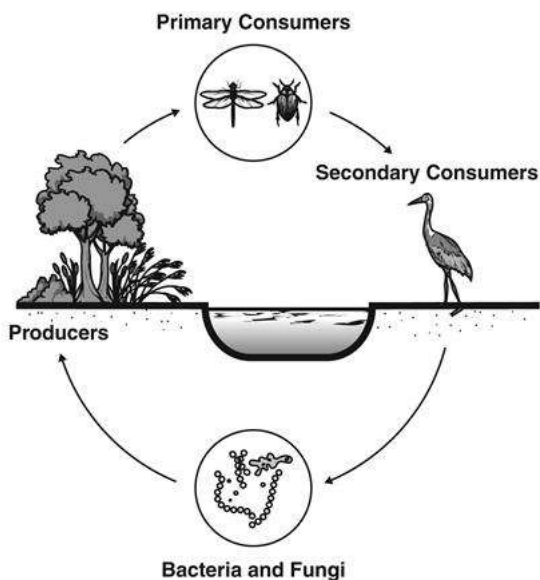
52. In Georgia, the majority of trees drop their leaves when days get shorter and cooler. Georgia is part of what biome?

53. Which biome is characterized by long winters, precipitation in the form of snowfall, and is dominated by coniferous trees?

54. Which biome is characterized as having warm temperatures year round, brightly colored and vocal animals, and contains the world's greatest biodiversity?

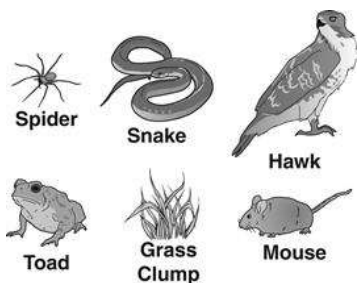
KEY: Ecology Benchmark Study Guide April 2013

1. The diagram shows components of a natural wetland habitat.



Which process is best demonstrated by this diagram? Energy flow

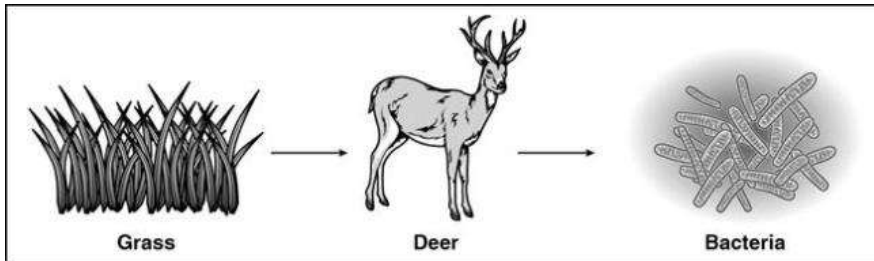
- In an ecosystem, not all of the energy that is available is used by the organisms. Some energy becomes unavailable before it can be transferred to organisms in the next trophic level. How does the energy most likely become unavailable? The energy is lost as heat.
- Construct a diagram that best describes the way energy would transfer up through the levels of this food chain. Start with a producer that provides 1000 J of energy and. Then place the consumers in order with the correct amount of available energy at each level.
- The organisms shown live in the same habitat.



Describe the exchange of energy between the organisms. One organism obtains energy from the environment, while the others obtain energy by eating other organisms.

- Which type of organism is at the lowest level of the food chain? autotroph
- In an energy pyramid, the total energy available for consumption from one trophic level to the next one above it is reduced.
- In the interaction between plants and animals, plants provide animals with oxygen and animals provide plants with CO₂.
- What is the initial source of energy for most ecosystems? sunlight
- Most of the atmosphere is made up of nitrogen. However, plants must rely on what type of organism to supply most of their nitrogen requirements? bacteria
- In natural settings, dead trees remain on the forest floor until decomposed by various organisms. Which of the following statements *best* explains how dead trees are important to an area? They decompose to make rich soil.
- At which level of an energy pyramid is the least amount of energy available? The top level

12. Food webs are used to model energy flow within ecosystems.
13. A simple food chain is shown. Label the organisms according to their feeding levels.

