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It’s A Plankton Eat Plankton World: Interpreting Food Chains & Webs

Inside a drop of water that you might collect from a stream, river, lake or ocean are tiny organisms. These tiny and sometimes not so small living things are called plankton.

What role do plankton play in aquatic food webs? What do plankton eat, and what uses plankton as a food source? There are 2 different types of plankton, phytoplankton and zooplankton.

All other life in the ocean needs **phytoplankton** to survive. Phytoplankton get their energy directly from the sun using photosynthesis, just like plants. **Zooplankton** then feed on phytoplankton, and are then eaten by larger zooplankton, fish, larger fish, and so on. Plankton are at the base of a complex aquatic food web.

**Marine Food Web**:

Use the marine food web below to answer the questions that follow.

**small fish**



**phytoplankton**





**zooplankton**

**sea turtle**

**large fish**





**jelly fish**



**shellfish**

**sea bird**





**sea lion**

**shark**

**baleen whale**

**toothed whale**

1. How would the jellyfish population be affected if sea turtles were removed?

2. Why do we use arrows when creating a food web? What do they represent?

3. If the phytoplankton population increases, what will be the effect on the population size of zooplankton? Small fish? Sea lions? Baleen whales? Explain why using the movement of energy in your explanation.

Effect on zooplankton:

Effect on small fish:

Effect on sea lions:

Effect on baleen whales:

4. If the phytoplankton population decreases, what will be the effect on the population size of zooplankton? Small fish? Jellyfish? Sharks?

Effect on zooplankton:

Effect on small fish:

Effect on jellyfish:

Effect on sharks:

5. If an oil spill killed a large population of small fish, how would that effect the phytoplankton population? Sea lions? Sharks? Explain.

Effect on phytoplankton:

Effect on sea lions:

Effect on sharks:

6. How many trophic levels are represented in this food web? Why are trophic levels usually limited to no more than 4 or 5 levels?

7. Using the food web, construct 2 food chains. You do NOT have to draw them, just use the names of the organisms. Be sure your arrows are pointing in the correct direction.

a.

b.

**Terrestrial Food Web**:

Use the food web below to answer the questions that follow.



1. What producers are shown in the food web?

2. What consumers are shown in the food web?

3. Are there any decomposers in the food web? If yes, which organisms?

4. Imagine that a landscaper was frustrated by caterpillars eating the grass of the lawns that he cared for. The landscaper decided to use a pesticide (a chemical that destroys pests) and successfully killed all of the caterpillars in the ecosystem. What organisms would be effected by the removal of caterpillars in the food web? Explain.

5. Although DDT (a pesticide) was banned more than 40 years ago, toxins from the pesticide continue to affect bird populations by weakening their egg shells. Based on this food web, if the population of birds continues to decline, what organism would be the first that is affected by experiencing a decline in its population? Which would increase first? Explain.

First to decline:

First to increase:

6. Rabbit populations can grow exponentially until limiting factors decrease their population size. What is one example of an organism that has a significant impact on controlling the population size of the rabbit? Explain.

7. If an herbicide was applied that killed the grass, how would this effect the population of foxes? The bird? The mouse? Explain.

Effect on foxes:

Effect on bird:

Effect on mice:

8. If a farmer stopped planting corn and replaced his field with grass, what effect would that have on the rabbit population? Mouse population? Explain.

Effect on rabbits:

Effect on mice:

**Pond Food Web**:

Use the food web below to answer the questions that follow.



1. On the food web above identify the consumers by using the following: put the letter **O** next to each organism that is an omnivore, put a **C** next to each carnivore, and an **H** next to each herbivore.

2. What would happen to the limpet population if the mussels were to die out due to a disease?

3. How would zooplankton be affected if the fish population were to increase?

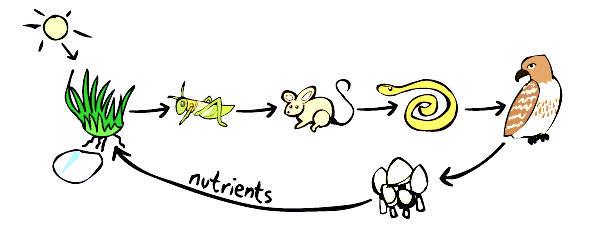
4. How would the whelk population be affected if crabs were removed?

5. To limit the population size of mosquitos, scientists suggest reducing the carrying capacity (max # of organisms area can hold) by removing standstill water in containers around the home. If the carrying capacity was reduced in this pond by removing 2 of the food sources for the mosquitos (specifically phytoplankton and bacteria), how would this change affect the population of algae? Explain.

6. An invasive species (brought by humans accidentally or purposefully from other places- they destroy ecosystems) was introduced into this pond that outcompeted crayfish for access to zooplankton, worms, snails, and insects. Due to the lack of natural predators, the invasive species increases exponentially (individuals in a population reproduce at a constant rate). How would this invasive species affect the phytoplankton population? Explain.

**Simple Food Chain**:

Use the food chain below to answer the questions that follow.



1. A hawk is a top predator. When it dies, a fungus, like the mushrooms above serve an important role in regards to the remains of the hawk. What role does the fungus play in the ecosystem food chain? Explain.

2. In an ecological pyramid, the population of organisms decreases as you move up each trophic level. Using the food chain above, explain how much energy is available to the tertiary level consumers if the producers contain 100 kcal of energy.