

Plankton Identification Activity

Teacher Edition

Overview:

This experiment allows students to gain tactile and visual experience with aquatic organisms and helps them understand the importance of the lowest trophic level. Students will collect plankton using a tow net and learn about the different types of plankton, trophic levels, and the importance of the different levels of food webs.

Background:

Plankton are microscopic organisms that are carried by the movement of water. Plankton are typically microscopic, but some are larger. There are two main types of plankton: phytoplankton and zooplankton. In simple terms, phytoplankton are plants and zooplankton are animals.

Phytoplankton are primary producers. Examples of phytoplankton include dinoflagellates, diatoms, green algae, and cyanobacteria (*Plankton: Small Organisms With a Big Role in the Ocean*, 2019). They use photosynthesis to convert sunlight into energy. This means they are found near the surface where they can access sunlight (*What Are Plankton?*, n.d.). As primary producers, they sit at the base of aquatic food chains and webs, producing energy and eventually being consumed by primary consumers. Some examples of primary consumers that consume phytoplankton are zooplankton and young small fish.

Zooplankton are primary consumers. They include microscopic organisms, young fish, and other weak swimming organisms. Krill, the food of choice for most filter feeding large whales, are an example of zooplankton (*What Are Plankton?*, n.d.). Because zooplankton consume other organisms and do not produce their own energy, they do not spend all their time at the surface like phytoplankton. They do surface at night to consume phytoplankton, but then return to a lower depth during the day to avoid predators (*What Are Plankton?*, n.d.). There are two main types of zooplankton: holoplankton and meroplankton. Holoplankton remain microscopic plankton for their whole lives. Meroplankton are only temporarily planktonic and eventually grow, such as fish (*Plankton: Small Organisms With a Big Role in the Ocean*, 2019).

Phytoplankton and zooplankton belong to different trophic levels, but both are important. Phytoplankton, which are the primary producers, are responsible for producing the energy that moves through food webs. Without primary producers such as phytoplankton, there would be no energy source for any of the other trophic levels. Zooplankton also play an important role in the ecosystem. As primary consumers, they help to transfer energy in a food web. All of the levels of a trophic pyramid help to keep each other in check. Without primary consumers, there would be no food for secondary consumers, which in turn means no food source for tertiary consumers and a collapse in the system. With too many primary consumers, primary producers are

consumed too quickly and the primary consumers deplete their food source, which also leads to collapse in the system. Each trophic level plays an important role in an ecosystem, and a change in one can disturb the balance of the entire system and result in collapse.

Materials:

- Plankton net and collection bottle(s)
- Compound microscope(s)
- Microscope slides
- Transfer pipette
- Student packet (one per student)
- Plankton ID guides (one per student)

Teacher Prep

1. Allow students to play TinySea and explore the TinySea website. Give special attention to the vocabulary section.
2. Students should have a basic understanding of trophic levels and food webs.
3. Print student packets (one per student) and provide a plankton identification sheet(one per student).
 - a. Click [here](#) for a plankton ID guide.

Directions

At the water:

1. Attach the collection bottle to the end of the plankton tow net.
2. Tow the plankton net by hand in a natural body of water. The net should travel across the surface of water. The fine mesh strains plankton into the bottle at the end of the net.
3. Remove the collection bottle from the net and cover the bottle.
4. Bring the collection bottle back to the classroom. Be sure to not let the water get too warm, as it can kill the plankton.

In the classroom:

5. Use the pipette to transfer specimens to microscope slides. If necessary, dump the contents of the collection bottle into a flatter tray to be able to see some of the plankton in the water.
6. Place the microscope slides in a microscope and look at your plankton.
7. Using the Plankton Identification Sheet, identify what you found and draw three different organisms.

Questions with answers

1. Based on where you are towing the net (at the surface of a natural body of water), would you expect to see phytoplankton or zooplankton? **Phytoplankton**

2. Would the types of organisms you expect to see change if you did this activity at night? Why? **You might see more zooplankton because they surface at night**
3. Why are plankton important to food webs and food chains? **Phytoplankton are primary producers, which is the base of the food chain. They provide the primary food source. Zooplankton are consumers, which are important in keeping a balanced ecosystem.**
4. Draw three plankton you observed and identify them. **Answers vary.**

References

Plankton: Small Organisms with a Big Role in the Ocean. (2019, August 9). Ocean

Conservancy. Retrieved January 25, 2023, from

<https://oceanconservancy.org/blog/2019/08/09/plankton-small-organism-big-role/>

What are plankton? (n.d.). NOAA's National Ocean Service. Retrieved January 25, 2023, from

<https://oceanservice.noaa.gov/facts/plankton.html>

Plankton Identification Activity

Student Packet

Name: _____

Overview:

This experiment allows students to gain tactile and visual experience with aquatic organisms and helps them understand the importance of the lowest trophic level. Students will collect plankton using a tow net and learn about the different types of plankton, trophic levels, and the importance of the different levels of food webs.

