Layers of Soil

A lesson based on the book, The Soil Neighborhood, by Dan Yunk and Steve Swaffar.

America's food supply is safe, affordable and abundant but misunderstood by the public. Kansas Farm Bureau seeks to improve consumer knowledge of the importance of farming and ranching through the *Kailey's Ag Adventure Series*, of which this book is a part.

Background Information:

After learning about the soil neighborhood with Kailey, we know that thanks to Clay, Rocky, Sandy, and their friends, crops are able to grow in the soil. These crops are present in items we use everyday.

Ask the students if they know the difference between soil and dirt. Allow all answers. Explain to them that dirt is what you find under your fingernails or what you sweep off the floor. Soil is what you walk on everyday. Soil is one of the most important natural resources on earth. Many living things depend upon it either directly or indirectly for a source of food. Not all soils are the same. Soils can be as diverse as the animals and plants above it.

Each soil consists of a series of layers called soil horizons. The soil profile is used for the entire depth of soil including all the layers of soil from the surface of the ground down to the bedrock. Soil profiles help distinguish one type of soil from another, just as we give names to our plants and animals.

The soil layers consist of:

Ground Level: The ground level is where the plants and animals grow and live. This layer helps keep the soil healthy. The plants help keep the soil cool and moist. Decomposers such as bugs, bacteria, and fungi break down dead plants and animals. This is nature's way of recycling.

Topsoil: Topsoil is often referred to as the organic layer. In this layer, plants grow and animals live on top of the soil. The plants keep the soil cool and from drying out. It also has decomposers that recycle the dead plants and animals. This layer consists of fine textured mineral particles and organic material known as humus.

Humus is black and gives the topsoil its color and odor. This layer is very important to life since it is where the plants grow. It is rich in nutrients, oxygen and water. This is the layer that MUST be PROTECTED!

Level: Pre K – Grade 2

Subjects/Standards:

Science 2nd:
Physical Science
Structure and Properties of Matter
2-PS1.1
Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Standards may be adjusted to fit other grade levels.

Student Learning Outcomes:

The students will compare and contrast the physical properties of soil by observing the colors of the different layers of the soil.

Estimated Teaching Time:

60 minutes

New Vocabulary:

Ground Level
Topsoil
Subsoil
Weathered parent-
Material
Bedrock
Soil horizon
Soil profile

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Subsoil: The subsoil layer is about one foot below the surface. Tree roots and earthworms live here. This is a mix of mineral particles and some humus near the top. Subsoil is very low in organic matter compared to the topsoil. A lot of soil nutrients are found in this layer. Deep plant roots come here looking for water.

Weathered parent material: This horizon can be very deep. There's no organic matter here at all. We're out of reach of all living and dead organisms down here. It's all rock particles that are full of minerals. This layer may contain rock particles that are different from the bedrock below.

Bedrock: We finally find the foundation. Bedrock is the deepest layer that contains nothing but hard, solid rock in it. The bedrock formed the soil above it. It will wait here until erosion or an earthquake exposes it to the surface. Some of it will be weathered to become the next batch of parent material. The soil making process will begin all over again.

Activity:

- Divide students into small groups depending on the size of the class. Students not at the soil activity in the front of the room should work on the word search puzzle at their desk.

- Each student will grab a zip lock bag or Dixie cup and go through each station. At each station the teacher will have a box with bedrock, subsoil, topsoil and the ground level. The students will go in single file line starting with the bedrock and end up at the ground level placing grass on the top. Have a scoop in each box so the kids can take one scoop of soil at each station to place in their baggie or cup.

- By doing this activity each student will build a soil horizon. After they have completed the soil activity they can go back to their desk and fill out the soil layers worksheet and hand it in for points at the end of class.

Materials Needed:

- The Soil Neighborhood by Steve Swaffar and Dan Yunk
- Enough zip lock bags or clear cups for the whole class
- 4 tubes or boxes
- The 4 types of soil horizon (bedrock, subsoil, topsoil, and ground level)
- 4 scoops for each layer of soil
- A table for the 4 boxes of soil to sit on
- Copies of the soil layer worksheet
- Copies of the word search

Prepare Ahead:

- Gather the 4 layers of soil, the zip lock bags or cups, 4 boxes, and the scoops before coming to class.
- Make enough copies of each worksheet for the entire class.

