Name: _____ Date: _____

Student Exploration: Forest Ecosystem

Vocabulary: consumer, decomposer, inorganic, organic, organism, population, producer

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. When a rancher puts cattle in a pasture, what happens to the amount of grass in it?

   _____

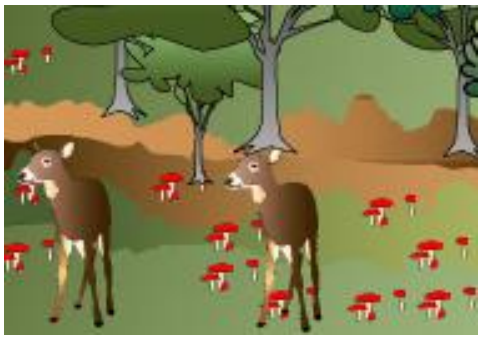
2. If someone adds millions of small fish to a lake, how would the number of big fish change?

   _____

Gizmo Warm-up

The *Forest Ecosystem* Gizmo™ shows you the effects of adding **organisms** to, or taking them from, a forest. An organism is any living thing. To start, do the following:

- Press **Reset** on the Gizmo.
- Click **Advance year** a couple times to see two years of growth.
- Remove all **deer** from the forest by clicking the minus (**-**) button until none remain.
- Click **Advance year** a couple more times.



1. Select the **Data** tab. Be sure the **Pictograph** is showing the size of the tree **population** for the past several years. (If it is not, click on the **tree**.) How did removing deer affect the tree population? Why do you think this happened?

   _____

   _____

2. Under **Choose organism**, select the **Mushroom**. How did losing deer affect the mushroom population? Explain why this occurred.

   _____

   _____

Activity A: **Trees**	Get the Gizmo ready: • Click **Reset**. • Select the **Forest** tab.	

Question: What role do trees play in the forest?

1. Form hypothesis: Where do you think trees get the nutrients they need to grow? _____

   _____

2. Predict: Based on your hypothesis, how will the tree population change if ALL other organisms are removed from the forest?

   _____

3. Analyze: Remove ALL organisms except trees. Click **Advance year** a few times and select the **Data** tab. Was your prediction correct? Explain what you found.

   _____

   _____

4. Draw conclusions: Substances that contain carbon and are produced by living things are called **organic**. Examples of organic materials are sugar, blood, protein, and fat. Other materials, like water, carbon dioxide, oxygen, and ammonia, are called **inorganic**.

   Some living things, called **producers**, can produce the organic materials they need (like food) from inorganic matter. All other organisms are **consumers**; they consume organic matter since they cannot make it themselves.

   Do your results show you that trees are producers or consumers? Explain.

   _____

   _____

5. Analyze: Click the **Forest** tab. Click the plus (**+**) button for **mushrooms** several times. Click **Advance year** a few times. Select the **Data** tab. How did adding mushrooms affect trees?

   _____

6. Extend: The mushrooms thrived without hurting trees. How could this happen? Try for *two* possible explanations. Write your ideas in your notebook or on the back of this sheet.

Activity B: **Bears**	Get the Gizmo ready: • Click **Reset**. • Select the **Forest** tab.	

Question: How do bears get the nutrients they need to live?

1. Explore: Run a few trials with the Gizmo to figure out what bears depend on for nutrition.

2. Form hypothesis: How do bears get the energy and nutrients they need? _____

   _____

3. Predict: Based on your hypothesis, which population(s) would be hurt if bears were added?

   _____

4. Test: Click **Reset**. Click **Advance year** a couple times. Add as many bears to the forest as possible. Then go forward a couple more years. Select the **Data** tab. Which populations were hurt by adding bears?

   _____

5. Classify: Are bears producers or consumers? Explain your reasoning. _____

   _____

   _____

6. Draw conclusions: An organism that breaks down organic matter into simpler inorganic matter (like carbon dioxide) is called a **decomposer**. Decomposers absorb nutrients from living things or the organic matter they leave behind. They do not need to kill to get their food.

   Do your results suggest bears are decomposers? Explain your reasoning. _____

   _____

   _____

7. Challenge: Using the Gizmo, figure out what bears prefer to eat most. Write your results and reasoning in your notebook or on the back of this sheet.

Activity C: Mushrooms	Get the Gizmo ready: • Click **Reset**. • Select the **Forest** tab (if necessary).	

Question: How do mushrooms get the nutrients they need to grow?

1. Explore: Use the Gizmo to test if mushrooms feed on living things. Describe your trials and results in your notebook or on the back of this sheet. What did you find?

   _____

2. Form hypothesis: How do mushrooms get their food? _____

   _____

3. Predict: Based on your hypothesis, how will the mushroom population change when other organisms are added to the forest? Fill in the middle column below with your predictions.

Change	Predicted effect on mushroom population	Actual effect on mushroom population
Trees added		
Deer added		
Bears added		

4. Test: Test your predictions with three separate trials. Write the results in the last column of the table above. Paste snapshots of the three **line graphs** into a blank document.

5. Classify: Do your experiments suggest that mushrooms are decomposers (organisms that break organic matter down to simpler, inorganic matter)? Explain.

   _____

   _____

   _____

6. Extend: If mushrooms were producers, how would your results have been different?

   _____

   _____