

Lab Skills Star 3

Name: _____

Date: _____

1. Base your answer(s) to the following question(s) on the investigation described below and on your knowledge of biology.

As part of an investigation, 10 bean seedlings in one setup were grown in the dark, while 10 seedlings in another setup were grown in sunlight. All other growth conditions were kept the same in both setups. The seedlings grown in the dark were white with long, slender stems. These seedlings soon died. The seedlings grown in the sunlight were green and healthy.

Which hypothesis was most likely being tested in this investigation?

- A. Plants grown in the dark cannot perform the process of respiration.
- B. Sunlight is necessary for the normal growth of bean plants.
- C. Light is necessary for the germination of bean seeds.
- D. Light is necessary for proper mineral absorption by plants.

2. Base your answer(s) to the following question(s) on the information and data table and on your knowledge of biology.

Data Table

In an investigation, three seeds of the same species were allowed to germinate and grow in three different locations. Each seedling was grown in the same amount and type of soil, and each received the same amount of water during a 6-day period. At the end of the investigation, the height of each seedling and the color of its leaves were recorded. The results are shown in the data table to the right.

Data Table		
Location	Height (cm)	Leaf Color
Sunny windowsill	7	green
Indirect sunlight	9	green
Closed closet	11	whitish yellow

Which hypothesis was most likely being tested in this investigation?

- A. A plant grown in the dark will not be green.
- B. The type of soil a plant is grown in influences how tall it will be.
- C. Plants need water to grow.
- D. Plants grown in red light are taller than plants grown in green light.

3. An investigation was designed to determine the effect of ultraviolet light on mold spore growth. Two groups of mold spores were grown under identical conditions, except one group was exposed only to ultraviolet light, while the other group was grown in total darkness. In this investigation, the group of mold spores grown without receiving any ultraviolet light is known as the

- A. control
- B. hypothesis
- C. dependent variable
- D. limiting factor

4. In an investigation to determine the change in heart rate with increased activity, a biology teacher asked students to take their pulses immediately before and immediately after exercising for 2 minutes. The data showed an average heart rate of 72 beats per minute before exercising and 90 beats per minute after exercising. If a valid conclusion is to be made from the results of this investigation, which assumption must be made?
- A. In most students, the average heart rate is not affected by exercise.
 - B. Exercise causes the heart rate to slow down.
 - C. Each student exercised with the same intensity.
 - D. The heart rate of each student goes up 18 beats after jogging for 2 minutes.
5. A scientist tested a hypothesis that white-tailed deer would prefer apples over corn as a primary food source. The findings of the test, in which the scientist claimed that the deer preferred apples, were published. Which research technique, if used by the scientist, might result in this claim being questioned?
- A. The scientist observed four deer in different locations at various times of the day.
 - B. The scientist observed a total of 500 deer in 20 different locations at various times of the day.
 - C. The scientist observed 200 deer in various natural settings, but none in captivity.
 - D. The scientist observed 300 deer in various locations in captivity, but none in natural settings.
6. A student formulated a hypothesis that cotton will grow larger bolls (pods) if magnesium is added to the soil. The student has two experimental fields of cotton, one with magnesium and one without. Which data should be collected to support this hypothesis?
- A. height of the cotton plants in both fields
 - B. diameter of the cotton bolls in both fields
 - C. length of the growing season in both fields
 - D. color of the cotton bolls in both fields
7. Substance *X* has a unique characteristic in that it fluoresces (glows) when exposed to ultraviolet light. An investigator added substance *X* to a dish containing a culture of cells. The investigator exposed the cells to ultraviolet light and found that substance *X* was highly concentrated only within mitochondria (cell organelles). Which assumption could the investigator make regarding the results of this experiment?
- A. Substance *X* could be used to identify mitochondria in living cells.
 - B. Substance *X* could be used to stain nuclei of living cells.
 - C. All fluorescent substances will be absorbed by mitochondria.
 - D. All mitochondria synthesize fluorescent substances.

8. Base your answer to the following question on the information below and on your knowledge of biology.

A student performed a laboratory investigation to determine the effect of temperature on the heart rate of *Daphnia* (water flea). The following temperatures and heart rates were recorded:

20°C—260 beats/min; 10°C—152 beats/min;
 25°C—300 beats/min; 5°C—108 beats/min;
 15°C—200 beats/min

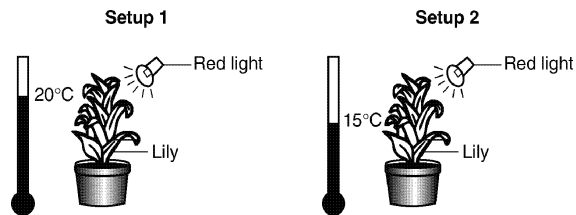
Organize the data by filling in the data table below. Complete both columns in the data table so that the temperature either increases or decreases from the top to the bottom of the table.

Data Table

Temperature (°C)	Heart Rate (beats/min)

9. Base your answer(s) to the following question(s) on the information and diagram below.

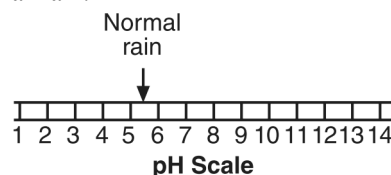
An investigation was carried out using the two setups shown below. Other than the difference shown in the diagram, all other conditions were identical.



What data should be collected in order to test the hypothesis in the previous question?

10. Base your answer(s) to the following question(s) on the provided information.

Acid rain can have a pH between 1.5 and 5.0. The effect of acid rain on the environment depends on the pH of the rain and the characteristics of the environment. It appears that acid rain has a negative effect on plants. The scale below shows the pH of normal rain.



Provide the information requested below that should be included in a research plan to test the effect of pH on the early growth of bean plants in the laboratory.

State a hypothesis.

1.
Answer: B

2.
Answer: A

3.
Answer: A

4.
Answer: C

5.
Answer: A

6.
Answer: B

7.
Answer: A

8.
Answer:

Data Table

Temperature (° C)	Heart Rate (beats/min)
5	108
10	152
15	200
20	260
25	300

9.
Answer: height, mass, number of leaves, or
 number of flowers

10.
Answer: As the pH decreases, the bean plants will
 grow faster. or Bean plants will grow
 faster in normal rain than in acid rain.