

**Biology End-of-Course  
Practice Test  
Session 1**

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

Period: \_\_\_\_\_

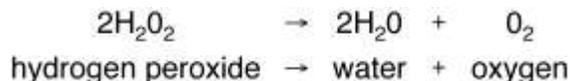
**Directions: Answer questions 1 and 2 on page 2. They are not connected to a scenario.**

- 1** People sweat to help maintain body temperature. What type of feedback happens when sweating regulates body temperature?
- A. Positive feedback, because sweating can increase body temperature
  - B. Positive feedback, because sweating can decrease body temperature
  - C. Negative feedback, because sweating can decrease body temperature
  - D. Negative feedback, because sweating can increase body temperature
- 2** Plants use nitrogen to make proteins. What is present in the soil that makes nitrogen **directly** available to plants?
- A. Air
  - B. Water
  - C. Sugars
  - D. Bacteria

## Foaming Spuds

**Directions:** Use the following information to answer questions 3 through 6 on pages 5 through 6.

Mike and Kelsey were studying how hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) in cells breaks down to form water and oxygen. When this reaction happens, bubbles of oxygen gas are released, producing foam. This reaction is described as follows:



A protein named *catalase*, found in all cells including potatoes, increases the rate of this reaction. Mike and Kelsey used potato juice as the source of *catalase* to do the following controlled experiment.

**Question:** What is the effect of the acidity of potato juice on the volume of foam produced when hydrogen peroxide is added to potato juice?

**Prediction:** As the acidity of potato juice decreases (higher pH), the volume of foam will increase.

### Materials:

graduated cylinders labeled pH 6, pH 7, pH 8, and pH 9

potato juice from the same potato,

divided and adjusted to four acidities: pH 6, pH 7, pH 8, and pH 9

hydrogen peroxide ( $\text{H}_2\text{O}_2$ )

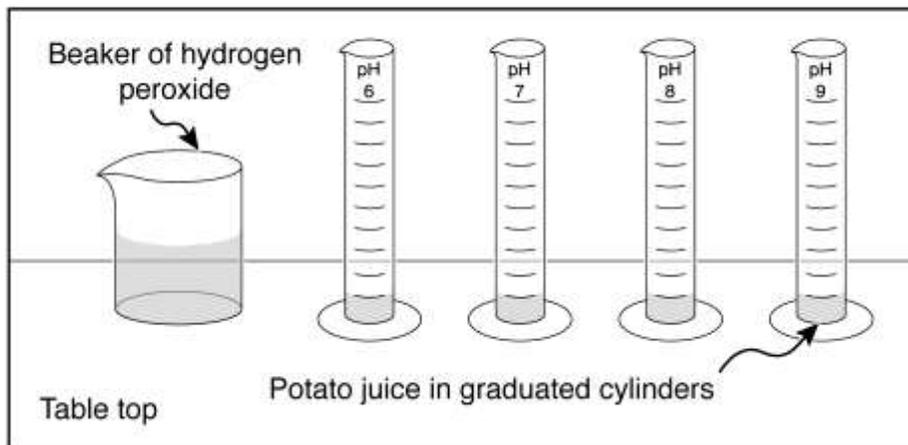
beaker

stopwatch

stirring rods

thermometer

### Controlled Experiment Setup



**Procedure:**

1. Label four graduated cylinders, one for each acidity.
2. Put 10 milliliters of potato juice at pH 6 in the appropriately labeled cylinder.
3. Do the same for each of the other cylinders.
4. Monitor the room temperature to make sure the temperature remains the same throughout the investigation.
5. Add 5 milliliters of hydrogen peroxide to each graduated cylinder, stir for two seconds. Wait three minutes.
6. Measure and record the volume of foam in each graduated cylinder as Trial 1.
7. Clean all graduated cylinders and stirring rods.
8. Repeat steps 1 through 7 two times for Trials 2 and 3.
9. Calculate and record the average volume of foam for each acidity of potato juice.

**Data:****Acidity of Potato Juice vs. Volume of Foam**

Acidity of Potato Juice (pH)	Volume of Foam (milliliters)			
	Trial 1	Trial 2	Trial 3	Average
6	22	25	25	24
7	32	38	36	35
8	41	42	42	42
9	32	29	30	30

3 How could Mike and Kelsey be more certain the results of their experiment are **reliable**?

- A. Test the reaction with other acidities of potato juice.
- B. Repeat the experiment the same way.
- C. Increase the volume of potato juice.
- D. Use a different type of plant juice.

