Organic Matter in Soils

Grade level:
- 5th-10th

Sample TEKS for 8th grade: Science
- 8.1
- 8.2
- 8.3
- 8.6

Objectives:
The students will be able to:
- Recognize the presence of organic matter in soils from their immediate area.
- Recognize which soil sample contains the highest concentration of organic matter.

Background:
Students live in different areas of a school district. The soils found in the different areas are not the same. Each is changed by the type of vegetation and by the minerals that make up the soil. Soils are similar because they all contain organic matter. The amount of organic matter will determine the vegetation that will grow in that area.

Vocabulary:
- organic
- hydrogen
- oxygen
- carbon

Materials List:
- Soil Samples (at least four different samples)
- Hand magnifying glasses or microscopes
- four (per group) 20 or 24 ounce plastic soda water bottles (cleaned and dry)
- Hydrogen Peroxide (one bottle per group)
- Four 50 ml or larger graduated cylinders
- Balloons

Procedure:
- Make sure each soil sample is dry and crumbles easily into small amounts.
- Label the soil samples A-D.
- Remove the labels from the soda water bottles, and make sure they are clean and dry.

- Label the bottles A-D with a marking pen. Make your letters large.
- Carefully measure 200 ml of soil sample "A". Carefully put it in the bottle marked "A". Continue this step for samples B-D.
- Place a different colored balloon by each bottle.
- Measure 50 ml of Hydrogen Peroxide into each graduated cylinder.
- Pour 50 ml of Hydrogen Peroxide into each bottle and put the open end of the balloon tightly over the top of the bottle. This needs to be done as quickly as possible.
- Begin timing when you attach the balloons. Observe the changes in the balloons. Check the bottles every three minutes until there is no further change in the size or until directed to stop by the teacher.
- Measure and record the circumference of the balloon using string and a ruler.
- Place a small amount of each soil sample on a separate sheet of paper. Carefully examine the sample with the hand lens or microscope. Describe the color, texture, and condition of the soil, and record your observations.

Assessment:

- Turn in data and observations and answer the following questions.
- Describe each soil sample using the hand lens or microscope.
- How did you determine which soil sample contained the highest amount of organic matter, based on your observations using the hand lens or microscope?
- How do you determine which soil sample contained the highest amount of organic matter, based on your observations of the bottles and balloons?
- How were you able to tell the difference in organic matter in each soil sample? Explain your answer.
- What gases do you think were causing the balloon to inflate? Why?

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