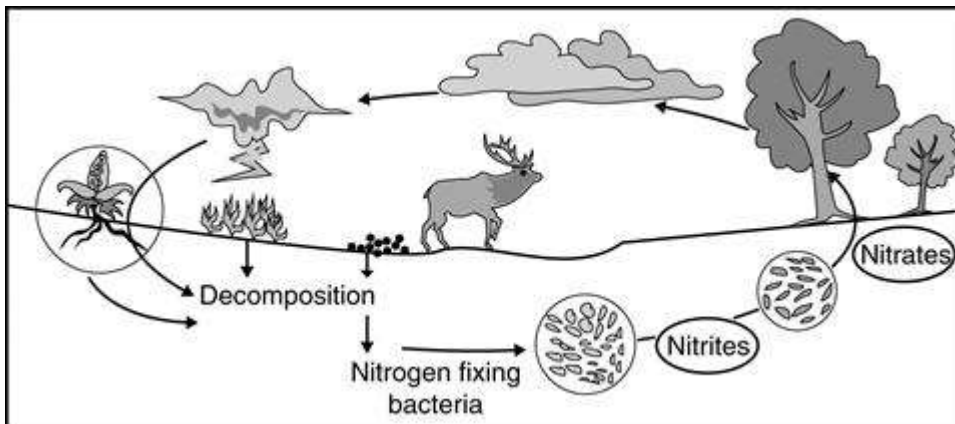


14. Energy is transferred from organism to organism in a food web. What populations of organisms provide the greatest amount of energy as a food source? producers
15. The arrows in food chains and food webs show the direction of the flow of energy.
16. Which are two processes involved with the carbon cycle? Photosynthesis and respiration
17. Why does the top of a food pyramid always contains less biomass than the bottom of a food pyramid? Energy is lost as heat as it passes through the food pyramid
18. Producers are responsible for releasing which gas into the atmosphere? oxygen
19. The diagram shows some organisms in an Antarctic food chain.

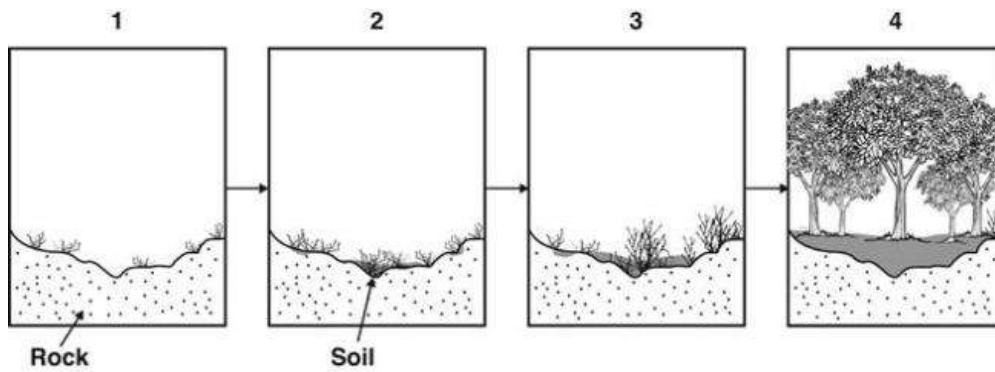
Sun → Algae → Krill → Cod → Seal → Whale

What is the role of krill in this food chain? Primary consumer

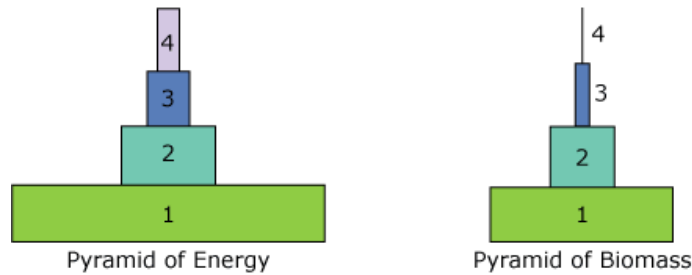
20. Matter cycles between the environment and living organisms in a complex web of interactions. Which organisms provide the important link from dead organic matter to matter from the environment? decomposers
21. The nitrogen cycle is shown below.



