A student constructs several terrariums like the one shown. Each terrarium is exposed to a different amount of sunlight each day. In order to determine the ideal amount of sunlight, which of the following variables must be held constant?

A Type of plants
B Growth rate of plants
C Wavelengths of sunlight
D Amount of sunlight received
2.

As part of an experiment to measure decomposition rates of different materials, students put food scraps from the cafeteria in compost bin A and leaves and grass clippings in compost bin B for six weeks. Students in first period measured the temperature in bin A, and students in sixth period measured the temperature in bin B. What is the greatest error in the students’ experimental design?

F  There are too many uncontrolled variables in the experiment.
G  Temperature is the only dependent variable in the experiment.
H  The materials chosen decompose too rapidly.
J  The students put equal masses of materials in each bin.

3.

Scientists are using genetic engineering to develop a wheat crop that is resistant to a particular kind of moth. How would they determine if the plants are moth-resistant?

A  Determine the length of the moth reproductive cycle in normal wheat.
B  Determine whether moths in test wheat can be controlled with chemical sprays.
C  Monitor numbers of moth species infesting normal wheat.
D  Monitor moth populations in fields planted with test and normal wheat.
Experimental Setup

The diagram shows a setup for a plant investigation. Which variable is most likely being tested?

F  Hours of light exposure  
G  Plant species  
H  Soil volume  
J  Soil pH

A student hypothesizes that green algae will grow fastest when exposed to blue light. To test this hypothesis, the student should design an experiment with which independent variable?

A  Color of algae  
B  Rate of algae growth  
C  Color of light that algae are exposed to  
D  Amount of time per day that algae are exposed to light
The graphs show the results of two separate experiments on the same species of plant. Students now want to determine how the use of rainwater or bottled water affects the growth of this plant. Which conditions should be used for optimal growth as the two water types are tested?

A 20°C, 10 mL/day
B 25°C, 35 mL/day
C 30°C, 45 mL/day
D 35°C, 20 mL/day
Bacterial Culture Experiment

<table>
<thead>
<tr>
<th>Day</th>
<th>Culture</th>
<th>Sample (400x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Initial sample</td>
<td>Sample A</td>
</tr>
<tr>
<td>2</td>
<td>Chemical agent</td>
<td>Sample B</td>
</tr>
<tr>
<td>3,4</td>
<td>Sample</td>
<td>Sample C</td>
</tr>
</tbody>
</table>

These three samples from the same live culture were all viewed at the same magnification. Which conclusion is best supported by the observation of these three samples?

A. The bacterial culture was unaffected by the chemical agent.
B. The sampling techniques used did not produce accurate data.
C. The culture became contaminated by airborne bacteria during the initial sampling.
D. The culture included some bacteria that were resistant to the chemical agent.
8. A scientist develops a hypothesis, designs an experiment, and obtains data that support her hypothesis. Which of the following best describes when a hypothesis becomes a theory?

A  When one good set of scientific data supports a theory
B  When the official scientific method is followed
C  When a website is created to display the theory
D  When it is supported by consistent data from many experimental trials

9. A student soaked 50 lima bean seeds and 50 green bean seeds in water for 24 hours. Then she planted the seeds in soil at a depth of two centimeters, using the same amount of water, light, and heat for each kind of seed. She measured every three days to determine which type of seed grew the fastest.

The paragraph describes —

A  an observation
B  a hypothesis
C  an experiment
D  a conclusion

10. A scientist wants to study the behavior of bald eagles. Which of these plans should be used to study the hunting habits of bald eagles?

F  Analyze the eagles at a zoo for several months.
G  Observe the eagles along the Potomac River for a year.
H  Ask a national park ranger questions about eagles.
J  Research hawks and make inferences about eagles.
Which of these would be the **best** conclusion regarding the experimental results shown?

A  The tallest this species of plant will ever grow is 50 cm.
B  This species of plant grew best between 18°C and 26°C.
C  The ideal temperature for all plant growth is 26°C.
D  Plants will not grow above 26°C.
In a student experiment, 4 earthworms were placed at each end of a compartment as shown. After 10 minutes, all of the earthworms were together in the same area. The students concluded that the earthworms had moved as far as they could in that period of time. Which alternative explanation is also supported?

A  The earthworms moved to their preferred temperature range.
B  The earthworms needed to be with other earthworms for warmth.
C  The earthworms preferred to be in protected corners.
D  The earthworms moved randomly until they grouped together.
A scientist observes that a species of insect appears to be more numerous during dry summers than during wet summers. Which is the next step to determine an explanation of this phenomenon?

F  Develop a hypothesis
G  Publish the observation
H  Observe the species in the winter
J  Present a theory in a scientific journal

A student is planning a field study of a pond in which a large increase in algae populations has been observed. Large numbers of dead fish have also been observed in the pond. To find out what caused the death of the fish, the student should do each of these EXCEPT —

A  test for chemicals that might poison fish and cause algae to grow
B  measure the dissolved oxygen content in pond-water samples
C  look for sources of pollution that may be affecting the pond
D  measure the amount of light at various levels in the pond

Many residents in a small town have developed a bacterial infection. Two students hypothesize that the bacteria are coming from the town's drinking water. They look for the bacteria in water samples from the lake that supplies 80 percent of the town's drinking water. When they find no bacteria, the students conclude that the town's residents are not getting the bacteria from their drinking water. Which is a source of error in the students' experimental design?

F  Water from the lake was not tested for other possible pathogens.
G  Residents of other nearby towns were not tested for the bacteria.
H  The residents' genetic predisposition for getting ill was not determined.
J  Other sources of drinking water were not tested for the bacteria.
A student plans to conduct an experiment to determine how a change in the pH of water affects the population growth rate of algae. To ensure that her experimental data are valid, she should —

F hold the acidity of the water constant  
G vary the temperature of the water used  
H control the final algae population sizes  
J use the same species of algae in all trials

The graph shows the populations of ladybugs and the red mites on which they feed. On which date did the ladybug population begin to exceed the red mite population?

F June 6  
G June 10  
H June 14  
J June 20
ANSWER KEY FOR Practice of Science Prompts

1.  A
2.  F
3.  D
4.  J
5.  C
6.  D
7.  D
8.  D
9.  C
10. G.
11. B
12. A
13. F
14. D
15. J
16. J
17. H