4 Write a conclusion for this controlled experiment.

In your conclusion, be sure to:

- Answer the experimental question.
- Include **supporting** data from the Acidity of Potato Juice vs. Volume of Foam table.
- Explain how these data **support** your conclusion.
- Provide a **scientific** explanation for the trend in the data.

<b>Question: What is the effect of the acidity of potato juice on the volume</b>
<b>of foam produced when hydrogen peroxide is added to potato juice?</b>
<b>Conclusion:</b>

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5 What did Mike and Kelsey do to make the results of their experiment **valid**?

- A. Recorded the volume of foam in milliliters.
- B. Calculated the average volume of foam for each acidity.
- C. Measured the volume of foam at each acidity three times.
- D. Waited three minutes before measuring the volume of foam.

6 Plan a controlled experiment to answer the question in the box. You may use any materials and equipment in your procedure.

Be sure your procedure includes:logical steps to do the experiment

- two controlled (kept the same) variables
- one manipulated (independent) variable
- one responding (dependent) variable
- how often measurements should be taken and recorded

<b>Question: What is the effect of the temperature of potato juice on the</b>
<b>time for bubbling to stop after hydrogen peroxide is added?</b>
<b>Procedure:</b>

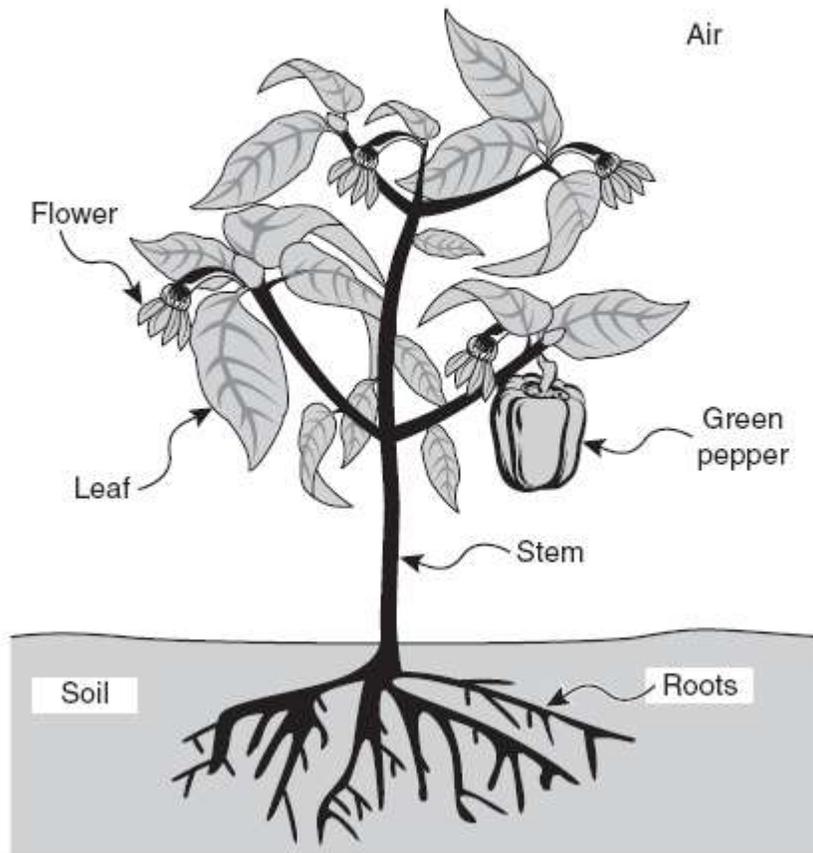


### The Green Machine

**Directions:** Use the following information to answer questions 7 through 10 on pages 8 through 9.

While helping to plant a school garden, Becky and Juan observed many different types of plants. They drew the following diagram of a green pepper plant growing in the garden.

**Green Pepper Plant**



- 7** The green pepper plant has proteins that control the process of making glucose. How does the plant obtain these proteins?
- A.** The plant makes the proteins using the instructions in DNA.
  - B.** The proteins are absorbed from the soil by the roots of the plant.
  - C.** The light energy changes molecules in the plant cell into proteins.
  - D.** The proteins are all present in the seed before germination occurs.
- 8** Becky and Juan want to increase the mass of food produced in the school garden. Which of the following questions could lead to a possible solution to this problem?
- A.** How much carbon dioxide do plants require?
  - B.** Which mineral nutrients do plants need?
  - C.** Which plants provide the most protein?
  - D.** Which plant seeds are largest?
- 9** What is the role of cellular respiration in plants?
- A.** To absorb carbon dioxide
  - B.** To release oxygen
  - C.** To produce ATP\*
  - D.** To form glucose

**10** Becky and Juan used a greenhouse as a model of a garden ecosystem to predict effects of amount of sunlight on green pepper production in a garden ecosystem.

