

“Ecosystems”**Teacher’s Guide:**

“Ecosystems” can be used independently, or in conjunction with the STC unit Ecosystems

Teacher Directions: This assessment is a two-part assessment. During the first sitting, students are expected to demonstrate their understanding of science concepts through a variety of questions focusing on the Gunner Brook Ecosystem.

During sitting two, students will be engaged in a performance task that allows them to utilize essential skills of inquiry that have been developed throughout the ecosystem unit.

Materials: Collect three quart-sized containers and label them with the following titles: upstream sample, spill site sample, and downstream sample. **The coke sample given in the assessment should be the same as the spill site sample.** Prepare the samples ahead of time using the following recipes:

- Site A: Upstream—water from the faucet (pH 6)
- Site B: Cola Spill—lemon cola (pH 4)
- Site C: Downstream—2/3 cola, 1/3 water (pH 5)

Set up four stations inside of the room that students can go to for collecting water quality data. Students should draw their tables before going to the desk with the samples. Be sure to mark samples (Site A Upstream, Site B Cola Spill, and Site C Downstream) clearly. The pH strips and a pH indicator chart should be available at each station. Students should measure the pH of each sample and record this data in the table they created. One student should work at a station at a time.

Standards**VT:**

7.1 aa. bb. cc. dd.. Inquiry GCEs All

7.13 aa. cc.

Grade Cluster Expectations: **S : 15** (Physical Science—Chemical Change); **S : 34** (Life Science—Ecosystems),
S : 35 (Life Science—Food Webs), **S : 36** (Life Science—Equilibrium in an Ecosystem)

NSES:

Scientific Inquiry (5-8) 1.2, 1.3, 1.4, 1.5,

Life Science (5-8): Populations and Ecosystems LS 4.1 LS 4.2 LS 4.3 LS 4.4

Score Guide:

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

Key Elements:

- Explains that healthy ecosystems have **diverse populations** that are **interdependent** (interdependence may be implied).

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.

Key Elements:

- Uses a diagram and/or words to explain that **green plants** use **sunlight** to change **water** and **carbon dioxide** into **food** and the by-product **oxygen**.
- 3.) Draw and label a diagram of the carbon dioxide/oxygen cycle using organisms from the Gunner Brook Ecosystem.

Key Elements:

Draws and labels a diagram that shows:

- plants take in carbon dioxide and give off oxygen
- animals take in oxygen and give off carbon dioxide

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

Key Elements:

- Explains the **interdependent relationship** between plants and animals in the carbon dioxide/oxygen cycle.
- 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.

Key Elements:

Part A: Demonstrates an understanding that

- plants produce food,
- consumers get food from other living things AND
- decomposers/scavengers break down debris.

Part B:

- Accurately gives three **examples** of producers, consumers, and decomposers/scavengers from the Gunner Brook ecosystem.

- 6.) What is the pH of cola?

Key Elements:

- Accurately measures the pH of cola.

- 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?

Key Elements:

- Recognizes that **cola** is an **acid**.

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.

Key Elements:

- Explains the **cause and effect relationship** between the acidity of the water and the health and well being of a variety of living things in and around the water.
- Makes a reasonable **prediction** and **explains the thinking** behind the prediction.

9.) Now you are ready to test the water samples. Draw and label a table for your data.

Key Elements:

Creates a legible chart with:

- a title,
- labels columns and rows,
- records data accurately including units of measure.

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.

Key Elements:

- **Identifies and explains the relationship** between the three sites and the level of acidity (Upstream-no effect, spill site-most acidic, & downstream-less acidic than spill site).

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.

Key Elements:

- Logically connects original predictions with the effects of the cola spill at each site.

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

Key Elements:

- Lists four appropriate effects of the spill on the White Water Creek Ecosystem.

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.

Key Elements:

- Writes a reasonable **question linked to the interdependence** within an ecosystem. The question is based on information presented in the article.