**Determining Soil Texture and Permeability**

**Purpose:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Descriptions: Examine the clay, sand, and silt and describe the samples in terms of smoothness, how gritty it is, and ability to form a ribbon and what was the ribbon length.**

**Clay:**

**Sand:**

**Silt:**

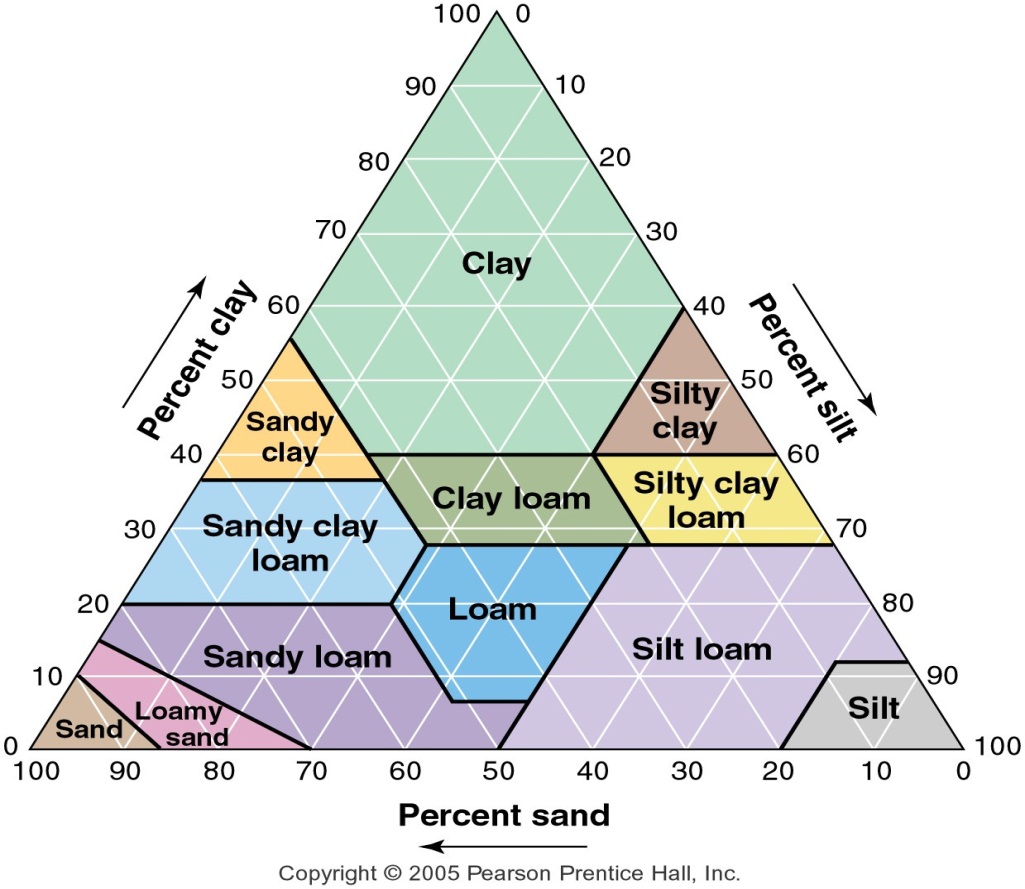


Table 2:1

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand%: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

