

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Teacher: \_\_\_\_\_

"Ecosystems"

The Gunner Brook is a favorite place for families to go on picnics. There is a nature trail that winds through the woods and follows the brook. People enjoy this trail because of the wide variety of plants and animals that live there.



Sitting 1:

1.) The Gunner Brook is a healthy ecosystem. What evidence in this picture provides proof that the Gunner Brook is a healthy ecosystem?

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2.) The duckweed in this ecosystem makes its own food (sugar) through a process called photosynthesis. Use the words in the box to explain what happens during this process. You can explain photosynthesis in words or in a diagram, but you must include all the words in the box and make it clear how each part (word) contributes to the process.

duckweed
sun
energy
carbon dioxide
oxygen
water
food

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3.) Draw and label a diagram of the carbon dioxide/oxygen cycle using organisms from the Gunner Brook Ecosystem.

4.) Explain how the carbon dioxide cycle is an example of interdependence in the ecosystem.

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5.) **Look closely at the picture of the Gunner Brook Ecosystem and fill in the table below.** Write the names of different producers, consumers, and decomposers that you would expect to find in this ecosystem. Describe their role in the food chain.

## Gunner Brook Ecosystem

	Producers	Consumers	Scavengers/ Decomposers
A.) Define roles			
B.) Examples	1.  2.  3.	1.  2.  3.	1.  2.  3.

**Sitting 2**

You and a friend are listening to the radio. The radio announcer begins the news by saying:

“News Alert! This news just in from the Environmental Protection Agency (EPA). The driver of a cola truck lost control of his vehicle, which caused it to overturn into Gunner Brook. There is a hole in the side of the truck’s tank, and the cola from the tank has spilled into Gunner Brook. At this time scientists from the EPA are unsure of the effect the spill will have on the local environment. The driver was not hurt. More details will be available as they are received.”

Everyone is talking about the accident in school the next day. Your teacher decides that investigating the environmental effects of the cola spill will be a good science activity because your class has just finished a science unit titled *Ecosystems*. In this unit, you have already investigated the effects of three different pollutants on an ecosystem.

A Barre Town parent is a laboratory scientist who has been asked to test three water samples taken from the Gunner Brook the day of the cola spill. She has some extra samples and thought that your class would like to do some investigating.

Before you begin testing the river samples, test a sample of cola to find its pH value.

6.) What is the pH of cola?

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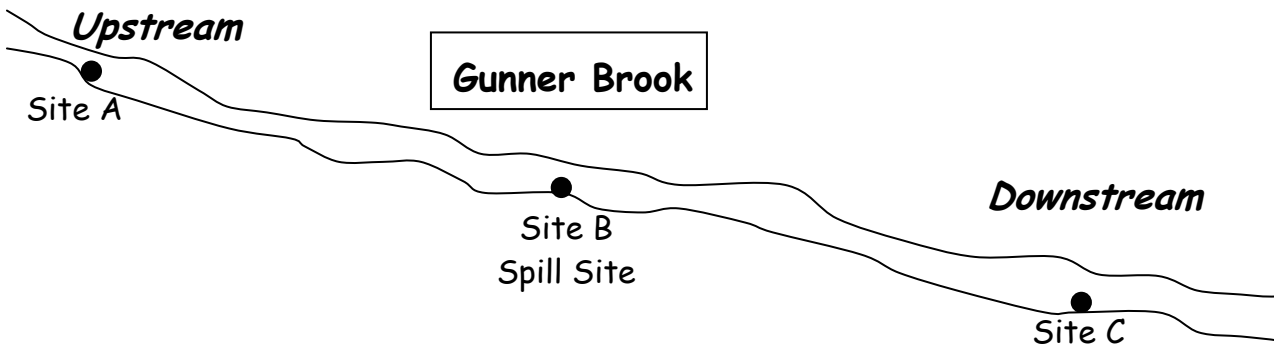
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7.) You know from your work in class that distilled water is neutral with a pH value of 7. Is your cola sample an acid, base, or neutral?

