**High School Soils Class Lesson Plan**

**What is the difference between dirt and soil? Dirt is what gets on your clothes and under your fingernails. Soil is the surface layer of the earth or the ground beneath your feet. Or to simplify—\*\*\*\*dirt is under your fingernails and soil is under your feet.\*\*\*\***

**Why is it important to conserve our soil? Do the earth as an apple demonstration (first attachment- 1 page on pink paper)**

**Read secrets buried under the ground (second attachment – 2 pages on brown paper)**

**Show 3rd attachment (pie chart showing composition of soil). \*\*\*\*Half of soil is air and water. The other half is broken rock, decaying plants and decaying animals.\*\*\*\***

**Show attachment 4 over and show the ideal soil profile horizons. Soil is made up of distinct layers, called horizons. Each layer has its own characteristics that make it different from all of the other layers. These characteristics play a very important role in what the soil is used for and why it is important.**

**O HORIZON- This is the top layer of soil that is made up of living and decomposed materials like leaves, plants, and bugs. This layer is very thin and is usually pretty dark.**

**A HORIZON- This is the layer that we call "topsoil" and it is located just below the O Horizon. This layer is made up of minerals and decomposed organic matter and it is also very dark in color. This is the layer that many plants roots grow in.**

**B HORIZON- This is the layer that we call "subsoil" and it is located just below the A Horizon. This layer has clay and mineral deposits and less organic materials than the layers above it. This layer is also lighter in color than the layers above it.**

**C HORIZON- This is the layer that we call "regolith" and it is located just below the B Horizon. This layer is made up of slightly unbroken rock and only a little bit of organic material is found here. Plant roots are not found in this layer.**

**R HORIZON – This is the layer we call bedrock.**

**Turn attachment 4 over and show chart with piece of gravel, sand, silt and clay). Soil comes in 3 sizes—large, medium and small or sand, silt and clay Show 2nd comparison salt, sugar and flour containers. Salt can be compared with sand-size soil particles. Sugar can be compared with silt-sized soil particles and flour can be compared with clay-size particles. Clay particles are so small that 50 million of them can fit in a grain of sand. Ask for a classroom volunteer to come stand next to you for a demonstration. We are going to demonstrate to you the pore space between the different particle sizes of soil. Both you and student stand next to each other with your arms stretched out so your fingertips touch. Sand particles have a large pore space between them, so water can flow quickly through sand. The problem here is that not much water is absorbed. Now you and student will but your hand on your hip so your elbows touch. Silt particles have a little less pore space between them than the sand so water does not pass nearly as quickly through the pores and more water can be absorbed. Now you and student will stand shoulder to shoulder with no space between you. Clay particles are close together, so water does not move quickly here at all. As a matter of fact, clay tends to become water-logged. Student can have a seat now.**

**Show attachment 5 soil textural triangle. Soil is generally a combination of all 3 particle sizes. Scientist use a soil textural triangle to determine the type of soil based on the percentage of sand, silt and clay. \*\*\*\*A loam is the best type of soil for growing plants. It has just the right mixture of sand, silt and clay for water movement and absorption.\*\*\*\* Use your finger to follow the lines on the textural triangle for the loam in the yellow box. So you see here that a loam is about 20 percent clay, 40 percent sand and 40 percent silt.**

**SHOW SOIL COMMUNITY BIORAMA**

**Break into 4 groups and give each group a worksheet and pencil. Let’s go to each station and I’ll explain what to do.**

**Station 1 - Soil Textural Triangle - pick up the laminated instructions at this station and read the paragraph. Then show the students the worksheet. Go over the first sample with them (silt clay loam). Then do line c. We are looking for 100 per cent. So if we have 40 and 40, what do we need to make 100? 20. Now you can follow the lines and you come up with the answer—loam. Show students how to follow the field flow chart to determine the texture of a soil sample. Did you know that some soil scientists put a soil sample on their front teeth and run their tongue across their teeth and can determine the texture of a soil? We will use our hands today. Students can wash their hands at the sink afterwards.**

**Station2 – Horizon Boxes. Pick up the laminated instructions at this station and read them. Show the students where to record their layers on the backside of the work sheet.**

**Station 3 –Soil Testing. You will be testing soil for Nitrogen, phosphorus, potassium and pH. Get your group’s soil sample and do the extraction first. Then do the tests in the order outlined. Some take 5 minutes for results. So set timer and move to next test. Record answers on your worksheet.**

**Station 4 – Core Sample Tube. Read the color page and then read the laminated directions for station 4. Students can give the soil auger a twist and pull up soil if they want to.**

**BE SURE AND LEAVE 15 MINUTES AT THE END OF THE CLASS SO EACH GROUP CAN DISPLAY THEIR HORIZON BOX AND NAME THE DIFFERENT LAYERS IN THEIR BOX FOR THE CLASS. THE CLASS CAN MAKE PREDICTIONS ABOUT WATER MOVEMENT AND ABSORPTION. THEN POUR A CUP OF GREEN-COLORED WATER INTO THE TOP OF THE BOX AND SEE IF THEIR PREDICTIONS COME TRUE.**

**Go over results of soil test.**

**Group A = Fafard Professional Potting Mix $10.12 for .75 cubic feet**

**Group B = Jolly Gardner Topsoil $2 at Dollar General for .75 cf**

**Group C = Miracle Grow Garden Soil $7.99 for .75 cf**

**Group D = Soil from my garden**