Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Elementary Study of Soils

**Purpose**

The purpose of this lab is to determine soil textural class by feel. [[1]](#endnote-1)

**Procedure**

 **Materials**

1. Spray bottle filled with water
2. Sink (to wash hands)
3. Paper towels
4. A variety of soil samples

**Sequence of Steps**

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1. Review soil textural class characteristics under “background information”.
2. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Complete the following steps, recording observations.
3. Examine the dry soil sample

(Note: Look for clods and ease of crumbling them between your fingers. Remember soils high in sand are seldom cloddy. Soils high in silt may be cloddy but usually break easily. Clay soils are usually cloddy and are often hard to break.)

1. Take a quantity of soil about the size of a golf ball. Moisten it with water from the spray bottle to the consistency of putty
2. Try to form a ball with the moistened soil sample; then try to form a "ribbon" by working the soil between the thumb and forefinger

(Note: Soils high in sand feel gritty and ribbon poorly unless also high in clay. Soils high in silt feel smooth or floury. They may also form a short ribbon in varying length depending on the clay content. Soils high in clay can be rolled out into very thin ribbons.)

1. Saturate the soil sample and note staining on the fingers

(Note: Clay or loam soil is indicated if the moist soil ball stains your fingers.)

1. Compare several soil samples of different textures

(Note: Compare the amount of grittiness of sand to the smoothness of silt and the stickiness of clay. Sand gives a grinding sound when held close to the ear. Grittiness indicates a sandy soil. Silt is smooth and velvety. Clay is sticky.)

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**Background Information: Soil Textural Class Characteristics**

**Sand or loamy sand:** Dry--loose, single grained; gritty; no or very weak clods; Moist--gritty; forms easily crumbled ball; does not ribbon; Wet--lacks stickiness, but may show faint clay staining (loamy sand especially); Individual grains can be both seen and felt under all moisture conditions

**Sandy loam:** Dry--clods break easily; Moist--moderately gritty to gritty; forms balls that withstand careful handling; ribbons very poorly; Wet--definitely stains fingers; may have faint smoothness or stickiness, but grittiness dominates; Individual grains can be seen and felt under nearly all conditions

**Loam:** This is the most difficult texture to place since characteristics of sand, silt and clay are all present but none predominates; Suggests other textures; Dry--clods slightly difficult to break; somewhat gritty; Moist--forms firm ball; ribbons poorly; may show poor fingerprint; Wet--gritty, smooth and sticky all at same time; Stains fingers

**Silt or silt loam:** Dry--clods moderately difficult to break and rupture suddenly to a floury powder that clings to fingers; shows fingerprint; Moist--has smooth, slick, velvety or buttery feel; forms firm ball; may ribbon slightly before breaking; shows good fingerprint; Wet--smooth with some stickiness from clay; stains fingers; Grittiness of sand is well masked by other separates; (Texture most like silt loam; there are few silt soils)

**Sandy clay loam:** Dry--clods break with some difficulty; Moist--forms firm ball that dries moderately hard; forms 1/2" ribbons that hardly sustain own weight; may show poor to good fingerprint; Wet--grittiness of sand and stickiness of clay about equal, masking smoothness of silt; stains fingers

**Clay loam:** Dry--clods break with difficulty; Moist--forms firm ball that dries moderately hard; ribbons fairly well, but ribbons barely support own weight; shows fair to good fingerprint; Wet--moderately sticky with stickiness dominating over grittiness and smoothness; stains finger

**Silty clay loam:** Resembles silt loam but with more stickiness of clay; Dry--clods break with difficulty; Moist--shows a good fingerprint; forms a firm ball drying moderately hard; ribbons 1/2" that can be fairly thin; Wet--stains fingers; has sticky-smooth feel with little grittiness of sand

**Sandy clay:** Dry--often cloddy, clods broken only with extreme pressure; Moist--forms very firm ball, drying quite hard; shows fingerprint; squeezes to thin, long, somewhat gritty ribbon; Wet--stains fingers; clouds water; usually quite sticky and plastic, but has some grittiness present

**Silty clay:** Dry--see sandy clay; Moist--forms very firm ball becoming quite hard on drying; shows fingerprint; squeezes out to a thin, long, smooth ribbon; Wet--stains fingers; clouds water; stickiness dominates over smoothness, grittiness is virtually absent

**Clay:** Dry--cloddy, clods often cannot be broken even with extreme pressure; Moist--forms firm, easily molded ball drying very hard; squeezes out to a very thin ribbon 2 to 3 inches long; Wet--stains fingers, clouds water; usually very sticky with stickiness masking both smoothness and grittiness; wets slowly

 **Observations**

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| --- | --- | --- | --- | --- |
| Soil Sample Letter/# | Visual Observations | Ball/Ribbon Test Observations | Staining Observations | Determined Soil Class |
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1. Describe your results.

2. How does soil textural class affect the movement of matter among reservoirs?

3. Give at least 3 specific reasons why this information is important to agriculturists.

4. What can agriculturists do to alter the soil class in their area?

1. Kohntopp, John (2008). Elementary Study of Soils. *Elko High School Agriculture Department Elko, NV.* [↑](#endnote-ref-1)