

Biology End-of-Course

Practice Test

Session 1

Directions: Use the following information to answer questions 3 through 6.

Foaming Spuds

Mike and Kelsey were studying how hydrogen peroxide (H₂O₂) in cells breaks down to water and oxygen. When this reaction happens, bubbles of oxygen gas are released, producing foam. This reaction is described as follows:



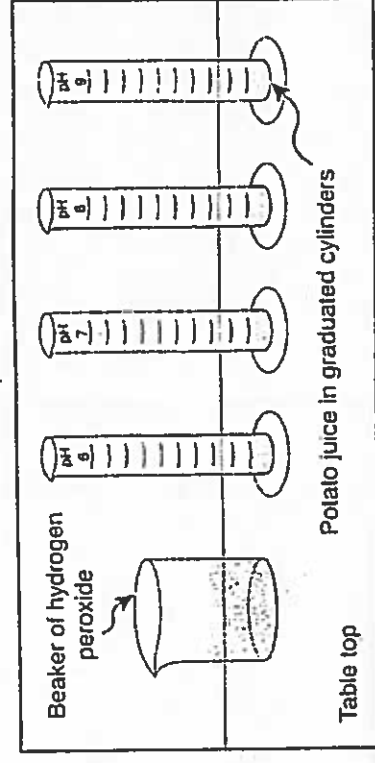
A protein named *catalase*, found in all cells including potatoes, increases the rate of this reaction. Mike and Kelsey used potato juice as the source of *catalase* to do the following controlled experiment.

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 (H₂O₂)
 beaker
 stopwatch
 stirring rods
 thermometer

Controlled Experiment Setup



Student Name: _____

Period: _____

Updates 2013 Biology EOC—Student

Directions: Answer questions 1 and 2.

- 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

Procedure:

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

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.

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?

Conclusion:

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

- O A. Recorded the volume of foam in milliliters.
- O B. Calculated the average volume of foam for each acidity.
- O C. Measured the volume of foam at each acidity three times.
- O 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

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

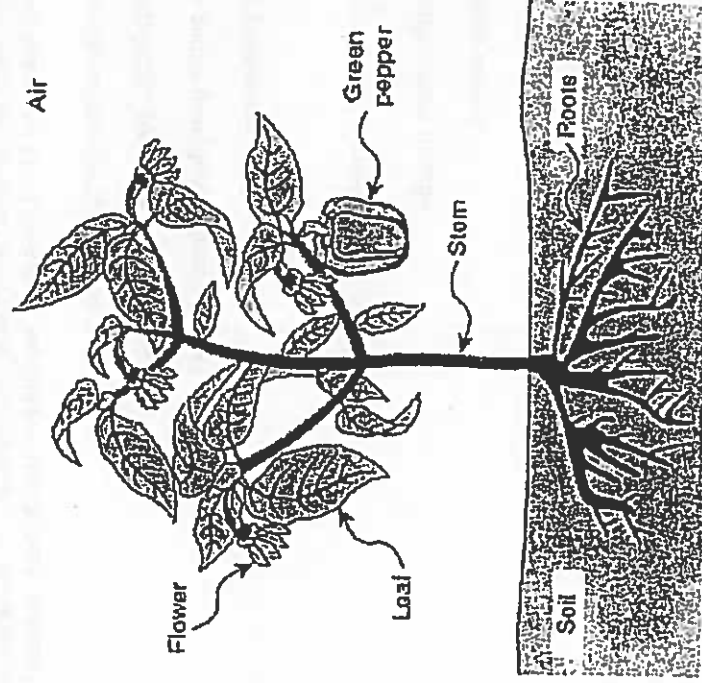
Procedure:

The Green Machine

Directions: Use the following information to answer questions 7 through 10

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



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.

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?

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 ~~the~~ 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.

One way:

Another way:

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 r 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 is the population density of finches on Daphne Major?

Write your answer in the box.

