

Chapter

1

Biology: The Study of Life

Problem Solving

Use with Chapter 1, Section 1.2

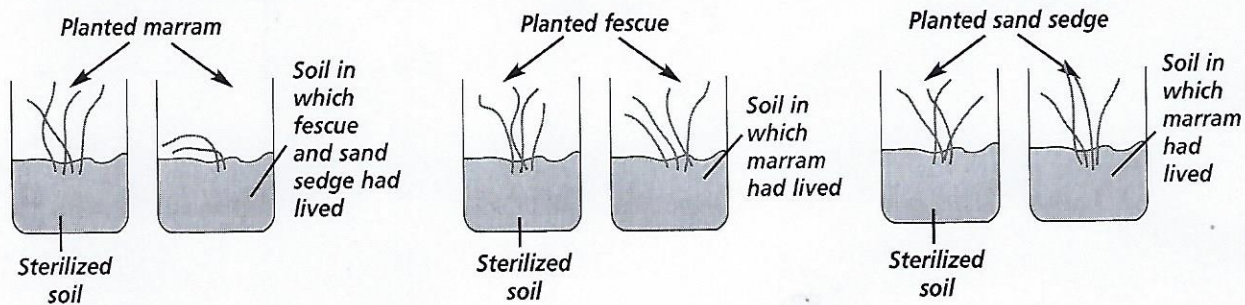
Using Scientific Methods

Scientists have long known that no plant community remains stable. Over time, existing populations of plants in an environment will be succeeded by whole new populations. Sometimes as these changes occur, it is difficult for the existing plant populations to continue to survive. What causes the older plants to die off?

A Testable Hypothesis A group of researchers, led by Dr. Wim Van der Putten of the Center for Terrestrial Ecology in the Netherlands, developed the following hypothesis. The changing plant populations in an area are controlled by disease-causing

microorganisms that develop in the soil itself. These soil-borne diseases specifically target the existing plant inhabitants. New species that invade the area are, however, unaffected by the microorganisms.

An Experimental Design The researchers knew that marram grass, which is found along European coastal areas, is regularly replaced by two other species of grasses—fescue and sand sedge. To test their hypothesis, the scientists designed an experiment, which is represented in the following diagram.



Refer to the diagram to answer the following questions about the experiment.

1. What were the independent variable or variables in the experiment? Which factor was the dependent variable?

2. What control was used?

3. According to their hypothesis, what predictions would the researchers make about the outcome of the experiment?

4. Suppose that fescue and sand sedge thrived in the soil in which the marram had previously grown. In order for researchers to rule out the possibility that nutrients, or chemicals such as salt or calcium chloride, favorably affected the new plant growth, what other observation would researchers have to make?
