

Student Instructions for Setting Up the Aquarium

1. Use part A for your aquarium.
2. Put one cupful of gravel in the bottom of the aquarium.
3. Use your empty gravel cup to fill your aquarium with water until it is approximately three to four cm from the top. (Be careful. If the water is too high, it may overflow when you join the aquarium and terrarium.)
4. Record how many cupfuls of water you used to fill your aquarium. Mark the water line on the bottle.
5. Add the elodea, duckweed, and algae. Carefully measure out the amount of each organism as instructed below, since too much duckweed and algae may choke out the animal life in your aquarium.

■ 1 or 2 sprigs of elodea

Place the elodea on a wet paper towel.

Measure the plant and record its size.

Place the plant in the aquarium.

Plant it in the gravel or let it float freely.

■ 10 to 15 duckweed plants

Use your spoon to scoop up the tiny plants and put them onto your wet paper towel. (Hint: Since they are so small, estimate the numbers.)

Put the plants in the aquarium.

Count the plants and record the number. (You can record a more exact count once they are in your aquarium, since duckweed will separate when floating.)

■ 3 dropperfuls of algae

Use your dropper and place 3 dropperfuls of algae into your cup.

Can you see the algae in the jars? Record what you see on your record sheet or in your notebook.

Put the algae into your aquarium. Record what you see.

6. Then draw and label a picture of how your aquarium looks today. Use your hand lens to observe closely.
7. Observe your aquarium every day throughout the rest of the unit. Use your science notebook to record these daily observations. Make certain you include any changes.



Reading Selection

Duckweed, Elodea, and Algae: Why Are They Important?

Why should you add duckweed, elodea, and algae to your aquarium? Each is special in its own way. Water plants, like elodea and duckweed, are beautiful to look at. Algae and water plants help keep a healthy exchange of gas in the water. They also provide food and shelter for many animals. What other reasons can you think of for adding these organisms to your aquarium?

oxygen. This is called **respiration**. Respiration helps organisms get energy. In the daylight, organisms that have chlorophyll, such as plants, algae, and some bacteria, can use the sun's energy, water, and carbon dioxide to make their own food. We call this **photosynthesis**. Through photosynthesis, these organisms release much more oxygen than they take in. In the water, animals such as fish, snails, and tadpoles use the oxygen to breathe.

Not Just Beautiful to Look At

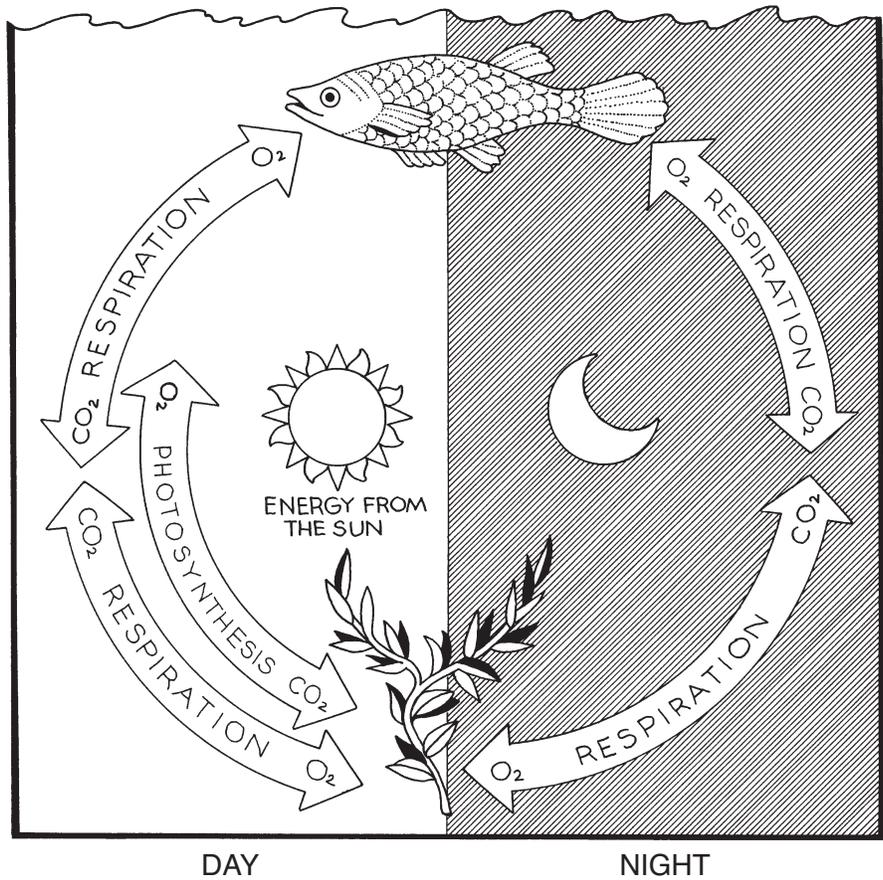
Aquatic organisms such as duckweed, elodea, and algae add a special kind of beauty to our world. Some have bright colors and unusual shapes. Others sway with the gentle motion of the water's current.

