SPRING | Critters
Earthworm Excavators: Aeration in Action

Summary:

Occasionally referred to as nature's plow, an earthworm works through soil to create tunnels and bring air to plant roots. Today, you're the engineer so prepare to test your tunneling and aerating abilities.

Before Visiting the Garden:

Gather: Paper plate, 2 two-liter clear plastic bottles, scissors, drinking straws, four coffee filters, small shovels, gardening claws, watering can or hose, and gardening gloves

Explore: Examples of tunnels such as:

- The Chunnel, connecting England to France
- The Lærdal Tunnel in Norway, the longest road tunnel
- The Seikan Tunnel in Japan, the longest and deepest rail tunnel.
- What do you notice about the shape of these tunnels? What do you think the engineers had to consider when they built these different tunnels?

Read: *Wonderful Worms* by Linda Glaser

In the Garden:

Earthworms are an essential part of keeping our plants and gardens happy and healthy. They provide our soil with the nutrients from their castings, worm poop! Earthworms also help to keep our soil soft and breathable by digging tunnels that aerate (bring air) to the roots of plants.

Go on an earthworm hunt! Explore the garden to look for earthworms.

- Use gardening claws to gently rake through the soil to find earthworms. When you find an earthworm, use a shovel to carefully scoop it onto your paper plate.
- Place some soil on the plate.
- After you find five earthworms, watch the way that the worms are moving in the dirt. Do you see any tunnels?
- Pay close attention to the conditions of the garden. Is it still cool, near freezing? Or is it warm? Rainy? Worms need water but they can't sit in water so they may be more visible after a rainstorm.

Questions to Explore:

- What do you notice about the shape of a worm's body?
- Were you able to spot any tunnels?
- Did you see any similarities to the tunnels you explored?
- If you were designing a worm, would you make any changes to it? If so, what changes and why?

Activity:

1. Cut off the top third of the two-liter bottles. Discard any lids.
2. Invert the top into the lower half as shown in the drawing.
3. Place your coffee filter into the bottom of the funnel.
4. Next, cut the drinking straws in halves and thirds.
5. Finally, collect enough soil to fill the tops of the funnels.
6. In one funnel, place tightly packed soil. In the other, place soil mixed in with the drinking straws.
7. Prepare to pour your water into the two containers but first predict which funnel will drain faster.
8. Now pour!
9. Did you notice a difference between the aerated (straw filled) soil and the hard packed soil? Repeat with other combinations to test soil drainage.

Beyond the Garden | Whichever Way the Worm Turns

Try a simple worm experiment at home.

- Gather a few worms, a paper towel, a ¼ cup of water, and a notebook. Now, we can test if a worm prefers wet or dry.
- First, make a hypothesis, or guess at what you think will happen, and record it in your notebook.
- Next, wet one area of the paper towel and leave the other area dry. Place your worm in the middle of the paper towel and watch which direction it chooses.
- Record your results in your notebook. Once you figure out which area your worm prefers, you can use that information to keep the soil in your garden to your worm's preference (hint, damp without soaking)!

Continue Exploring | Supporting Materials

Engineering is Elementary: http://www.eie.org

Shape Lab: http://www.pbs.org/wgbh/buildingbig/lab/shapes.html