- If the nitrogen-fixing bacteria were destroyed by a virus, the most likely result would be a decrease in nitrogen compounds available to organisms.
22. The series of diagrams shown represents ecological succession. Compare diagrams 1 and 4. Which is a pioneer community? Which is a climax community?

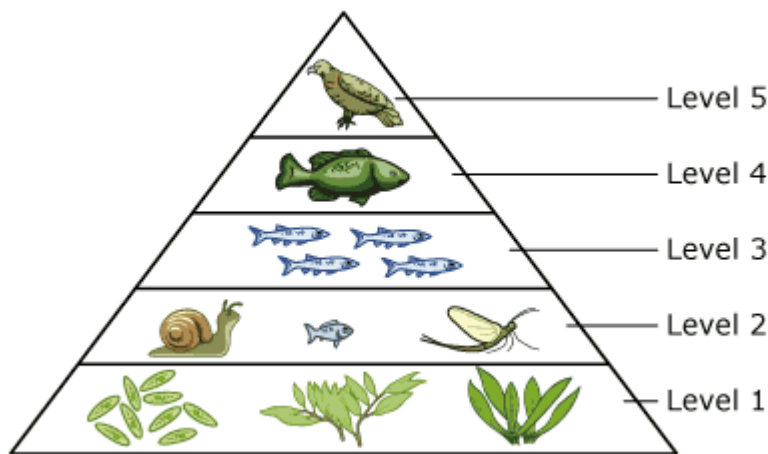


23. The following drawings show pyramids of both energy and biomass.



In a grassland, which organism is most likely to be in position 2 in these pyramids? bison

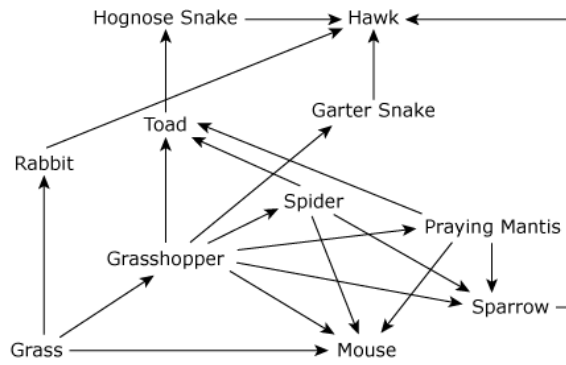
24. The diagram below shows an energy pyramid.



Some energy is lost as it is transferred from one level of the pyramid to the next. At what level will the total amount of usable chemical energy be approximately 10% of the amount found at Level 1? 2

25. The organisms that comprise the bottom layer of an energy pyramid MUST be photosynthetic.

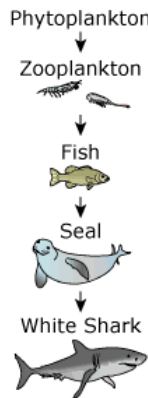
26. The diagram below shows a food web.



A town in Tennessee observes an increase in the praying mantis population during a certain year. Based on the diagram, how would you best explain this phenomenon? There was a decline in the number of toads.

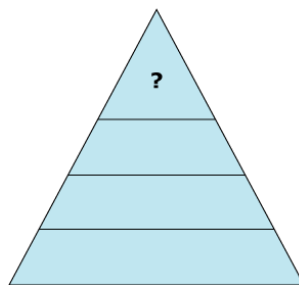
27. The drawing below shows an ocean food chain.