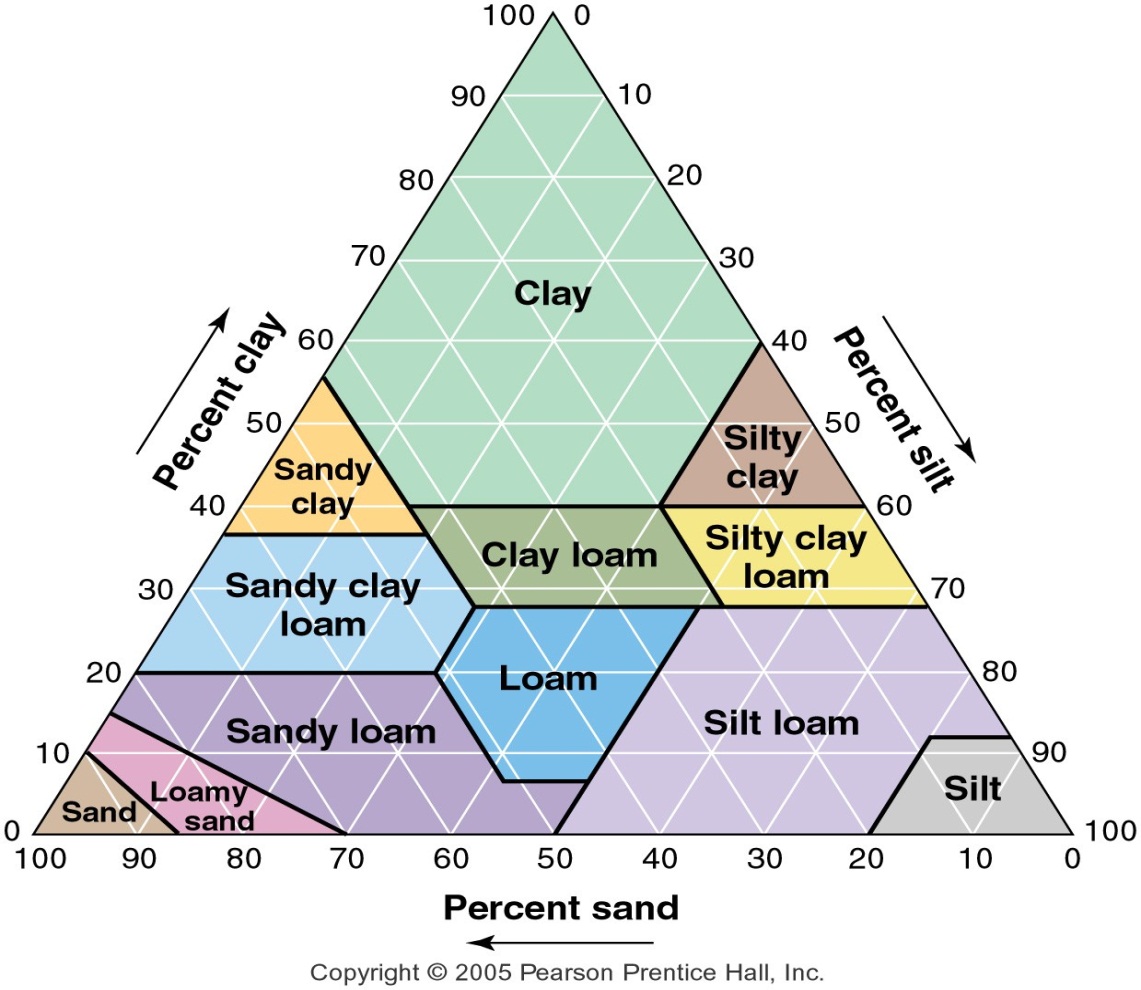


Table 2:2

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand%: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

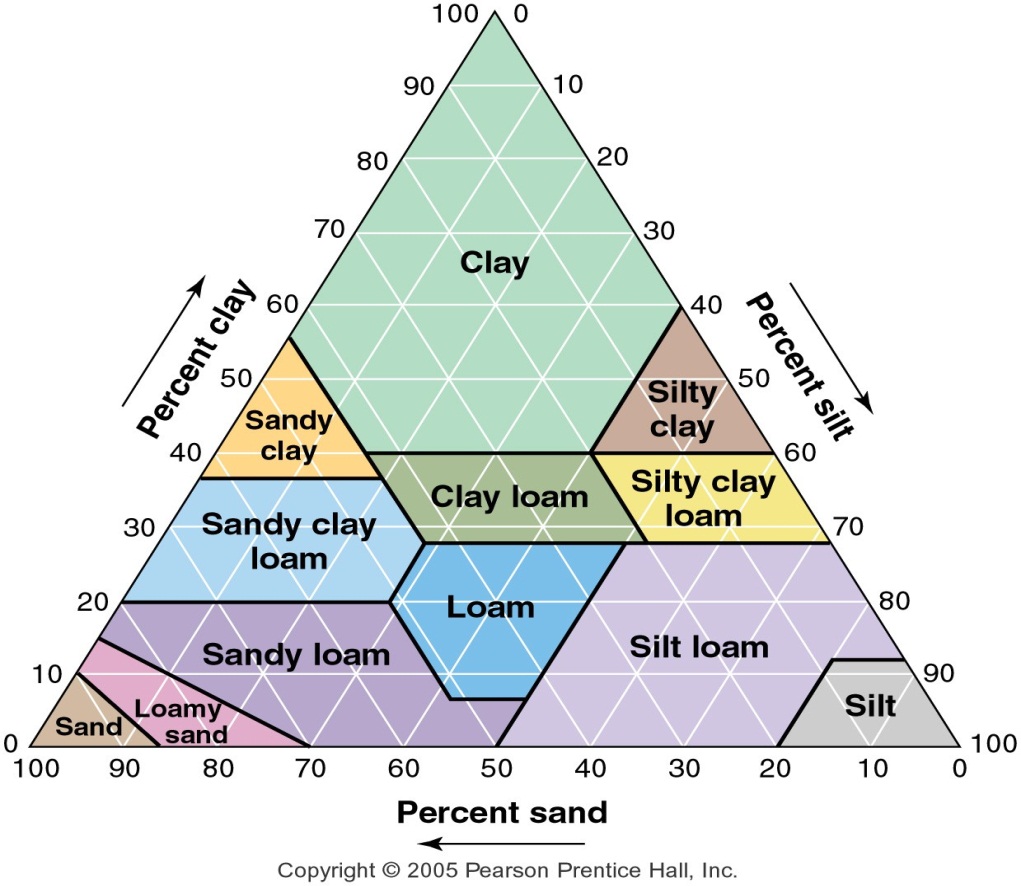


Table 2:3

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand%: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

