## Ag Adventure Lesson Plan

<table>
<thead>
<tr>
<th><strong>Subject Area:</strong> Agronomy</th>
<th><strong>Grade Level:</strong> 3</th>
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**Learning Center:** Rainfall Simulator

**Objectives:**

~Students will be able to explain how rain affects the type of material it is running over.  
~Students will be able to define ground coverage and describe how it works around the Fort Collins area.

**Standards:**

Science 3.1 Earth’s materials can be broken down and/or combined into different materials such as rocks, minerals, rock cycle, formation of soil and sand- some of which are usable resources for human activity.

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<th><strong>Personnel Needed:</strong></th>
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<tr>
<td>-Rainfall Simulator</td>
<td>-2 Volunteers</td>
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**Lesson Plan**

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<th>Instructor:</th>
<th>Students:</th>
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**Part 1: What is Erosion?**

-Define erosion.  
-Give two causes of erosion (wind and water).  
-Show wind erosion if wind is blowing dust.  
-Show water erosion in the simulator.  
-Ask students which water they would rather swim in.  

-Listen quietly.  
-Look at rainfall simulator.  
-Answer as a group.

**Part 2: What is Groundcover?**

-Give examples of groundcover (straw in simulator, grass, crops).  
-Explain how groundcover reduces erosion.  

Listen quietly.

**Assessments:**

Ask Students:  
-What is it called when soil is carried away?  
-What causes erosion?  
-What is an example of a groundcover?

**Sources:**


Rainfall Simulation Script

Part 1: What is Erosion?

Volunteer: At this station we will talk about how rainfall affects soil and groundcover.

Volunteer: Erosion occurs when soil is carried away. There are two things that can cause erosion: wind and water. Erosion is a problem because it can make it difficult to grow grass and crops.

We can see erosion occurring from wind when there is dust blowing in the wind. *If the wind is blowing you can point it out.* The soil is carried away as part of the dust.

Water can also cause erosion. *Show students the rainfall simulator.* This is called a rainfall simulator. The first chamber has rain falling on bare soil. The second chamber has straw on top of the soil.

These two jars show the water after it passes through the chamber. What do you notice that is different in the jars? Which water would you rather swim in? *Call on one or two students.* That is right; the jar from the soil with straw over it is less muddy. When it rains this water and soil will travel into streams and lakes making the water cloudier with mud.

Part 2: What is Groundcover?

Volunteer: The straw you see here is an example of a groundcover. Many things can be used as groundcover. Grass is a groundcover. Farmers can also use the left over part of their crops to protect the soil after harvest.

Raindrops travel at very high speeds. The groundcover slows the rain before it reaches the soil and reduces erosion.

Volunteer: Groundcover is important to keep the amount of soil lost to rainfall low.
Agronomy

Soil - “the loose surface material of the earth in which plants grow...an environment in which something may take root and grow” (Definition of Soil [3,noun]), soil can be used for construction of schools, playgrounds, roads, etc.

Dirt - displaced soil

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<tr>
<th>Particle Size Classes</th>
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<th>Properties</th>
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<td>gritty with round or irregularly shaped particles</td>
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Loam - ideal soil with a mix between sand, silt and clay

Soil Horizons

| O- Organic Layer | - leaf, twigs, roots, organic material on the surface of the soil |
|                 | - not present in fields that are farmed                          |
| A- Top Soil     | - typically darker than lower layers                             |
|                 | - loose and crumbly                                              |
|                 | - contains some organic matter                                   |
|                 | - typically most productive layer of the soil                    |
| B- Sub Soil     | - light colored/dense layer                                      |
|                 | - low organic matter                                             |
| C- Parent Material | - unconsolidated organic and mineral matter where soil forms |
| R- Bed Rock     | - solid rock below soil                                          |

Erode (Erosion) - to wear away by water, wind or glacial ice

Dust - is made up of microscopic particles including pollen, bacteria, smoke, ash, salt crystals (from the ocean), dirt and tiny pieces of rock.
Agronomy

Dust Bowl- is the area in the Great Plains of the United States (especially Oklahoma, Arkansas and Texas). It received its name after a severe drought in the 1930's that caused extreme dust storms (sometimes reducing visibility to several feet). There was little ground cover to hold the soil. Many farmers had to move to other areas.

References:


<http://education.nationalgeographic.com/education/encyclopedia/dust/?ar_a=1&ar_r=3>.

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**Objectives:**
~Students will be able to define soil.
~Students will be able to measure the horizons (layers) of topsoil.

**Standards:**

*Science 3.1* Earth’s materials can be broken down and/or combined into different materials such as rocks, minerals, rock cycle, formation of soil and sand- some of which are usable resources for human activity.

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<td>- Large Tape Measure</td>
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<td>- Labels for Each Layer?</td>
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**Lesson Plan**

**Instructor:**

**Students:**

**Part 1: Soil vs. Dirt**
- Define soil and its uses.
- Explain the difference between soil and dirt.

**Part 2: Soil Horizons**
- Explain that there are horizons in the soil.
- List the four horizons of soil and explain what each level contains/processes occurring in the horizon.
  - Show each layer in the soil pit.

**Part 3: Measuring the Horizons**
- Use measuring tape to measure the depth of each horizon.
  - Ask students to help read the tape.
  - Volunteer to read the measuring tape.

**Assessments:**
- What is the difference between soil and dirt?
- What is one of the four soil horizons?

**Sources:**

Soil Pit Script

Part 1: Soil vs. Dirt

Volunteer: Today we are going to learn about soil and the difference between soil and dirt. Soil is loose material on the surface of the earth in which plants can grow. Soil can also be used for the construction of schools, playgrounds or roads.