Background:

Plankton are microscopic organisms that are carried by the movement of water. Plankton are typically microscopic, but some are larger. There are two main types of plankton: phytoplankton and zooplankton. In simple terms, phytoplankton are plants and zooplankton are animals.

Phytoplankton are primary producers. Examples of phytoplankton include dinoflagellates, diatoms, green algae, and cyanobacteria (*Plankton: Small Organisms With a Big Role in the Ocean*, 2019). They use photosynthesis to convert sunlight into energy. This means they are found near the surface where they can access sunlight (*What Are Plankton?*, n.d.). As primary producers, they sit at the base of aquatic food chains and webs, producing energy and eventually being consumed by primary consumers. Some examples of primary consumers that consume phytoplankton are zooplankton and young small fish.

Zooplankton are primary consumers. They include microscopic organisms, young fish, and other weak swimming organisms. Krill, the food of choice for most filter feeding large whales, are an example of zooplankton (*What Are Plankton?*, n.d.). Because zooplankton consume other organisms and do not produce their own energy, they do not spend all their time at the surface like phytoplankton. They do surface to consume phytoplankton, but then return to a lower depth during the day to avoid predators (*What Are Plankton?*, n.d.). There are two main types of zooplankton: holoplankton and meroplankton. Holoplankton remain microscopic plankton for their whole lives. Meroplankton are only temporarily planktonic and eventually grow, such as fish (*Plankton: Small Organisms With a Big Role in the Ocean*, 2019).

Phytoplankton and zooplankton belong to different trophic levels, but both are important. Phytoplankton, which are the primary producers, are responsible for producing the energy that moves through food webs. Without primary producers such as phytoplankton, there would be no energy source for any of the other trophic levels. Zooplankton also play an important role in the ecosystem. As primary consumers, they help to transfer energy in a food web. All of the levels of a trophic pyramid help to keep each other in check. Without primary consumers, there would

be no food for secondary consumers, which in turn means no food source for tertiary consumers and a collapse in the system. With too many primary consumers, primary producers are consumed too quickly and the primary consumers deplete their food source, which also leads to collapse in the system. Each trophic level plays an important role in an ecosystem, and a change in one can disturb the balance of the entire system and result in collapse.

Materials:

- Plankton net and collection bottle(s)
- Compound microscope(s)
- Microscope slides
- Transfer pipette
- Plankton identification sheet

Directions

At the water:

1. Attach the collection bottle to the end of the plankton tow net.
2. Tow the plankton net by hand in a natural body of water. The net should travel across the surface of water. The fine mesh strains plankton into the bottle at the end of the net.
3. Remove the collection bottle from the net and cover the bottle.
4. Bring the collection bottle back to the classroom. Be sure to not let the water get too warm, as it can kill the plankton.

In the classroom:

5. Use the pipette to transfer specimens to microscope slides. If necessary, dump the contents of the collection bottle into a flatter tray to be able to see some of the plankton in the water.
6. Place the microscope slides in a microscope and look at your plankton.
7. Using the Plankton Identification Sheet, identify what you found and draw three different organisms.

Questions

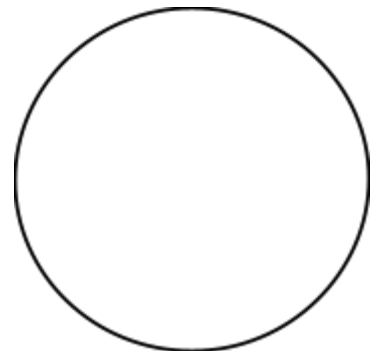
1. Based on where you are towing the net (at the surface of a natural body of water), would you expect to see phytoplankton or zooplankton?
2. Would the types of organisms you expect to see change if this activity happened at night? Why?
3. Why are plankton important to food webs and food chains?
4. Draw three plankton you observed and answer the following:

What is it? _____

Is it phytoplankton or zooplankton? What kind?

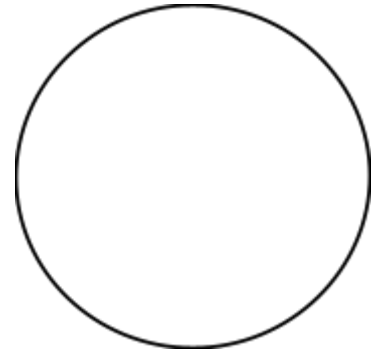
How many did you observe? _____

Other observations (is it moving?) _____



- a. What is it? _____
- b. Is it phytoplankton or zooplankton? What kind?

- c. How many did you observe? _____
- d. Other observations (is it moving?) _____



- a. What is it? _____
- b. Is it phytoplankton or zooplankton? What kind?

- c. How many did you observe? _____
- d. Other observations (is it moving?) _____

