

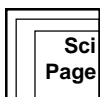
WHAT'S IN SOIL? Teaching Tips



LEARNING OBJECTIVES

Youth will be able to

- * List the component parts of soil.
- * Explain what each part of the soil provides to growing plants.
- * Describe how soil is made.
- * Separate out and group the parts of soil.



HOW TO USE THE WHAT'S IN SOIL? SCIENCE PAGE

Point out to youth that there are basically three parts of soil, as shown on the pie chart—minerals, organic matter, and pore spaces. Give them some time to read the information on the Science Page about each of these parts. Then you may wish to do the following activities to illustrate each part.

To show how soil particles are created from rock, hold two rocks of the same type over a piece of newspaper, and rub together to create small rock particles. Ask youth where rocks rub together in nature to create rock particles. (Answer: when soil particles are blown against rock; when soil particles are washed over rock.)

To illustrate pore spaces in soil, put a lump of dry soil in a bucket of water. Air should rise from the soil as it leaves the pore spaces. To illustrate how organic matter improves the soil, add some peat moss or compost to some clay soil. Wet the clay, and make a mud pie out of it. Make a second mud pie without organic matter. Put the mud pies in a warm place to dry. The mud pie with organic matter will easily crumble apart, and the clay without organic matter will be harder and denser. Challenge youth to set up an experiment to find out if sandy soil will hold more water if organic matter is added to it.



WORD SCRAMBLE

Answers: organic matter; pores; water; rock particles; air; living things.



TRY THIS

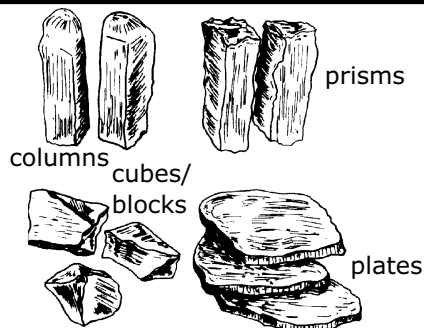
Before youth do this activity, ask them to predict what factors might influence the characteristics of the soil they collect. For example, ask: How might the soil under a well-worn path be different from the soil under a lawn? (Answer: The soil under a path becomes compacted and devoid of organic matter and living things. Soil under a lawn or wooded area should be much higher in organic matter, and thus looser and darker in color.)

Give youth time to examine soils in any way they wish. When youth have the opportunity to explore, they may come up with interesting observations and questions. Encourage them to observe the soil very closely with magnifying lenses. When they separate out and examine closely the different parts of soil, they will realize that there is more in soil than appears at first glance. The quote by Les Molloy at the bottom of the Science Page may inspire youth to scrutinize their soil samples more closely.

Soil particles are usually classified into three sizes—sand, silt, and clay. Sand particles are biggest, and feel gritty to the touch. Silt particles are medium-sized, and feel silky. Clay particles are smallest, and feel smooth when dry and sticky when wet. Most soils are made up of a combination of these three particle sizes. (See Soil Texture Science Page for more information.)

Youth may notice that the soil particles clump together into distinctive shapes, such as columns, prisms, cubes, or plates.

These clumps, called peds or aggregates, give soil its structure.



The structure of a soil depends, in part, upon the type of soil particles in a soil and the way the particles are held together. Peds are held together by clay particles and organic matter, which have a natural tendency to hold water and other particles to their surfaces. Other substances, such as calcium carbonate, also help bind soil particles together. A soil with stable peds has lots of pore spaces. Pore spaces in soil are important because that is where important processes such as water and air movement take place. Also, soil organisms live in the pores, and plant roots grow in the pores. An ideal soil has both large and small pore spaces. There are large pore spaces between stable peds. Large pores allow soil to drain well during wet periods. There are small pore spaces between individual soil particles. Small pores can hold water and soil nutrients during dry periods.

Soil structure can be destroyed by compaction. The soil under a well-worn path will not have good soil structure, but will be densely-packed together and will have few pore spaces. Plants will not be able to grow in such soil because it will be devoid of water, air, nutrients, and soil organisms.



SPOTLIGHT ON RESEARCH

The source is: "Waste Management and Re-utilisation Design." Department of Earth Science and Engineering. Imperial College of Science, Technology, and Medicine, UK. 31 March, 2003 <<http://www.ese.ic.ac.uk/general.php?GenID=180>>