Additional Resources:

- National Science & Technology Center

http://www.blm.gov/nstc/soil/Kids/

- Soil-net

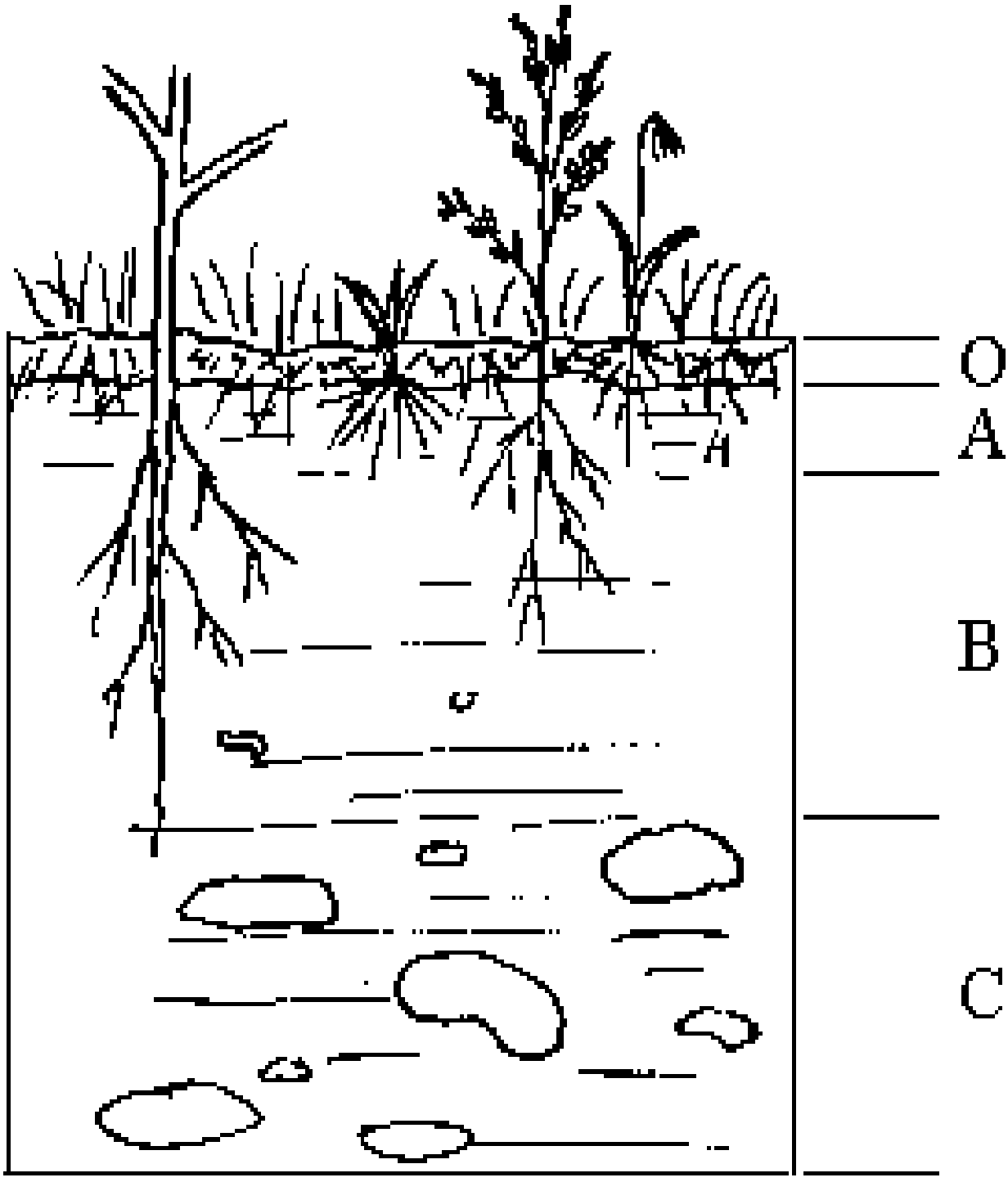
http://www.soilnet.com

- Butler Soil & Water Conservation

http://www.butlerswcd.org

Name_____

Color and Label each layer of the soil on the diagram. Place the right number with the correct layer.



Source: Fun Science Gallery

1-Subsoil 2-Ground Level

5-Weathered parent material

4-Topsoil 3-Bedrock

Name _____

Find and circle each of the words in the word search!

B G O T X W N S Z F Z D S J S

E H L P R O F I L E B E T T U

D K S R E Y A L N T N D N O B

R S U M U H B C Z Q F U E P S

O D E C O M P O S E R S I S O

C H O R I Z O N K B C C R O I

K D N U O R G L E V E L T I L

R E T A W C L D T Z P L U L Y

K M Q Y T R P O Q D A B N F H

H L S N E G Y X O C X P K V T

BEDROCK DECOMPOSERS

GROUND HORIZON

HUMUS LAYERS

LEVEL NUTRIENTS

OXYGEN PROFILE

SUBSOIL TOPSOIL

WATER

Name KEY

Find and circle each of the words in the word search!

BEDROCK DECOMPOSERS

GROUND HORIZON

HUMUS LAYERS

LEVEL NUTRIENTS

OXYGEN PROFILE

SUBSOIL TOPSOIL

WATER