**Big Roots for Big Problems**

**Soil Erosion Demonstration!**

**Materials:** two plastic bins (with walls less than 6 inches tall), fast growing grass seeds, growth medium (e.g., potting soil), device to cut plastic (e.g., handsaw, durable scissors, box cutter), watering can, two trays or buckets

**Background:**

This activity is designed to demonstrate how vegetation and roots stabilize soils to prevent erosion. Erosion is the process where soil is removed from one location by water or wind and deposited somewhere else. Soil erosion can result in a wide range of problems including desertification, land degradation, loss of nutrient rich topsoil, and degradation of waterways. Plant roots hold soil together in an intertwining mass that protects against wind and water erosion. Larger, more complicated root systems are more effective at holding soil together. In this activity the teacher or the class will construct soil erosion boxes in order to compare how soil erodes in a vegetated bin (i.e., soil and established grass) versus a non-vegetated bin (i.e., only soil). This demonstration is especially appropriate before doing the *Build Your Own Root System!* activity in this lesson plan.

**Procedure:**

1. Three weeks prior to the demonstration, prepare the soil erosion boxes.
   1. Fill each plastic bin with 3-5 inches of potting soil.
   2. On the narrower side of both bins, cut out a section of the plastic from the top of the bin wall down to the top of the potting soil and no wider than half the width of the side. When the opposite end of the erosion box is elevated, this missing section will be where the water and soil erode out of the box during the demonstration.
   3. In one of the bins, liberally cover the surface of the soil with grass seed and then cover the seed with a light layer of soil. Do not plant grass in the other bin.
   4. Water both bins and place them in a window or under a grow light for three weeks or until the grass and roots are well established. Water as necessary.
2. For the demonstration, situate the soil boxes in the front of the classroom with the cut side of the box facing the students.
3. Elevate the opposite end (i.e., the non-cut side) 3-5 inches to create a sloping surface. Make sure these are stable and won’t slide off the table.
4. Ask the students to make a prediction about which soil erosion box will yield more erosion during a rain event.
5. Have at least two students volunteer to help with the demonstration. One student will take a full watering can (preferably one with a spout head that makes the water exit in multiple streams simulating rainfall) and liberally water the top third of the soil erosion box without the grass to simulate a rain event. The second student will hold a tray or bucket at the bottom of the erosion box to collect the water and eroded soil.
6. Set the tray aside.
7. Repeat this procedure with the vegetated soil erosion box, using approximately the same volume of water. Use a new tray or bucket to collect the water and eroded soil.
8. Place the two trays side by side and have the students compare how much soil eroded out of each box. If it’s difficult to tell which tray holds more soil, dry the wet soil mixture and weigh the soil during a future class period.

Were the students predictions correct? Did the soil erosion box with the grass yield any soil at all? Why or why not?

Where in their environment might the students find bare soil that might be eroded away during rain events?

Inform the students that as our climate changes, models predict (and we’ve already seen) that we will experience more intense rain events, and fewer slow-soaking rain events. How might this affect the amount of erosion that might occur on the landscape?