_____ finches per acre

The Birds and the Beaks

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

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

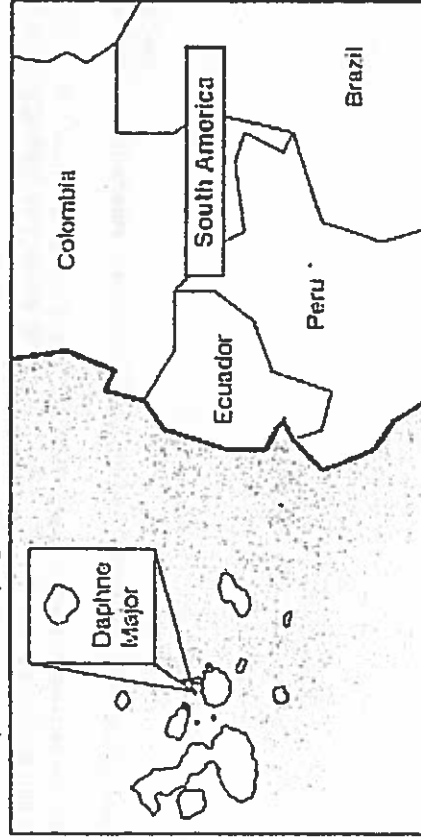


Diagram not to scale

Blueberry Blues

Directions: Use the following information to answer questions 14 through 17.

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

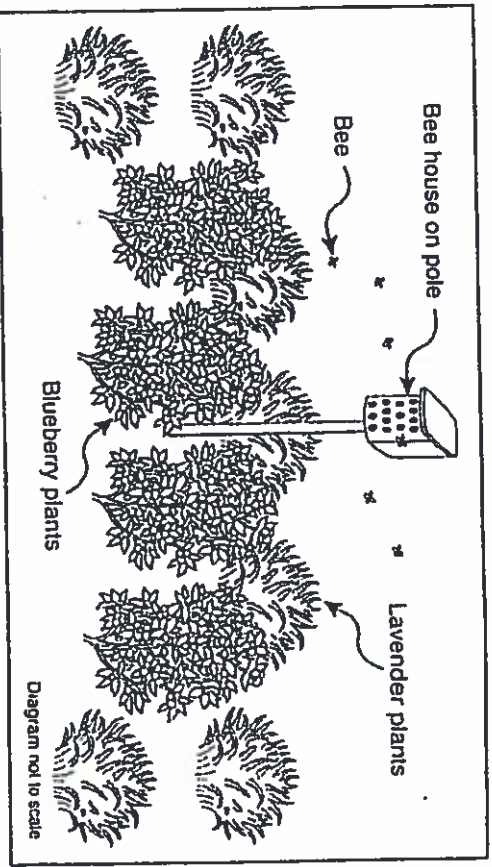
Explore Ideas:

- 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.

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.

Problem: Increase the population of worms in the soil

Research the Problem:

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

regions: Answer questions 18 through 22, They are not connected to a scenario.

How is cellular respiration by plants similar to the burning of fossil fuels?

- A. Both release oxygen for organisms that are consumers.
- B. Both break down carbon-containing compounds.
- C. Both produce ATP.
- D. Both absorb light.

Which process increases genetic variation among whale offspring?

- A. Division of cells in mitosis
- B. Fertilization of egg cells
- C. Synthesis of proteins
- D. Assembly of lipids

Adding habitat is a solution to the problem of decreased butterfly populations in prairie ecosystems. What could be an unintended consequence of adding habitat for butterflies?

- A. Beneficial nutrients could be removed from the ecosystem.
- B. The air temperature could increase in the ecosystem.
- C. Materials new to the ecosystem could be introduced.
- D. The amount of light in the ecosystem could increase.

21 In mammals, the hormone *insulin* helps decrease the amount of glucose in blood. Which describes a negative feedback system between *insulin* and glucose?

- A. Small amounts of glucose in blood keep *insulin* from working properly.
- B. *Insulin* is constantly released to prevent low glucose levels in blood.
- C. *Insulin* causes the addition of large amounts of glucose to blood.
- D. High levels of *insulin* decrease blood glucose levels.

22 Months after a forest fire, some nonnative plants began to grow in the area. Why were these plants able to grow?

- A. The plants were able to survive without water.
- B. The plants were able to use the ash as chemical energy.
- C. The plants were able to thrive in the newly formed niches.
- D. The plants were able to mutate to adjust to the new surface materials.

Salmonberry Plants

Directions: Use the following information to answer questions 23 through 31

Salmonberry plants can be found all along the Pacific coast. Salmonberry plants are a food source for many animals in Pacific coast ecosystems including hummingbirds, deer, and bear. Scientists conducted a field study to learn about salmonberry plant populations in different habitats in Washington.