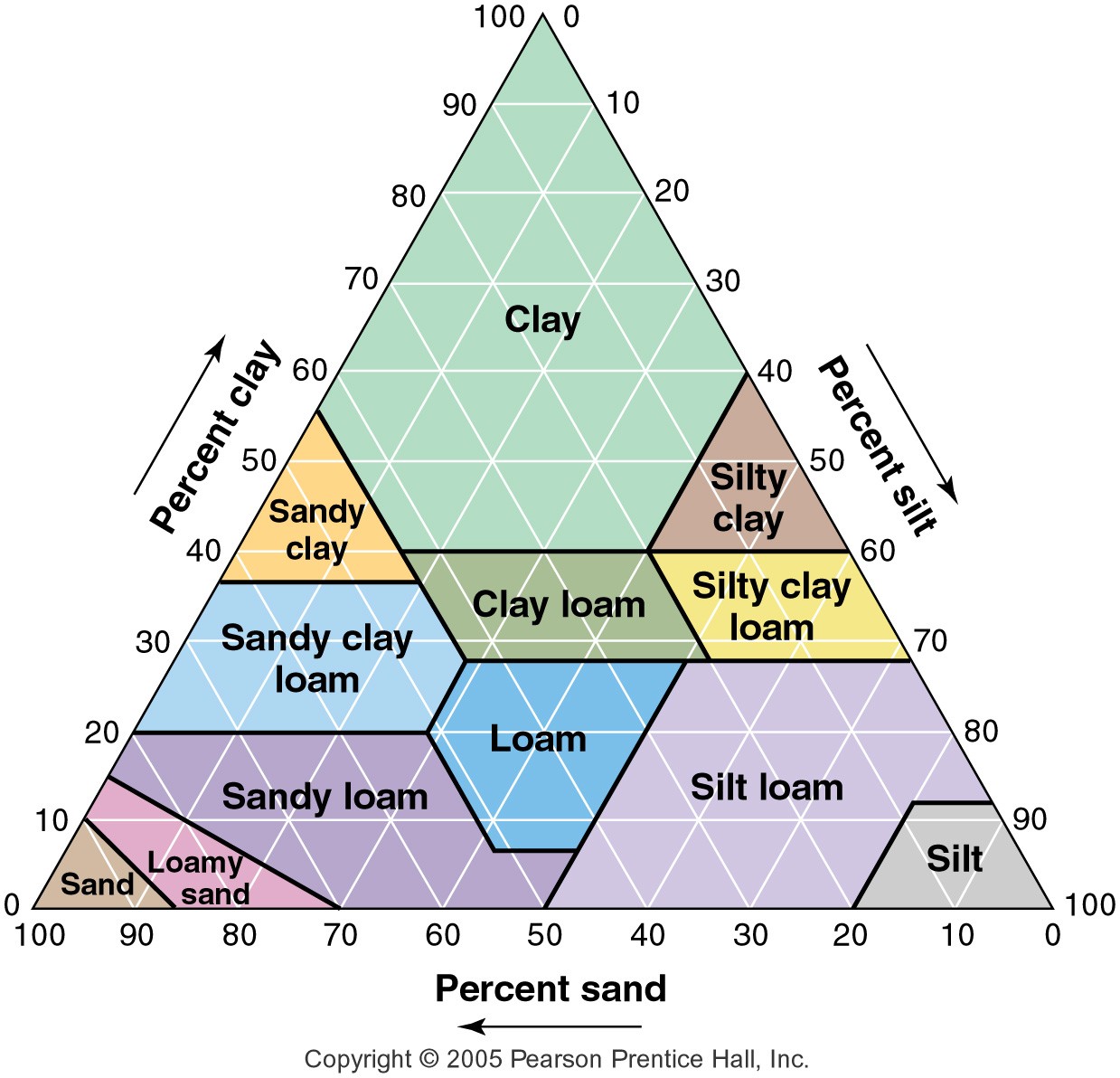


Table 2:4

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand%: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