These producers are especially important in a pond or slow-moving stream. This is because they help provide oxygen for animals in the water. How? By taking in one gas (carbon dioxide, or CO²) and giving off another (oxygen or O²).

Some aquatic organisms provide homes and protection for tinier organisms and baby animals. These creatures nestle in the leaves and stems of underwater plants where they can live safely.

Why Swap Gases?

Animals, plants, and other living things, such as algae and bacteria, are always using



Oxygen-carbon dioxide cycle

From Moose to Flea

Water plants and algae also provide food for many animals, from the huge moose to the tiny water flea. Because green plants and algae carry on photosynthesis to produce their own food, they are called **producers**. Producers make the food that animals need to live. Since animals cannot produce their

own food, they must eat other organisms to get energy. This is why animals, such as the moose and tiny water flea, are known as **consumers**. They eat, or consume, water plants and algae, such as those you will find in your ecocolumns.

Let's take a look at each of these producers now.



Water plants and algae are food for the huge moose and tiny flea.

Where There Is Water, There Are Algae

Thousands of kinds of algae live in every wet environment you can think of. They come in all sizes, from microscopic (like the kind you will be growing) to gigantic (like the 46-m-long [150-ft-long] brown kelp). They also come in a rainbow of colors: green, golden, brown, and red.

Microscopic algae are too small to see with just your eyes. But if you've ever seen a pond with what looks like green water, you've seen algae by the millions. It's actually the algae that turn the water green. But you can see them only when they grow in great numbers.

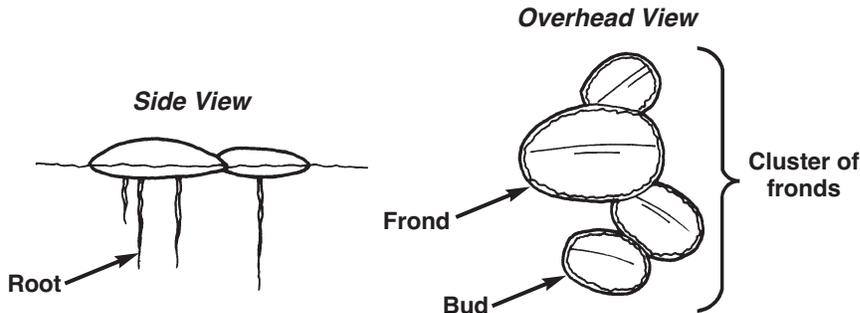
Duckweed: Food for Fowl

Duckweed is a tiny floating plant. It usually grows on the surfaces of ponds, lakes, and slow-moving streams. Duckweed is a favorite food of many waterfowl—ducks, for instance—which is how it got its name. Fish and snails eat duckweed, too.

When growing conditions are good, duckweed plants will multiply very rapidly and form a lush carpet on the top of the water. This thick covering is lovely to look at. But it can cut off so much light from other water plants that it can kill them. That means there is less life-giving oxygen in the water.

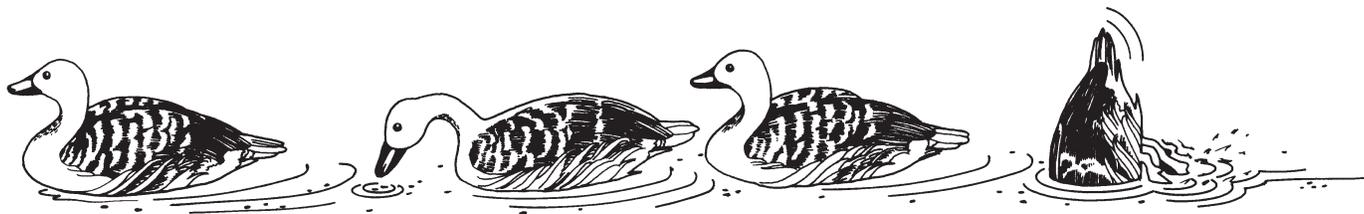
Healthy duckweed is bright yellow-green. It is an unusual plant because it has no leaves or stems. Instead, it consists of one to three leaflike fronds attached at the center. From each frond a single root hangs. Use your hand lens to observe one duckweed plant up close.

DUCKWEED



Make New Fronds

Duckweed rarely flowers, and it almost never does out of nature. So how does duckweed make new plants? It buds to form new fronds. Each frond grows its own root and then becomes an independent plant. In nature we usually can't observe a single frond of duckweed; the fronds tend to stay in groups until four or more plants are produced. (That is why it may have been difficult for you to count out 10 to 15 duckweed plants when setting up your aquarium.)