Field Study Question: How does the salmonberry plant population vary by habitat?

Salmonberry Plants Field Study

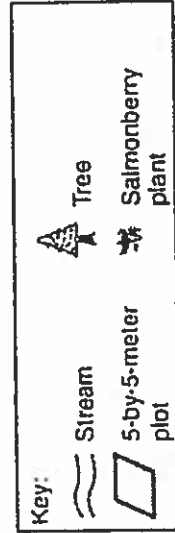


Diagram not to scale

Procedure:

1. Go to the salmonberry field study area. Record location, date, time, and temperature.
2. Choose a random location in the forest edge habitat.
3. Measure a 5-meter-by-5-meter plot and label as Plot 1.
4. Count the number of salmonberry plants in Plot 1. Record as Plot 1 for the forest edge habitat.
5. Repeat steps 2 through 4 for Plot 2 and Plot 3, choosing a new location in the forest edge habitat for each plot.
6. Repeat steps 1 through 5 for the stream bank and forest habitats.
7. Calculate and record the average number of salmonberry plants for each habitat.

Data Collected:

Location: Forest edge, stream bank, and forest habitats
 Date and Time: May 1, from 11:00 A.M. to 2:00 P.M.
 Temperature: 10°C to 15°C

Habitat vs. Number of Salmonberry Plants

Habitat	Number of Salmonberry Plants (in a 5-meter-by-5-meter plot)			Average
	Plot 1	Plot 2	Plot 3	
Forest edge	15	18	15	16
Stream bank	11	13	12	12
Forest	5	5	2	4

23 How could the validity of this field study be improved?

- A. Use a fourth habitat type in the field study.
- B. Count the number of trees in the field study area.
- C. Use three 1-meter-by-1-meter plots in each habitat.
- D. Count the salmonberry plants in four plots at each habitat.

24 Which output from bears is used by salmonberry plants?

- A. Carbon dioxide from bears is used for photosynthesis in plants.
- B. Oxygen from bears is used for photosynthesis in plants.
- C. Glucose from bears is used for respiration in plants.
- D. Water from bears is used for respiration in plants.

Results from the field study are shown in The Habitat vs. Number of Salmonberry plants table. Describe a scientific reason for the results in the forest edge habitat and a scientific reason for results in the forest habitat.

Your description, be sure to:
Describe a scientific reason for the results in the forest edge habitat.
Describe a different scientific reason for the results in the forest habitat.
Include data from the Habitat vs. Number of Salmonberry Plants table that supports each scientific reason.

Forest edge habitat results:

Forest habitat results:

26 Blackberry plants are found in forest edge habitats. How could blackberry plants limit the population of salmonberry plants?

- A. Blackberry plants increase oxygen in the ecosystem.
- B. Blackberry plants lack flowers that attract bees.
- C. Blackberry plants produce dark purple berries.
- D. Blackberry plants compete for resources.

27 Salmonberry leaf cells contain 14 chromosomes. How many chromosomes will a new leaf cell contain after mitosis?

Write your answer in the box.

_____ chromosomes

29 Which event might be evidence that the forest edge habitat is in equilibrium?

- A. A dead tree providing nutrients for a young tree
- B. A bird species leaving as temperatures increase
- C. A landslide damming the stream in the habitat
- D. A flood washing away topsoil from the ground

30 Salmonberry plant roots absorb minerals. What cellular process moves minerals across root cell membranes from an area of low mineral concentration to an area of high mineral concentration?

- A. Facilitated diffusion
- B. Passive transport
- C. Active transport
- D. Osmosis

31 Scientists wondered how the presence of the new type of grass could affect the population of salmonberry plants in a forest ecosystem. What kind of investigation would be most appropriate to answer this question?

- A. A field study because factors that are hard to control could influence the results
- B. A research paper because information is available about many kinds of plants
- C. A controlled experiment because all the variables can be kept the same
- D. A simulation because computers are more reliable than natural systems

28 Some bears are getting into trash cans at campgrounds near the forest. The park rangers plan to trap and relocate these bears to solve the problem of these bears getting into the trash. Describe two constraints other than cost that park rangers could encounter while trapping and relocating these bears.

- In your description, be sure to:*
- Identify two constraints on trapping and relocating these bears other than cost.
- Describe how each constraint is a limitation.

One constraint:

Another constraint:
