Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Lesson 3: Courting Erosion**

The only location for a basketball court a school wants to build is near a steep hillside. The threat of landslides is a real possibility when heavy rains fall on the area. Can you design erosion control methods to keep the basketball court safe and not get dunked on by falling soil?

Here are some definitions to help you in your investigation.

Erosion - the movement of weathered materials from one location to another

Erosion rate - how quickly or slowly erosion happens

Erosion agent - things that increase the rate of erosion

Landslide - the sliding of rock or soil down a hill or mountain

Tradeoff - a balancing of two or more things that are not possible at the same time

**Doing the Science**

1. Start the Erosion Control Simulation by clicking on the “Simulation” tab.

2. Click the “Court Builder” button at the bottom of the screen. You’ll have three investigations to build the best erosion control system to protect the basketball court.

3. Check one or more boxes for the erosion control method you want to investigate. Use a “√” to record your selection(s) in Table 1.

4. Once you’re satisfied with your selection(s), click the blue “Rain” button on the left side of the screen.

5. Note and record in Table 2 the results and the total costs of your erosion control method.

6. Repeat steps 3 – 5 for a total of three investigations. Make sure to record your selection(s) in Table 1 and your results and costs in Table 2.

**Table 1. Erosion Control Methods**

|  |  |  |  |
| --- | --- | --- | --- |
| **Method** |  | **Selections** |  |
|  | **Investigation 1** | **Investigation 2** | **Investigation 3** |
| Terracing |  |  |  |
| Ground Cover |  |  |  |
| Retaining Wall |  |  |  |
| Soil Lifts |  |  |  |
| Sloping |  |  |  |

**Table 2.** **Erosion Control Results**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Investigation 1** | **Investigation 2** | **Investigation 3** |
| **Results** |  |  |  |
| **Costs** |  |  |  |

**Do You Understand?**

1. What was eroded in this experiment?

2. What were the two agents of erosion in this experiment?

3. Compare your multiple erosion control solutions by identifying advantages and disadvantages of each investigation in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Investigation 1 | Investigation 2 | Investigation 3 |
| Advantages |  |  |  |
|  |  |  |
| Disadvantages |  |  |  |
|  |  |  |

4. Construct an explanation about which of the three erosion control investigations you tested was best at preventing soil erosion. Highlight the positive and negative effects of your chosen remediation method(s). Support your explanation of which method (investigation) was best using evidence from your investigations.

5. If cost effectiveness is a major factor in the school’s decision about how to prevent or minimize soil erosion at the basketball court, which erosion control method would they select? What explanation and what evidence would they provide to support their decision? [Provide a reason why you think this method was best while not costing the greatest amount of money.]

6. A member of the school board is skeptical about the results of a computer- based simulation of soil erosion. Plan an investigation for how you could create and test out a model in the classroom. What materials would you use? What procedural steps would you take? What data would you collect and how would you organize your data?

7. Explain how your responses to questions #4 and #5 illustrate a tradeoff engineers must make when they design structures to solve problems.