Why do you think they call it "duckweed"?

Elodea: A Well-Adapted Plant

Elodea is a dark green plant. It's found in ponds and slow-moving streams. Elodea has pointed leaves. And the leaves grow around the stem in tight whorls, or circles, of three or more. These leaves provide excellent shelter for baby fish. The stem itself is kind of brittle. Still, it can grow up to two feet long. Along this stem, new branches often grow.

You will find elodea interesting to observe in your aquarium. It is able to grow in two ways. It can float freely near the surface of the water. Or, it can take root at the bottom. You may notice free-floating plants sending down long pale roots.

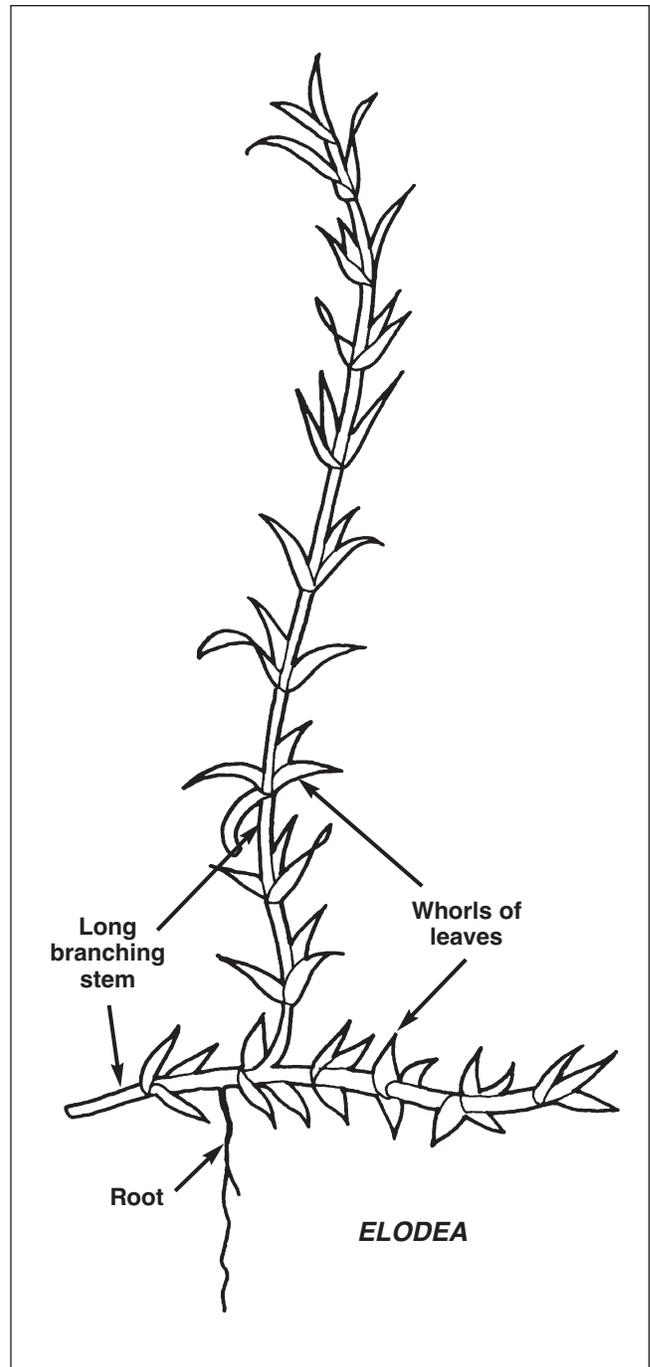
What happens when elodea breaks apart into smaller segments? Each piece can grow into a new plant. And like its parent, each new plant can either float or take root.

Easy to Grow

Elodea is very hardy and easy to grow. It thrives in strong light. But it can survive for a fairly long time in low light, too. If there is not much light, the plant will become thin. It may lose some of its bright color. If you put it back in bright light, though, it will grow strong again.

All of these features are adaptive. They help the plant survive under poor conditions. But they can also make the plant a problem for people, animals, and other plants. Can you imagine why? Well, first because elodea grows so quickly it can clog waterways. It can also crowd out other plant life on both the water's top and bottom.

Your aquarium has only three types of producers. But real waterways, such as oceans, ponds, and streams, have a wide variety. Can you name some others?



Record Sheet 3-A

Name: _____

Date: _____

Setting Up the Aquarium

Use this table to record today’s observations of your aquarium. Take the time to observe closely with the hand lens. Record what you see as accurately and completely as possible.

1. Fill in this table.

Observations Table

	Amount and Size	Color/ Description	Other Observations (for example, texture and shape)
Gravel			
Water			
Elodea			
Duckweed			
Algae			

Setting Up the Aquarium *(continued)*

2. Draw the contents of your aquarium in this bottle. Be sure to label every item.