Describe **two** ways the greenhouse model may lead to unreliable predictions about the effects of amount of sunlight on green pepper production in a garden ecosystem.

In your description, be sure to:

- Describe **two** differences that make a garden ecosystem more complex than the greenhouse.
- Describe how **each** difference could cause predictions about green pepper production in a garden ecosystem to be unreliable.

<b>One way:</b>
<b>Another way:</b>

## The Birds and the Beaks

**Directions: Use the following information to answer questions 11 through 13 on page 11.**

Nikki and Jon were studying a type of bird called the Medium Ground Finch shown in the picture. These birds live on one of the Galapagos Islands called Daphne Major shown in the map. Medium Ground Finches have beaks adapted for eating small, soft seeds.

Nikki and Jon learned that in 1977, a drought reduced the amount of small, soft seeds. The drought left mostly large, tough seeds that most Medium Ground Finches were unable to eat, and about 84% of the population died off. A year later the population of Medium Ground Finches had an average beak size bigger than the average beak size of the population before the drought.

Typical Medium Ground Finch



Map of the Galapagos Islands Off the Coast of South America

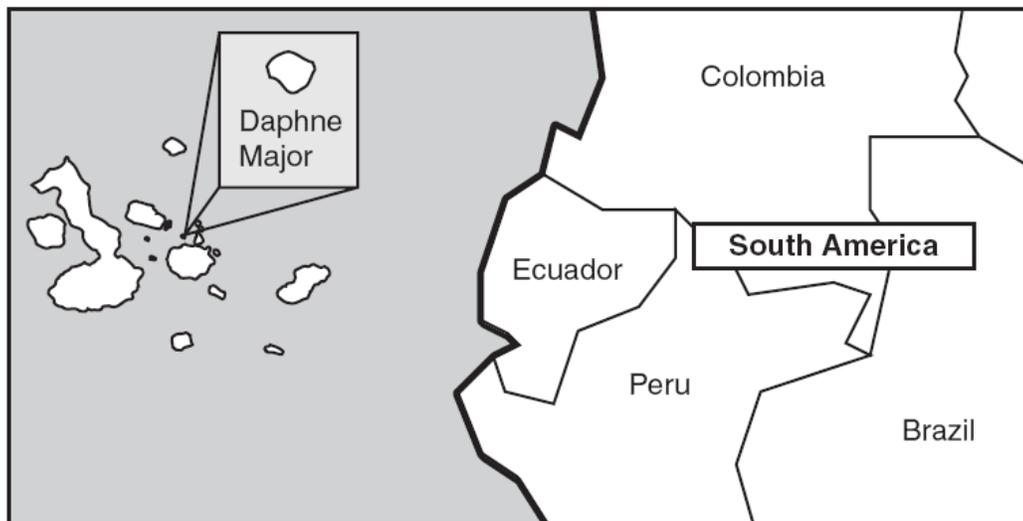


Diagram not to scale

**11** What caused the increase in the average beak size of the finch population after the 1977 drought?

- A. Finches' beaks grew bigger because of the lack of water.
- B. Finches with small beaks were able to grow bigger beaks.
- C. Finches with bigger beaks were unable to leave the island.
- D. Finches with bigger beaks were able to survive and reproduce.

**12** Scientists must be careful that their activities in an ecosystem do not introduce any new organisms into that ecosystem. What might be an effect on the finch population of Daphne Major if a new bird species were brought to the island?

- A. The finch population would decline due to reproduction.
- B. The finch population would increase due to adaptation.
- C. The finch population would decline due to competition.
- D. The finch population would increase due to predation.

**13** Before the drought, Daphne Major had 720 finches living on 80 acres of land. What was the population density of finches on Daphne Major?

Write your answer in the box.

_____ finches per acre
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## Blueberry Blues

**Directions:** Use the following information to answer questions 14 through 17 on pages 14 through 15.

José and Tasha noticed last year the blueberry plants in their neighborhood garden had many flowers, but produced only three kilograms of berries. They wanted to change the garden so the blueberry plants would produce more blueberries this summer. While making the changes to the garden, José and Tasha documented the stages of their design process as follows.

