

A man and two children are outdoors in a grassy field. The man is crouching in the center, looking down. To his left, a young girl is crouching, wearing a light blue long-sleeved shirt and blue gloves, holding a clear glass jar. To his right, another young girl is crouching, wearing a purple jacket and polka-dot pants. The background is a field of green grass and some small plants.

DIY

LAKE SCIENCE

ALGAE IN EXCESS

HOW CAN NUTRIENTS THAT HELP PLANTS HARM LAKES?

ACTIVITY DESCRIPTION

Plants need nutrients to grow—this is why we apply fertilizers to grass and food crops. If fertilizers are great for plants, how can they harm lakes? In this activity, you'll explore how fertilizers can affect lakes and other bodies of water.

Age: 10 and up

Preparation: 10 minutes

Activity: 20 minutes + data collection

Cleanup: 15 minutes

ACTIVITY MATERIALS

- 3 clear containers, such as jars or plastic bottles, approximately 500 mL (2 c) each
- Access to a pond, lake or stream with algae
- Liquid fertilizer used for lawns or house plants
- Masking tape
- Marker
- Disposable gloves
- One or more drinking straws (optional)
- Fish food (optional)



MATERIALS NOTE

Liquid fertilizer can come in concentrated form. Read the directions on the bottle to make sure you use an amount of fertilizer that is appropriate for the amount of water (approximately 500 mL) of pond/lake water sample. Fish food is a fertilizer as well—it is optional in this activity.

Algae can be found in some lakes, ponds, streams, and rivers. It often grows near the shoreline, where water is calm. See the activity steps for further instructions on how to get algae safely from a body of water. Some varieties, such as green algae, can also be purchased from online biological suppliers.

SAFETY

- Get an adult to help with this activity.
- Be careful when using liquid fertilizer. Follow the manufacturer's safety precautions for using and disposing of fertilizer and be sure to wash your hands after using it
- It is best to wear disposable gloves when using chemical fertilizers. If you have a latex allergy, use latex-free gloves such as nitrile or vinyl.
- Some algae, such as blue-green algae, can be toxic to humans. See the activity steps for instructions on safely handling and identifying algae.

STEP 1

In this experiment, you will see how different types of fertilizer, used to make plants grow, affect the growth of algae, which can harm freshwater bodies. Does algae grow better in some types of fertilizers than others? Find a pond, lake, or stream near you that contains algae—the slimy green organism that often grows near a shoreline where water is calm. Algae can also be shades of yellow or brown.



STEP 2

Wear disposable gloves when handling algae, as some types, like blue-green algae, are toxic. Do not use or touch blue-green algae. To determine the type of algae, use the “stick test.”

Take a sturdy stick and plunge it into water that is covered with algae. Then pull the stick out. If the stick looks like it’s covered in green paint, it is likely blue-green algae, which is toxic. If the stick has strands that look like green hair or threads, the algae is likely safe to use.



STEP 3

Break any safe algae apart with your gloved fingers. Place an equal amount of algae, a “pinch,” in each container. Then fill your three containers with water from the body of water. You can use more than three containers if you want to test more types of fertilizer. You can also test various amounts of fertilizer as well.



STEP 4

Use masking tape and a marker to label each container with the type of fertilizer you will put in. Make sure you label one container “control,” where no fertilizer will be added. Add the type of fertilizer according to the label on each container. Determine how much of each fertilizer to add from instructions on the fertilizer container. For example, you may be able to use about 25 drops of common house plant fertilizers. Using a drinking straw, gently mix the fertilizer into its cup of water.



STEP 5

If using fish food, add a “pinch” to a container labeled “fish food.” Again, mix the fish food into the water with a new drinking straw.



STEP 6

Place all the uncovered containers in a sunny area where they won't be disturbed. You can put them outside if it's not raining, or in a sunny windowsill.



STEP 7

Check on your containers each day for two weeks. Using your device's camera, take pictures of them each day and record any observations. Does the water look the same as when you started, or is it changing? Is each algae sample the same or different than it was at first? Does the algae look different from one container to the next?



WHAT'S GOING ON?

The results of this experiment may vary slightly, depending on how you carried out your investigation. If you used liquid fertilizer, you should have seen the algae grow much more compared to the control. Why did the algae grow more? Algae are like plants—they can grow faster and larger when they get key nutrients, such as those found in common fertilizers. Algae in the control container should not have grown much, because no fertilizer was added.

If you used fish food, the algae may have grown a little, but not as much as in the other containers. Fish food also contains nutrients, but not as much as liquid fertilizer.



Algae can grow more when given fertilizer used for lawns, gardens, and crops.

EFFECTS OF TOO MUCH ALGAE

Too much algae can be a problem, but why? People often fertilize plants in farms, parks, lawns, and gardens, but plants don't use all this fertilizer. Rain and watering wash away some of the fertilizer. These excess end up in rivers and lakes, where they can cause more algae to grow, just as it did in your experimental cups.



When algae dies, it sinks to the bottom of the water body. Bacteria feed off dead algae and consume oxygen that's in the water, and the more algae, the more bacteria. When bacteria use up oxygen, there is less for fish and other organisms. Reduced oxygen can cause large numbers of animals and plants in water to die off.

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CREDITS |

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This activity from the DIY Lake Science app allows families to investigate and learn about lakes and bodies of water at home or on the go! The app features twelve hands-on investigations, as well as videos and a lake simulation.

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