Ocean Food Chain



A student wants to use this food chain to draw an energy pyramid. The pyramid levels will be assigned numerically, with 1 at the bottom, 5 at the top, and levels 2, 3, and 4 in the middle. Correctly assign these ocean animals to their levels in an energy pyramid. Phytoplankton 1; zooplankton 2, fish 3; seal 4; white shark 5

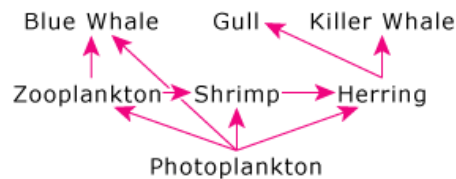
28. The diagram below shows an energy pyramid.



One level is marked with a question mark. Describe an organism that would be correctly assigned to this level. A hawk that eats the mice that eat grasshoppers

29. The diagram represents an ocean food web.

Ocean Food Web



Which of these organisms is not an omnivore? Gull

30. Which of the following contains the greatest amount of stored energy in a forest ecosystem?

Primary producer

31. Why is a food web a more realistic representation of nutritional patterns than a food chain?

Species usually are consumed by or feed on more than one species.

32. In the wild, wolves hunt moose for food. The relationship between the wolf and the moose is a form of predation.

33. The role of each organism in its environment is described as the organism's niche.

34. Which situation tends to allow a population to grow? increase in the carrying capacity

35. When members of the same species of bird eat the same food, what would happen if there was a lack of rain? competition for resources

36. What happens when a population grows larger than the carrying capacity of its environment?

The death rate will increase.

37. Provide an example of symbiosis. a tick feeding on a deer

38. Provide an example of mutualism. A bird eats blood-sucking parasites off of mammals.

39. Provide an example of commensalism. The shark and remora have a relationship that benefits the remora but neither helps nor harms the shark.

40. Provide an example of parasitism. Hookworms live inside the intestines of dogs. As the dog eats, the hookworms consume partially digested food. As a result of this nutrient diversion, the dog can become malnourished and weakened.

41. Draw and explain the logistic growth curve. population has used up available resources in its environment

42. A volcano erupted, covering the plant life in the area with lava. Over time, pioneer plants began growing on the lava rock. Which term describes the new growth? succession

43. After mining removes layers of rock from a hillside, new plants begin to grow in the cracks of the bare rock. The plants beginning to grow are an example of which type of succession?

primary

44. When a plowed field is abandoned, a new habitat becomes available to be colonized by plants and animals. What would be the first plants to emerge after the plowing? grasses

45. This food chain shows the interactions between organisms.

grass → mouse → snake → hawk

Which organism would be affected first if grass was removed from the ecosystem? mouse

46. Cameron's family traveled frequently by road. On a trip he noticed that a large forest area appeared to have burned a few weeks ago. Along the burned area, new pine trees were sprouting. Their cones release seeds when heated. How will this affect the future vegetation of the forest? The trees will grow and the forest will be restored to its original form

47. What do tropical rainforests and savannas have in common? latitude

48. Tundra biomes are found in the northern polar region. The ground is frozen from deep underground nearly to the surface. The thin layer of soil allows only small plants with shallow roots to grow. However, it is believed that global warming might cause tundra ground to thaw

to a greater depth, allowing larger plants to grow. If this occurs, animal populations in the tundra could be expected to increase. Explain why animal populations could increase. A limiting factor would become more available.

49. Draw an exponential growth curve and explain the conditions under which a population would experience exponential growth. The population has experienced unlimited resources
50. A short plant with a thick, fleshy stem, deep and extensive roots, and a short blooming period would most likely be found in which environment? desert
51. The Arctic tundra is covered by a thick frozen layer called permafrost. The surface of the ground thaws during the summer in which a few microorganisms and some plants with shallow roots are able to survive. Which factor most limits the diversity of life in the Arctic tundra during the summer? the amount of fertile soil
52. In Georgia, the majority of trees drop their leaves when days get shorter and cooler. Georgia is part of what biome? Deciduous forest
53. Which biome is characterized by long winters, precipitation in the form of snowfall, and is dominated by coniferous trees? Taiga
54. Which biome is characterized as having warm temperatures year round, brightly colored and vocal animals, and contains the world's greatest biodiversity? Rain forest