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8.) Now you know the pH of cola. Predict three things that you think are likely to happen to the plants and animals in the Gunner Brook Ecosystem. Predict and explain why you think these things will happen at each of the sites on the map below.



a. \_\_\_\_\_

\_\_\_\_\_

b. \_\_\_\_\_

\_\_\_\_\_

c. \_\_\_\_\_

\_\_\_\_\_

9.) Now you are ready to test the water samples. Draw and label a table for your data. Test each sample of the water three times and record your data in the table.

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10.) Look at the data table that you made for Question 9. Use this table to identify and explain the relationship between the three sites and their level of acidity.

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11.) In question 8 you made predictions about three sites in the Gunner Brook Ecosystem. Does the water sample data support or challenge your original predictions about what would happen at each site? Explain.

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The next day at school, your friend brings in a newspaper article to share with the class. She and her mother were excited to find this article because it tells about the effects of a similar environmental spill. Read the article, "Long-term Effects of ATCO Spill." While you are reading, **underline** the environmental effects of this spill.

### Long-term Effects of the ATCO Spill By Mae B. Stable

Clearton, MD~Last spring, an ATCO oil truck rolled near the Lee Lane Bridge and spilled 200 gallons of oil into the White Water River. Immediately, the oil spread out into the local river and its surroundings. The oil spill affected the plants and animals who call that river home. The long-term effects were not known at that time.

Since then, the fish population has suffered at the spill site. Further downstream, where the oil has been diluted, the environment appears to be less effected. Bill Green, a spokesman for the U.S. Fish and Wildlife Service, said that before the spill there were about 40 adult rainbow trout and 24 young rainbow trout near the accident site. The current number of rainbow trout has dropped to just 10 adult and 6 young.

Before the accident last May, the river ecosystem was home to many animals. There were many ducks, deer, and otter. Now a lone raccoon appears to be the only inhabitant on the riverbank. The blue heron that once frequented this river every season has not been seen this summer. Some species have thinned out in numbers or disappeared completely. However, other animals have seen the accident as an opportunity to move in. Black-headed gulls, which have aided in the clean-up of dead fish, have made this area their temporary home.

According to Mr. Green, in a healthy food chain, river ecosystems depend on the existence of many species of insects. Common varieties include dragonflies, mosquitoes, and diving beetles. Another river insect, water boatmen, collect air bubbles on their hairy abdomens. Right after the accident the insect population did not exist in the White Water River. Now, ten months later, the insect population is once again on the rise.

The nearby area, once covered with vegetation, has also been affected by the oil spill. There are fewer cattails, tiger lilies, and other plants than before the accident. Algae was affected right after the spill but it has made a comeback. It can now be found everywhere. As a result, the water is greener and cleaner. Algae helps clean up the water by releasing bubbles of oxygen back into the water.

An ATCO spokesperson said the oil spill was the company's fault. ATCO has spent 1.2 million dollars and hundreds of man hours on cleaning up the spill. Within a week of the accident, the company had built three restraining walls. They kept the oil in the five mile section of river between Lee Lane Bridge and town. Machines are being used to slowly remove the oil from the river. ATCO has also promised to restock the river with rainbow trout by next spring.

The U.S. Fish and Wildlife Service is now hopeful that the White Water River Ecosystem will make a full recovery. After three months, signs of healing are beginning to show. The appearance of algae is a sure sign that the ecosystem is returning to normal. The underwater leaves of aquatic plants may bring young ducklings, snails, and insects back to the river. The comeback of insects will lead to the return of hungry fish, frogs,



swallows, and bats. These animals, in turn, will provide food for larger animals that will hopefully return by next spring.

12.) After reading the article, list at least four effects this spill has had on the White Water Creek Ecosystem.

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

13.) If you were a scientist visiting the White Water Creek Ecosystem, what question relating to the effects of the oil spill on this ecosystem might you want to investigate? Write down a question that would guide your investigation.

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