**Discover how farmers care for the land by using soil conservation practices**

Pillar 1 B. (4th-8th Grades)

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| **Activity**: Keeping Soil in Its Place and Splash Zone <http://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=22>  **The Great Plant Escape** <http://www.urbanext.uiuc.edu/gpe/>  **Video:** Soil Stories (Part 1) (<https://vimeo.com/channels/soilstories/videos> |

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**Background Teacher Information**

**Conserving Soil**

Over time, and without proper care, humans can deplete the soil and actually kill it, turning healthy, living soil into just dirt. Farmers try to protect and conserve their soil so it can support and grow healthy crops. To cultivate healthy soil, farmers follow these practices:

* “Rotate Crops. The more crops you rotate over time, the more diverse your soil web will be. For instance, if you rotate corn and tomatoes, you’ll have one level of biodiversity in the soil food web. If you rotate corn, tomatoes, broccoli, and beans, you’ll have more kinds of soil organisms (fungi, bacteria, etc.) present” (<https://bonnieplants.com/library/the-soil-is-alive-really/>)
* “Aim for a little mess. A garden that’s cleanly tilled with crisp edges and no leaf litter offers limited habitat for arthropods. Mulches, fence-rows, and deep trench edging provide shelter for arthropods” (<https://bonnieplants.com/library/the-soil-is-alive-really/>)
* Farmers consider how companion plants deter pests, attract beneficial insects, and add nutrients to the soil. Farmers are strategic in how they plan their fields.
* “Try not to walk on the soil. When you put weight on the soil, it causes it to compact. Make garden beds narrow enough to reach from either side, or use paths or stepping stones to create a walkway within the garden” (<https://bonnieplants.com/library/the-soil-is-alive-really/>)
* “Keep soil covered. Mulch is one of the soil food web’s best friends because it adds organic matter and helps keep moisture in the soil. Apply organic mulch, such as compost, pine straw, or shredded leaves. In vegetable gardens, when crops are not actively growing, cover soil with mulch to encourage the soil food web to remain active. You can plant a “living mulch” of ryegrass, clover, or some other cover crop to keep soil organisms active while vegetables are absent. Some people plant cover crops in the aisles between rows and keep it mowed” (<https://bonnieplants.com/library/the-soil-is-alive-really/>)

**Keeping Soil in Its Place**

Purpose:

Students will be able to demonstrate raindrop splash (*splash erosion*) and determine its impact on bare soil, ultimately being able to visually identify types of erosion.

Why are we studying this? To understand the need for soil conservation practices to prevent erosion

Materials:

* Splash Zone Target (these could be made on a transparency, this way they could be washed and used year after year)
* Graph handout
* *Soils on the Move*, for handout or display
* 5 teaspoons of dry soil
* Eyedroppers or dropper bottles
* Water
* Rulers
* *Erosion Control Practices*, for handout or display

Essential Files (maps, charts, pictures, or documents)

* Soils Activity Sheets (found here: <http://naitc-api.usu.edu/media/uploads/2014/06/19/keeping_soil_in_its_place.pdf>)

Procedures

**Activity 1: Splash Zone**

1. Divide the class into five groups.
2. Give each group a *Splash Zone Target*, eyedropper, and a small container of water.
3. Instruct student to put enough soil (about ½ teaspoon of dry soil) in the center of their target to just cover the center circle.
4. Fill the eyedropper with water.
5. Hold the eyedropper about 18 inches (or 46 cm) above the soil sample.
6. Drop 5 drops of water directly onto the soil sample. If a drop misses the soil, continue until 5 drops hit the soil.
7. Record the number of water “splashes”—drops containing soil—in each zone.
8. Complete the graph using handouts from this website (<http://naitc-api.usu.edu/media/uploads/2014/06/19/keeping_soil_in_its_place.pdf>) to show your results.

Discuss the following questions:

* + What did you observe? How did the soil particles move from the center of the target? (They were picked up and moved with the water)
  + Which zone contained the most number of water drops with soil particles? Why?
  + Which zone contained the least number? Why?
  + What would happen if the drops were larger? (splashes would travel further)
  + How might you prevent splash erosion? (plant vegetation, cover the soil with mulch)
  + How do farmers decide which erosion control methods to use? (it depends on the slope, soil types, and what he or she wants to plant)
    - *Note: You may want to repeat this activity with drops from a higher start point or try the activity with wet soil.*

**Concept Elaboration and Evaluation**

Review and summarize the following key concepts:

* Soil is a valuable resource that needs to be conserved to allow farmers to grow our food.
* Erosion is a process that moves soil from one place to another using water or wind.
* Farmers use various methods such as furrows, row crops, terraces, and cover crops to prevent erosion of soil on their farms.

Show Video (parts 1, 2, 3 depending on time):

**Soil Stories** <https://vimeo.com/channels/soilstories/videos>

Discussion questions after the Soil Stories video:

1. What conservation practices are highlighted in the video?
2. What significant event in history contributed to the depletion of topsoil?

Alternative Activity:

Activity 4.1.3 Moving Earth

Purpose:

In this activity we look at two types of soil erosion, reduction and addition. Reduction is when soil is removed from the surface, and addition is when soil is deposited to a different spot.

Materials:

* Stream bed
* Catch basin
* Stand
* Rainmaker
* Stream sand
* 30 ml graduated cup
* Plastic spoon
* 9-oz plastic cup
* Water
* Paper towels

Procedures:

1. Students will read procedures, and start to place paper towels on their desk and will use the visual representation to assemble the rainmaker.
2. The students will then use the graduated cup to add 30ml of water to the sand at the peak of the rainmaker.
3. They will then need to draw the movements of the send in the box labeled part A.
4. Students will repeat steps 2 and 3 two more times for part B and C.
5. Have students answer the conclusion questions.

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| Additional Online Resources: <http://www.soils4kids.org/5-8> Games  * A-Maze-ing Underground: Help corn flourish by collecting the perfect balance of nutrients like pacman would. from Agrium's [www.growingthenextgeneration.com](http://www.growingthenextgeneration.com/). <http://seedsurvivor.com/agrium-games/A-Maze-ing-Underground/index.htm> * Detective Leplant and his partners, Bud and Sprout, need your help to unlock the mysteries of soil and plant life in The Great Plant Escape. <http://www.urbanext.uiuc.edu/gpe/>  Science Experiments What makes soil stick together? [Check it out!](http://www.soils4kids.org/files/s4k/soil-glue-lesson-plan.pdf)   * Dr. Dirt's K-12 Teaching Resources and Activities A sponge in water is used to demonstrate many types of soil water interactions. <http://www.doctordirt.org/teachingresources/sponge> * Use grape Kool-Aid to learn how "Soil is a Filter" and how important soil is for clean drinking water. <http://www.doctordirt.org/teachingresources/soilfilter> * Fun Stuff   Are you an artist? When you make your next painting, you can Paint with Soil for an earthy masterpiece. Dig down below the topsoil to get different colors and avoid painting with sandy soils. [Look here!](http://www.soils4kids.org/files/s4k/painting-with-soil.pdf) |