



Our Soil

Lesson

Goals

Students will learn about the properties of soil through hands-on investigations.

Objectives

Students will determine the type of soil in their garden and come up with creative ways to describe the different elements of soil.

Standards

Science: Life Science

GR.2-S.2-GLE.1

GR.3-S.3-GLE.1

GR.4-S.2-GLE.3

Total Time – 60 minutes

Did you know?

Each inch of topsoil takes more than 100 years to form. More than 100 billion microorganisms live in a pound of soil.

Materials

- Samples of clay, compost, sand and garden soil
- Slips of scrap paper
- Paper bags
- Four pieces of poster board
- Soil sample from your garden
- Clear glass jar with lid
- Apples
- Plastic knives

Method

Introduction (10 minutes)

1. Ask the class: *What is soil? What is dirt? What is the difference between soil and dirt?* Dirt is what is under your fingernails and gets washed off before meals. Dirt is what gets on your shoes and you track into the house. Soil is a living entity that grows the food we eat.
2. Ask the class: *Why is soil important for our health?* Help them make the connection that without healthy soil we could not grow food. There could be no life without soil and no soil without life.
3. Continue discussing the soil and different types of soil: *Why is soil important for plant growth? What type of soil do cacti grow in (sandy soil)? What type of strong plants could grow in clay soil (ferns and dandelions)? What kind of soil is the best for the majority of the plants we have planted?* A nutrient rich, balanced soil, which includes the right mixture of sand, silt, clay and compost. We are going to explore the properties of the soil in our garden.

Activity (35 minutes)

1. Review the different elements that make up soil. Sand, silt and clay. Proportionally, sand is

equivalent to a beach ball, silt is the size and shape of a Frisbee and clay is the size and shape of a dime. You may want to bring these items in for a visual. Explain to the class that before determining how much of each element is in the garden soil, they are going to do a descriptive writing exercise.

2. Set up the room with four different stations. Each station will include a sample (clay, garden soil, compost or sand), enough scrap paper for each student to have one and a paper bag for the scraps to go into. Break the class into four groups. Each group will spend a few minutes at each station before moving onto the next. In the end every student will visit every station
3. At each station, have the groups use their senses (touch, sight, smell and hearing) to examine the sample. Each student should write a single word describing the sample.
4. After all groups have visited each station, assign a bag to each group. Have the group open the bag and compose a creative poem. Every slip has to be used and can only be used once. Encourage the groups to get creative (e.g. rhyming, singing, hand clapping, etc.).
5. Have each group read their poem to the class. These can be transcribed onto large poster board and hung around the room or on the garden bulletin board.
6. Collect a soil sample from your garden. Scrap away the top 2" of soil and take a trowel-full or two of soil. Make sure there are not stones, roots or large clumps of soil. Get enough to fill a quart jar about $\frac{1}{4}$ full. Add enough water so that your jar is $\frac{3}{4}$ full.
7. Shake your jar vigorously to break up all of the soil. Place the jar on a flat surface to let the sediment settle. Do not move or disturb it during this time or your results may be messed up.
8. After one minute, mark on the jar with a marker or tape the top of the layer that was formed. This is the sand. After one hour, mark on the jar with a marker or tape the top of the layer that was formed. This is the silt.
9. After at least 24 hours, mark the final layer formed. This is the clay.
10. Measure each layer and calculate the percentages of each component in your soil.
11. An ideal soil would have a mixture of sand (10%), silt (40%) and clay (50%). Have the class look at the soil chart to determine what type of soil the garden has.
12. If your garden soil does not have an ideal mixture, discuss different ideas the class has to make the soil better. (Adding compost can always be helpful.)

Snack & Conclusion (15 minutes)

1. To emphasize the importance of caring for our soil demonstrate "If the World was an Apple." You may want to demonstrate this while the class is eating their snack (see recipe below), or have an apple for each group to cut up themselves (plastic knives will work and are safe).

2. Cut an apple into 4 equal pieces. Tell them 3 pieces would represent oceans and other bodies of water (3/4) and one piece would represent land on earth (1/4).
3. If the quarter piece that represents land is cut in half, this 1/8 piece would represent land on earth that is too poor to grow crops on because it is desert, mountain, swamp or arctic land. The other 1/8 piece would represent land on earth that is suitable for growing crops and living.
4. If the 1/8 piece that represents land suitable for farming or living on is cut in to 4 pieces – 3 pieces would represent soil on earth that is too poor to grow crops on because it is too wet, hot, rocky or has cities or roads on it (3/32) – 1 piece would represent soil on earth that is suitable for farming (1/32) – if the peel is removed from the 1/32 piece that represents the topsoil we use for farming.
5. Have the class journal what they learned about soil and why they believe it is important. Brainstorm ways to care for and save our soil. This is a great time to talk about the importance of composting.

Assessment Tools

- Journals
- Poems
- Participation

Possible Modifications and Extensions

- Experiment with trying to germinate and grow plants in different types of soil (sand, clay, garden, compost).
- Talk about how soil is created and link this to weather.
- This could be a great follow-up to the Big Four lesson.
- Buy a simple soil test and test your garden soil to find the nitrogen, phosphorus and potassium content.

Baby Greens and Watercress Salad

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| • 6 oz mixed baby greens | • 1 bunch watercress, torn |
| • 1 avocado, diced small | • 1 Tbsp honey |
| • 1 cup pickled beets | • 1 tsp cayenne powder |
| • 1 cup sugar snap peas, sliced on a bias | • 1 lime, juiced |
| • 1 cup roasted pistachios, crushed | • 6 Tbsp olive oil |
| | • Salt and pepper to taste |

Preparation (10 minutes):

For the dressing: Combine lime juice, olive oil, honey and cayenne in a bowl. Whisk until emulsified. Season with salt and pepper and set aside.

For the salad: Combine baby greens, avocado, sugar snap peas, pickled beets, pistachios, and watercress in a bowl. Pour the dressing over the salad, mix well and serve.

Sources

Jaffe, Roberta, and Gary Appel. *The Growing Classroom: Garden-based Science*. South Burlington, VT: National Gardening Association, 2007.

Recipe courtesy of Corey Ferguson.

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