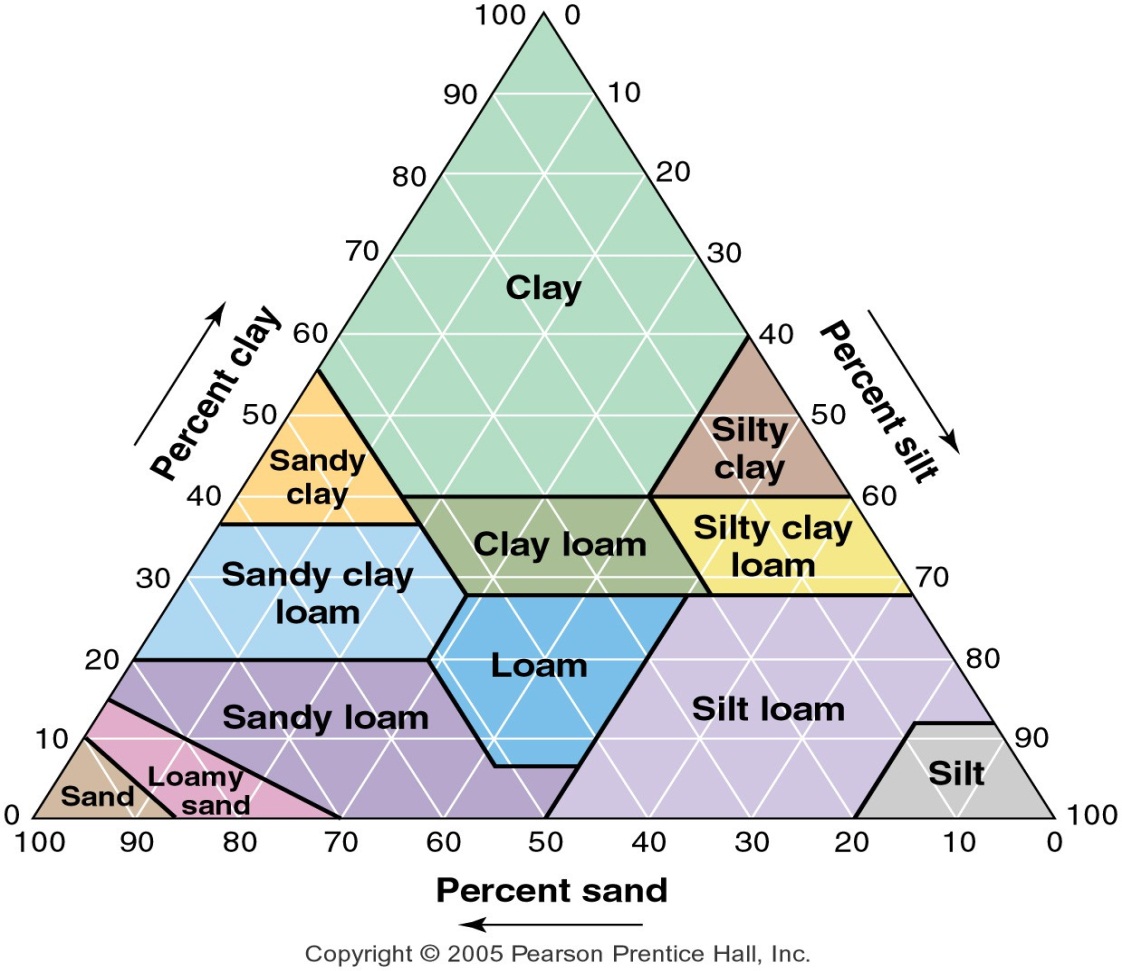


Table 2:5

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Determining Soil Texture by Feel

**Step 1:**

**a.) Obtain and moisten a soil sample and place some soil (the size of an egg) in your gloved hand**

**b.) Moisten the soil sample until it is damp but not soaked through with water**

**c.) Try to form a ball, if the soil forms a ball, go to step 2, if the soil does not form a ball go to Step 5**

**Step 2:**

1. **If the soil is**
   1. **Really sticky**
   2. **Hard to squeeze**
   3. **Stains**
   4. **Has a shine**
   5. **Form a ribbon (5+ cm) without breaking**

**Classify as Clay and go to Step 3 – otherwise go to b -**

1. **If the soil is**
   1. **Somewhat sticky**
   2. **Is somewhat hard to squeeze**
   3. **Forms a medium ribbon (between 2-5 cm)**

**Classify it a clay loam and go to Step 3 otherwise go to c -**

1. **If the soil is**
   1. **Soft**
   2. **Smooth**
   3. **Easy to squeeze**
   4. **At most slightly sticky**
   5. **Forms a short ribbon (less than 2 cm)**

**Classify it as a loam and go to Step 3; otherwise go to D-**

1. **If the soil forms a ball but does not form a ribbon go to Step 4**

**Step 3: refine the initial soil texture classification from Step 2 for relative amounts of sand and silt**

**Wet a small pinch of soil in your gloved palm and rub it with your forefinger.**

**e.) If the soil feels gritty, add the word sandy to the initial classification (i.e. sandy clay)**

**f.) If the soil feels very smooth with no gritty feeling, add the word silty to the initial classification (i.e. silty clay)**

**g.) If the soil is a little gritty, leave the original classification (i.e. clay)**

**Step 5: TEST FOR SAND**

**If the sand does not form a ball and instead falls apart in your hand –**

**Soil texture is sand**

**Step 4: (testing for loamy sand or silt)**

**If the soil: forms a ball, forms no ribbon, and is very gritty the soil texture is loamy sand**

**If the soil: forms a ball, forms no ribbon, and is very soft and smooth with no gritty feeling**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Group # | Sample A:Clay | Sample A: Silt | Sample A: Sand | Sample B: Clay | Sample B: Silt | Sample B: Sand | Sample C: Clay | Sample C: Silt | Sample C: Sand |
| 1 |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |
| Average  Groups  1-7 |  |  |  |  |  |  |  |  |  |

Data Collection Part I: Estimating Soil Texture through Sedimentation

Calculations:

**Individual Sample A:**

|  |  |  |  |
| --- | --- | --- | --- |
| **% Sand** | | | |
| Sand (cm) |  | Total (cm) |  |
| (cm) sand/total (cm) x100 |  | | |
| **% Silt** | | | |
| Silt (cm) |  | Total (cm) |  |
| (cm) silt/total (cm) x100 |  | | |
| **% Clay** | | | |
| Clay (cm) |  | Total (cm) |  |
| (cm) clay/total (cm) x100 |  | | |
| Soil Class Name |  | | |