**Problem:** Change the neighborhood garden so the existing blueberry plants will produce more blueberries.

**Research the Problem:** Research what blueberry plants need to grow, be healthy, and produce berries.

### Needs of Blueberry Plants

<b>Mineral nutrients</b>	Nitrogen
<b>Amount of light</b>	At least 6 hours of full sunlight every day
<b>Amount of water</b>	Regular with moderate amount
<b>Type of pollinating insects</b>	Bees
<b>Needs of the pollinators</b>	Nectar, pollen, water, nesting place

### Explore Ideas:

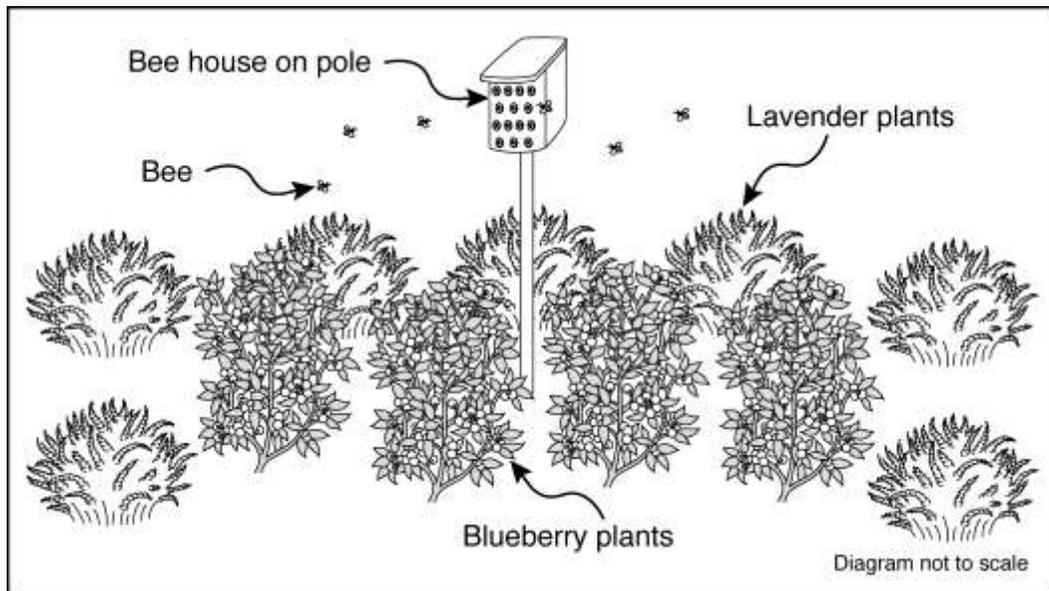
- ✓ Add a layer of bark to the garden so the soil can hold more water.
- ✓ Water the plants at night so the water will evaporate more slowly.
- ✓ Add fertilizer to increase the mineral nutrients in the soil.
- ✓ Add flowers like lavender, roses, or pansies.
- ✓ Put a bee house near the plants.

**Plan Summary:** Add a bee house and some lavender plants to the neighborhood garden to attract more bees to the blueberry plants.

### Steps to Do the Plan:

1. Put a bee house in the middle of the blueberry plants.
2. Plant lavender plants around the edge of the blueberry plants.
3. Water the garden every day.
4. Remove the weeds in the garden every week.

### Diagram of Solution:



**Test Solution:** Measure and record the mass of all the blueberries harvested this year. Compare the mass of the blueberries this year to the mass of the blueberries last year.

**Test Results:** Ten kilograms of blueberries were harvested, which is seven kilograms more than last year.

**14** Why are the offspring of flowering plants genetically different from the parent plants?

- A. Sexual reproduction produces offspring with new combinations of genes.
- B. Sexual reproduction produces offspring with half the number of genes.
- C. Asexual reproduction produces offspring with twice as many genes.
- D. Asexual reproduction produces offspring with a variety of genes.

**15** What part of the cell produces ATP for the blueberry plant to grow?

- A. Mitochondrion
- B. Cytoplasm
- C. Ribosome
- D. Nucleus

**16** Blueberries contain sugars like glucose. What is the source of carbon for the glucose in blueberries?

- A. Carbon atoms in fertilizer
- B. Carbon dioxide gas in air
- C. Carbon dissolved in water
- D. Carbon molecules in the soil

**17** Jose and Tasha want to improve the soil in the garden by increasing the population of worms in the soil. Describe how to begin solving this problem.

Be sure to describe the following stages in your design process:

- **Research the Problem:** Describe any scientific information needed to solve the problem and how to collect that information.
- **Explore Ideas:** Describe several possible solutions to the problem, including any useful scientific concepts.

<b>Problem: Increase the population of worms in the soil</b>
<b>Research the Problem:</b>
<b>Explore Ideas:</b>