Preserving Soils Answer Key

1. What factors do you think account for the uneven distribution of croplands around the world?
   Croplands are unevenly distributed around the world because precipitation levels and temperatures are not the same around the world. Some areas are better than others for growing crops.

2. How thick is the topsoil layer?
   12 inches

3. Roots gather water and nutrients for plants. Root structure and depth depend on the plant and on the soil texture. In what layer(s) of soil do you expect to find plant roots? (Select all that apply.)
   O horizon
   A horizon
   B horizon

4. Plants absorb nutrients through their roots. Describe why plants' roots grow extensively in the topsoil.
   Plants' roots grow extensively in the topsoil because the topsoil has a lot of nutrients and water. Plants need nutrients to grow and obtain nutrients through their roots. They can obtain the most nutrients by putting more roots into the most nutrient-dense area—the topsoil.

5. What do you think is the most important resource to follow in this model?
   Topsoil is the most important resource to follow in this model.

6. What processes are changing the availability of this resource in the model?
   Erosion removes soil from each zone. It can be deposited from one zone into another, or it can leave the model entirely.

7. Which slope had the highest erosion rate?
   hilly terrain

8. Explain why the slope you chose increases the erosion rate.
   In a plain, the terrain is mostly flat, so erosion doesn't happen very quickly. In hilly terrain, the slope increases the erosion rate. In a terraced landscape, the terrain is completely flat in places. The erosion doesn't happen much on the flat areas, and the vertical areas are fortified so that they don't erode as much as a vertical slope on similarly hilly terrain would erode.

9. Plants need nutrients to grow. Explain how erosion can affect plant growth.
   Erosion can affect plant growth if the topsoil is eroded away. Plants get nutrients through their roots, which grow extensively in the topsoil. But if the topsoil is eroded away, so are the nutrients. And when there are fewer nutrients, plants don't grow as well.

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10. What do you think is the most important resource in this model?
    Soil is the most important resource in this model.

11. What processes are changing the availability of this resource in the model?
    Erosion affects the availability of the topsoil. Growing plants also affects the availability of the topsoil.

12. Which management plan increases the erosion rate?
    hill with bare soil

13. Explain why the management plan affects the erosion rate.
    The slope affects the erosion rate, but so do plants. When plants are planted on the slope, the erosion rate is less because the plants keep the soil from moving around as much.

14. A new housing development is being built on a slope. Some people suggest planting grass on the bare slope now. Others say it can be done later. Which choice will maintain the soil structure?
    planting grass now

15. Explain your answer.
    Planting grass now will keep the topsoil in place. Keeping the topsoil in place means that the grass will grow better as the plants get their nutrients from the topsoil. If grass is planted later, the topsoil will have eroded away. Then the people will have to bring in topsoil to get the grass to grow later. The grass won't grow very well if there is no topsoil left on the hill.

16. After the land dries out, will crops grow as well as they did before the flooding event?
    no

17. Explain your answer.
    The crops will not grow as well after the flooding event as before the flooding event because the topsoil has been washed away. The topsoil contains many nutrients that are necessary for plant growth. With the topsoil gone, the nutrients have also gone.

18. How certain are you about your claim based on your explanation?
    Student answers will vary.

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19. Explain what influenced your certainty rating.
    Student answers will vary. Scientific evidence includes: flooding events cause erosion of topsoil and topsoil contains nutrients that plants need to grow. Students may state that since some of the plants remain, some of the topsoil is retained, so the future plant growth might be patchy, depending on where the topsoil was washed away.

20. Describe what farmers should do to prevent erosion of the soil in the Palouse Hills. Explain how your suggestion(s) would reduce erosion.
    To prevent erosion of the soil in the Palouse Hills, farmers should plant plants in the soil, not leave it bare. Keeping plant roots in the soil prevents wind and water from carrying away the topsoil. Farmers should also plow their fields so the water doesn't easily run down the rows when it rains. Having the rows not parallel to the slope of the hill decreases erosion by increasing the number of barriers to erosive forces.

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