**Individual Sample B:**

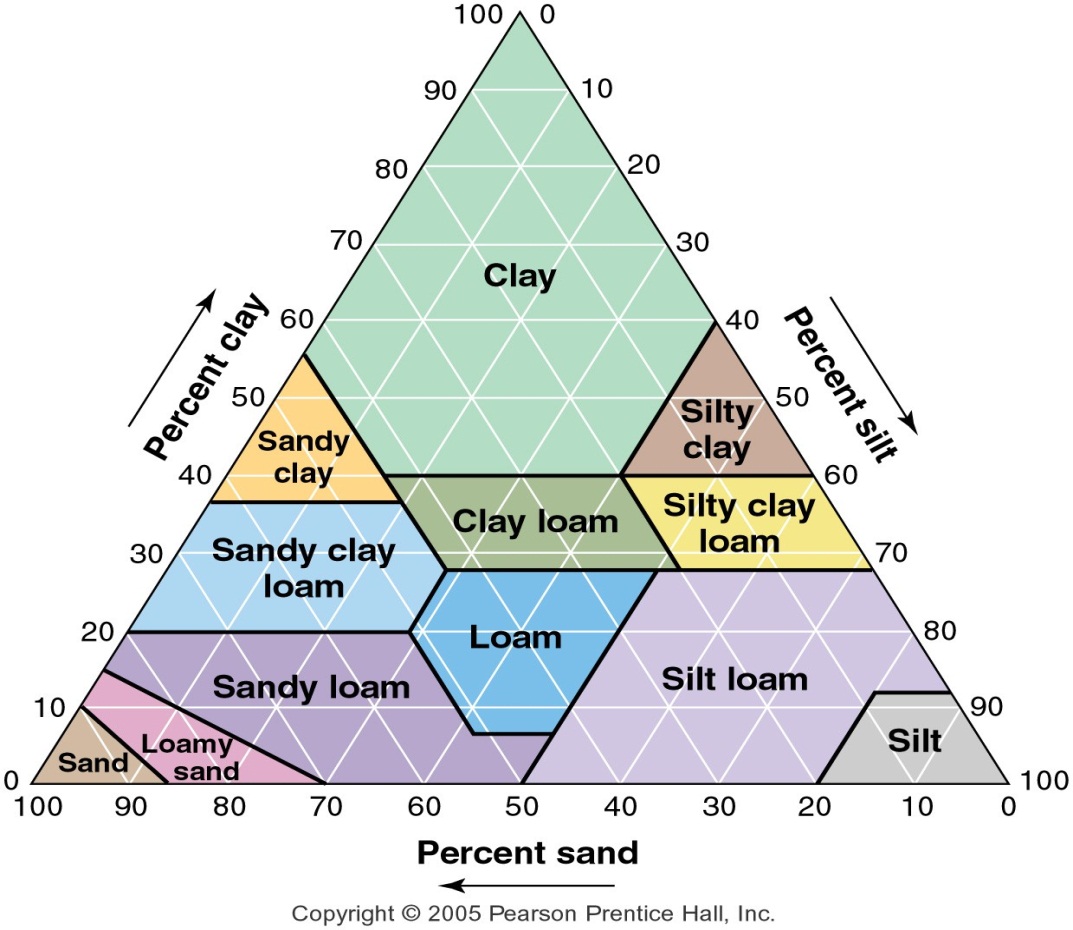
|  |  |  |  |
| --- | --- | --- | --- |
| **% Sand** | | | |
| Sand (cm) |  | Total (cm) |  |
| (cm) sand/total (cm) x100 |  | | |
| **% Silt** | | | |
| Silt (cm) |  | Total (cm) |  |
| (cm) silt/total (cm) x100 |  | | |
| **% Clay** | | | |
| Clay (cm) |  | Total (cm) |  |
| (cm) clay/total (cm) x100 |  | | |
| Soil Class Name |  | | |

**Individual Sample C:**

|  |  |  |  |
| --- | --- | --- | --- |
| **% Sand** | | | |
| Sand (cm) |  | Total (cm) |  |
| (cm) sand/total (cm) x100 |  | | |
| **% Silt** | | | |
| Silt (cm) |  | Total (cm) |  |
| (cm) silt/total (cm) x100 |  | | |
| **% Clay** | | | |
| Clay (cm) |  | Total (cm) |  |
| (cm) clay/total (cm) x100 |  | | |
| Soil Class Name |  | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sample** | **Average % Sand** | **Average %**  **Silt** | **Average %**  **Clay** | **Soil Class Name** |
| **A** |  |  |  |  |
| **B** |  |  |  |  |
| **C** |  |  |  |  |

Based on the data collected, formulate a hypothesis to predict which of the three soil samples will be the most permeable and write below:



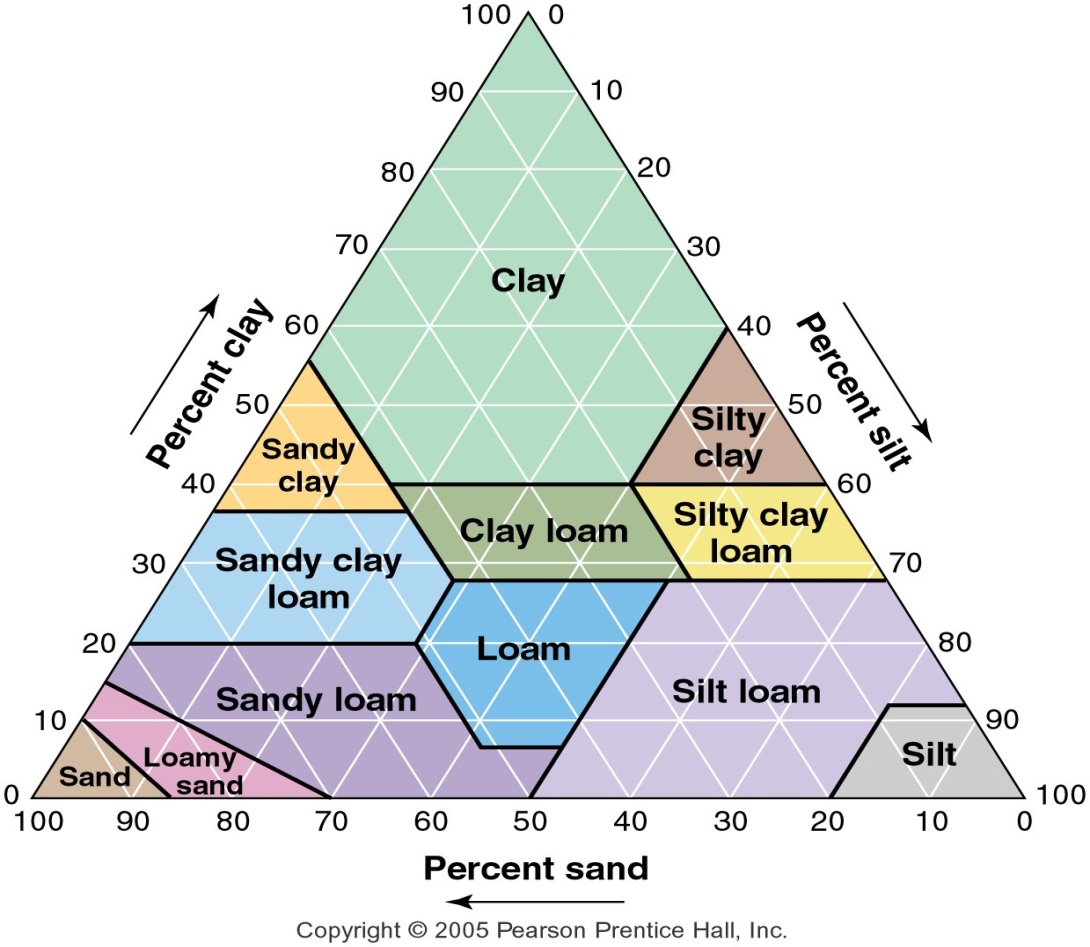
Individual Data: A

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



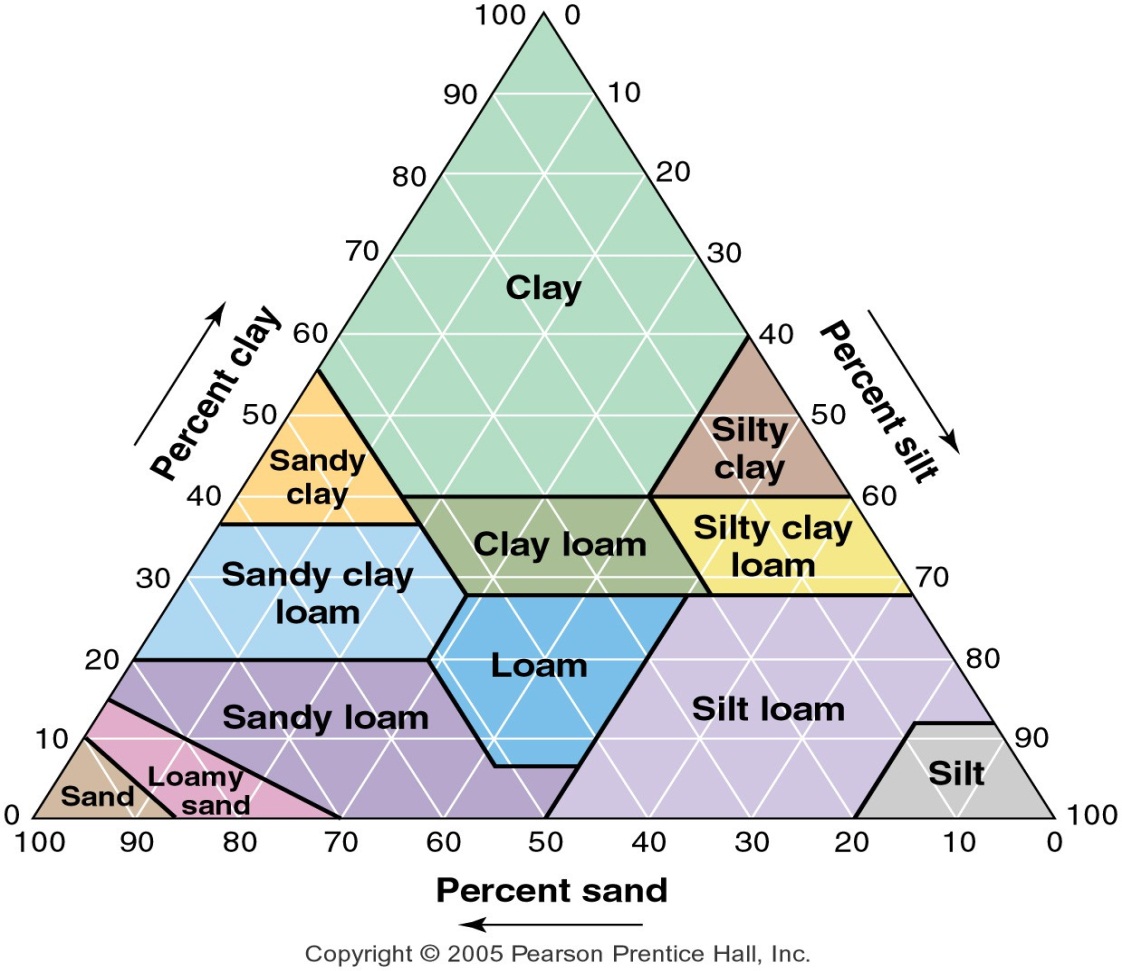
Individual Data: B

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



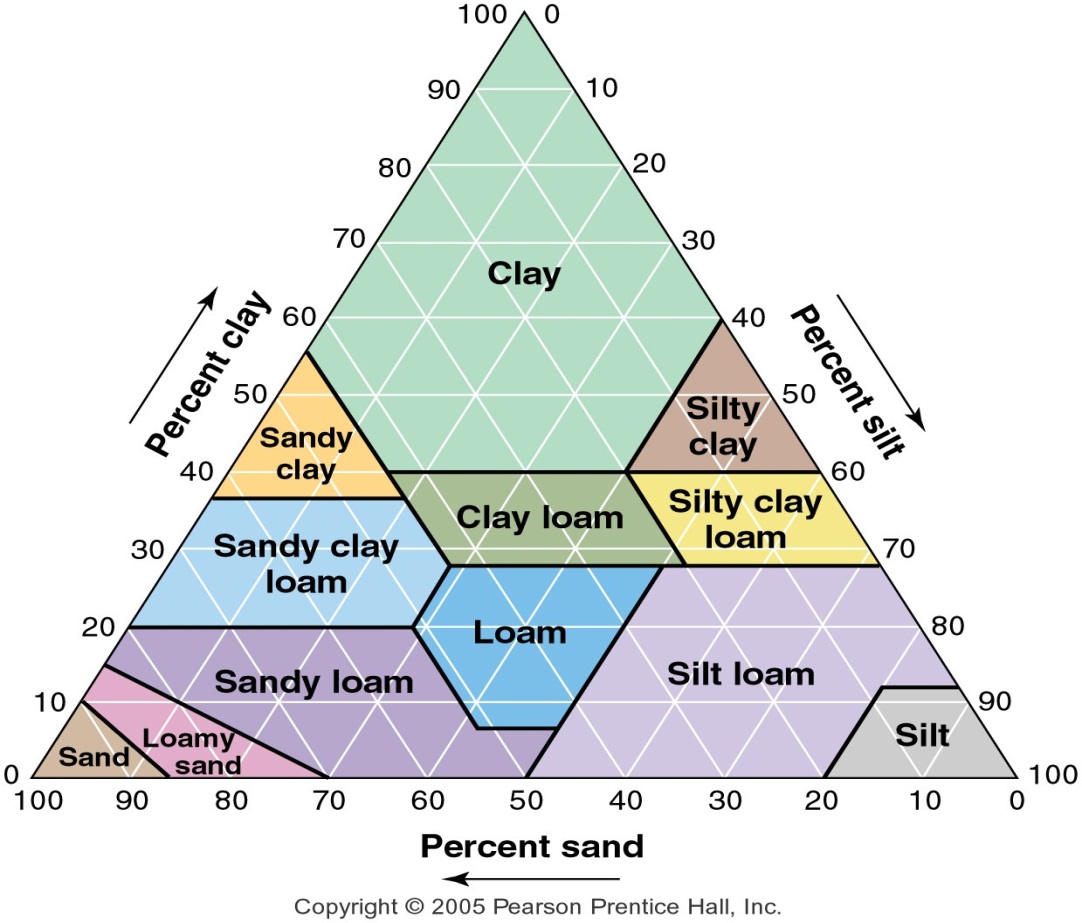
Individual Data: C

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



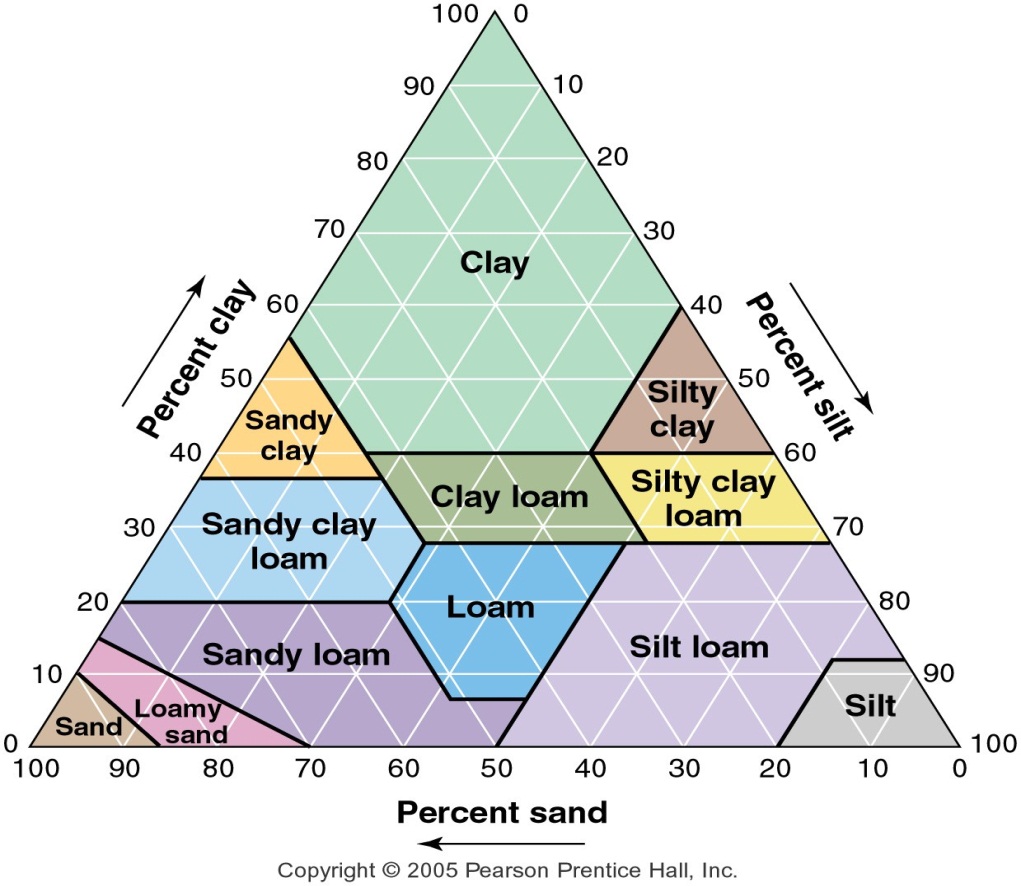
Class Data: A

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



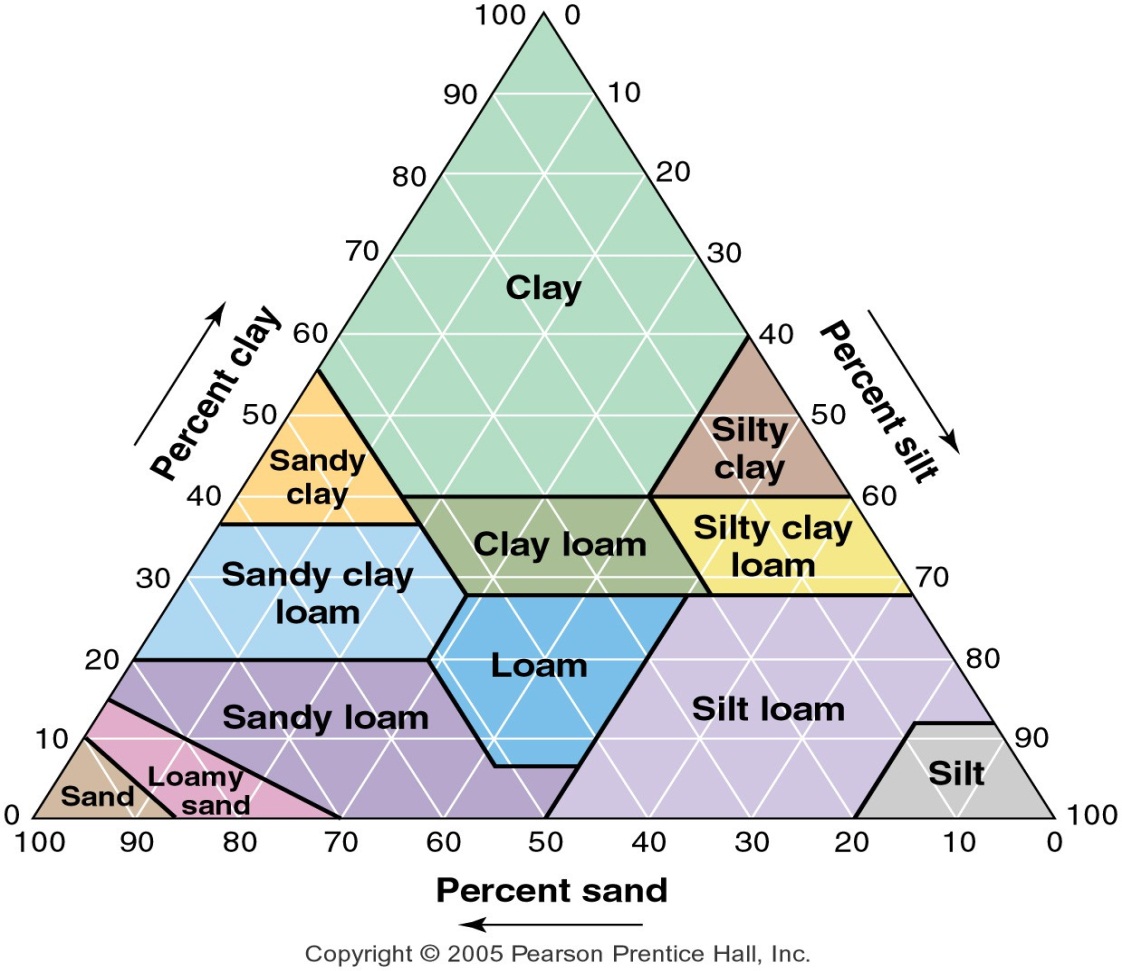
Class Data: B

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Class Data: C

Clay %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Silt %: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sand %: \_\_\_\_\_\_\_\_\_\_\_\_\_

Soil Texture: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Group # | Sample A:  Volume (mL)  Water passed through sample | Sample A:  Volume (mL)  Water held by soil | Sample A: time (sec) time required for water to permeate | Sample A:  Volume (mL)  Water passed through sample | Sample A:  Volume (mL)  Water held by soil | Sample A: time (sec) time required for water to permeate | Sample A:  Volume (mL)  Water passed through sample | Sample A:  Volume (mL)  Water held by soil | Sample A: time (sec) time required for water to permeate |
| 1 |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |  |
| Average  Groups  1-7 |  |  |  |  |  |  |  |  |  |

What is your individual Group Number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Sample with greatest permeability \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_