Volunteer: Many people use the word dirt when they are referring to soil. The two words have different meanings. Soil is what you see here. It is what we use to grow plants. Dirt is soil where it does not belong. Dirt is what people yell at you for when you track it into the house on the bottom of your shoes.

Part 2: Soil Horizons

Volunteer: Soil has layers, like a cake. There are four layers in the soil. Here we can see these layers. Show students the soil pit. Each layer is called a horizon. Not all of the horizons are always present. Point to the horizon as you tell students about each layer.

   The top layer is called the O or the organic layer. This layer is made up of leaves, twigs and other organic material on the surface. The layer is not present in fields where farmers grow crops.

   The next layer is the A horizon or top soil. This horizon is normally darker than lower layers and contains some organic materials. The top soil has the most nutrients and is important for growing crops.

   The next layer is the subsoil or the B horizon. This layer has little organic material and is a lighter color. The parent material or C horizon is the lower layer where soil is formed. Roots grow in these lower layers so that they can reach water.

Part 3: Measuring the Horizons

Volunteer: Let's measure the horizons that we see here in the soil pit.

   Use measuring tape to show students the depth of each layer. Tell students the name of each layer again. Ask students to help you read the measuring tape.
Agronomy

Soil- “the loose surface material of the earth in which plants grow...an environment in which something may take root and grow” (Definition of Soil [3,noun]), soil can be used for construction of schools, playgrounds, roads, etc.

Dirt- displaced soil

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Loam- ideal soil with a mix between sand, silt and clay

Soil Horizons

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- R- Bed Rock
  - solid rock below soil

Erode (Erosion)- to wear away by water, wind or glacial ice

Dust- is made up of microscopic particles including pollen, bacteria, smoke, ash, salt crystals (from the ocean), dirt and tiny pieces of rock.
Agronomy

Dust Bowl- is the area in the Great Plains of the United States (especially Oklahoma, Arkansas and Texas). It received its name after a severe drought in the 1930's that caused extreme dust storms (sometimes reducing visibility to several feet). There was little ground cover to hold the soil. Many farmers had to move to other areas.

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# Ag Adventure Lesson Plan

**Subject Area:** Agronomy  
**Grade Level:** 3  
**Learning Center:** Soil Texture

## Objectives:
- Students will be able to explain the difference between soil and dirt.  
- Students will be able to identify and describe the properties (water retention, etc.) of the three main soil particle size classes: sand, silt, and clay.

## Standards:

**Science 3.1** Earth’s materials can be broken down and/or combined into different materials such as rocks, minerals, rock cycle, formation of soil and sand- some of which are usable resources for human activity.

## Materials Needed:  
- Clay Tub  
- Sand Tub  
- Hand Wash Tub  
- Towels

## Personnel Needed:  
- 3 Volunteers

## Lesson Plan

### Instructor:

|----------------------|-----------------------------|---------------------|
| - Define soil texture.  
- List the three textures and their properties. | - Listen quietly.  
- Touch the sand and clay.  
- Raise hand to answer.  
- Explain that mixes are best for plants. | - Listen quietly.  
- Quickly wash hands in tubs. |

### Students:

- Plan the difference between dirt and soil.  
- Tell students to wash their hands.

## Assessments:

- What are the three soil textures?  
- What texture do plants like best?  
- What is dirt?

## Sources:

Soil Texture Script

Part 1: Soil Textures

Volunteer: Today we are going to talk about soil texture.

Volunteer: Soil texture looks at the different size of particles in the soil. There are three sizes of particles that make up soil: sand, silt and clay. The largest is called sand and the smallest is clay. Each type has different properties.

The size of these particles is measured in millimeters. Sand particles are big enough for you to see, but clay is microscopic, meaning you cannot see individual particles with your eyes.

Sand feels gritty or rough. If you try to roll it into a ball it will not stay together. Sandy soils do not hold very much water. This is good for plants that don’t like to have wet roots but bad for plants that need lots of water during a dry year.

Silt holds more water than sand. It feels powdery or slick. Silt is easily carried away by wind and water.

Clay is sticky and holds lots of water.

Part 2: Feeling the Textures

Volunteer: Today we have some sand and clay for you to feel. Tell students what is in each container and allow them to touch each. Remind students of the properties of sand and clay.

Volunteer: Now that you have felt the sand and the clay which one do you think a plant would like to grow in? Raise your hand if you think sand. Now raise your hand if you think clay. Both answers are right, the best soils are generally a mix of the three materials which is called a loam.

Part 3: Hand Washing

Volunteer: The last thing we need to talk about is the difference between soil and dirt. Dirt is displaced soil or soil where it does not belong. An example of dirt is what you parents yell at you for tracking into the house or what is now on your hands. We have buckets here for you to wash off your hands. Make sure students wash their hands and dry them if towels are available.
Agronomy

Soil- “the loose surface material of the earth in which plants grow...an environment in which something may take root and grow” (Definition of Soil [3,noun]), soil can be used for construction of schools, playgrounds, roads, etc.

Dirt- displaced soil

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                                  - water moves through quickly |
| Silt                  | 0.05 to 0.002 mm | - powdery, feels slick  
                                  - holds more water than sand  
                                  - high erosion potential |
| Clay                  | >0.002 mm (microscopic) | - sticky/ will make a ball  
                                  - holds the most water and nutrients |

Loam- ideal soil with a mix between sand, silt and clay

Soil Horizons

Erode (Erosion)- to wear away by water, wind or glacial ice

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