Worksheet 2:

Soil Characteristics

In this activity you will be examining certain characteristics of the four different soils that appear on the Soil Map. Your task is to determine which soil is least likely to produce high corn yields.

You will be examining four characteristics for each soil type—soil texture, drainage class, available water capacity, and slope-- in Don's fields which will help you determine the soil most likely to be least productive. Below is an explanation of the four characteristics that will help you in making your final decision. Use the Summary Table at the end of the handout to keep track of your findings.

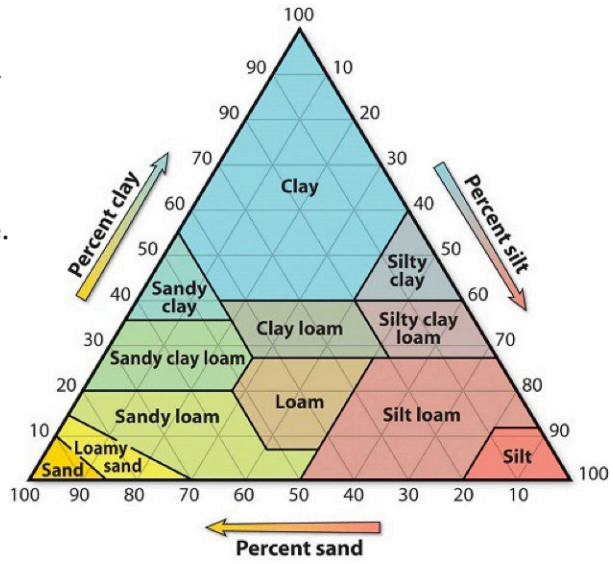
1. Soil Texture

Soil texture probably exerts more influence on soil productivity and management requirements than any other physical characteristics of soil. Texture of the surface layer has an important influence on tilth, ease of tillage, resistance to soil erosion, water-holding capacity, and ability to hold and release nutrients.

Texture reflects the proportion of sand, silt, and clay size particles that make up the soil mass. Use the Soil Texture Triangle that appears below. The triangle shows that a soil can vary to some extent in its proportions of sand, clay, and silt. So we can get a general idea of the proportions of sand, silt, and clay in each of the soils in the Villwock fields.

Here is an example of how the triangle works for Lyles loam. Beginning from the Percent Sand side of the triangle, follow the 40% sand up and to the left. This line intersects with the 20% clay line that comes straight across from the Percent Clay side of the triangle. It also intersects with the 40 percent silt line that comes down from the Percent Silt side of the triangle. So loam is 40 percent silt, 40 percent sand and 20 percent clay.

Now you calculate the general proportions of sand, clay and silt in the other soils. Soil descriptions appear on the Soil Map. Record your findings on the summary table for all four soils. To draw some conclusion about your findings, you might want to read "How Soil Affects Your Operation" which appears just below the triangle.



How Soil Affects Your Operation

When matching corn hybrids to each field, consider the amount of water that will be available for corn plants from the field's soil type.

Sandy soils hold less water per foot of soil, subjecting corn hybrids to stress during drought periods.

Clay soils hold more water than other soil textures, bur plant roots are not able to extract the moisture needed from high-clay (small particle size) soils.

Loamy soils provide the most usable amount of plant-available water per foot of soil.

2. Drainage Class
Drainage classes provide a guide to the limitations and potentials for field crops, such as corn. The class roughly indicates the degree, frequency, and duration of wetness, which are factors in rating soils for various uses. Shown below are descriptions of the three drainage classes mentioned on the Soil Map. How do you think the drainage class of each soil in the Villwock fields will affect corn production? Enter you conclusions in the summary table.

Somewhat Excessively Drained: Water is removed from the soil rapidly. Internal water occurrence commonly is very rare or very deep.

Somewhat Poorly Drained: Water is removed slowly so the soil is wet at a shallow depth for significant periods during the growing season.

Poorly Drained: Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods.

3. Available Water Capacity
Available water capacity is the amount of water that a soil can store that is available for use by plants. In areas where drizzle falls daily and supplies the soils with as much or more water than is removed by plants, available water capacity is of little importance. In areas, like in the Villwock fields, where plants remove more water than the amount supplied by precipitation, the amount of available water that the soil can supply may be critical.

Examine the description of each of the four soils that appear in the **Soil Description** section below, and determine the available water capacity for each. Enter that that information in the summary table along with your thoughts about how the available water capacity affects productivity for each soil.

4. Slope
Slope is the steepness of the land, expressed as a percent. Erosion can be a serious problem on steep slopes unless there are plenty of range plants growing there to protect the soil.

Examine the description of each of the four soils that appear in the Soil Description section and determine the slope for each. Enter that information on the summary table along with your thoughts about how slope affects productivity for each soil.

Soil Description
The Bloomfield Series
Consists of deep, somewhat excessively drained, gently sloping to steep soils that formed in more than 6 feet of windblown sand on uplands.

These soils are rapidly permeable. Surface runoff is slow to rapid.

Erosion is a hazard, and the low available water capacity is a limitation in the use and management of these soils.

Bloomfield loamy fine sand (BIB), 2 to 4 percent slopes. This soil is at ridgetops and on short irregular slopes. Surface runoff is slow.

The soil is suited for all crops, including corn.

Erosion is a hazard, and the low available water capacity is a limitation. During years when rainfall is below average or poorly distributed, crops are subject to severe damage from drought.

The Ayrshire Series
Consists of deep somewhat poorly drained, nearly level soils that formed in wind-deposited sand and course silt on uplands.

These soils are moderately permeable and have a high available water capacity. Surface runoff is slow.

Wetness is a major limitation in the use and management of these soils.

Ayrshire fine sandy loam (Ay), 0 to 2 percent slope. This soil is in broad flats on uplands. Surface runoff is slow.

If a suitable drainage system is established and maintained, this soil is suited to all crops, including corn. Wetness is s major limitation.

The Lyles Series
The Lyles series consists of deep, very poorly drained, nearly level soils that formed in water- and wind-deposited sands and course silt in depressions on uplands and terraces.

These soils are moderately permeable and have a high available water capacity. Surface runoff is very slow. Wetness is a major limitation in the use and management of these soils.

Lyles fine sandy loam (Ls), 0 to 2 percent slopes. This soil is in depressions on uplands and terraces surrounded by sandy soils. Surface runoff is very slow. This soil is suited for growing a variety of crops, including corn, if a suitable drainage system is established and maintained. Wetness is a major limitation.

Lyles loam (Ly). 0 to 2 percent slopes. This soil is in depressions on uplands and terraces. Surface runoff is very slow. This soil is suitable for all crops, including corn, if suitable drainage systems are established and maintained. Wetness is a major limitation.

Source: Daviess County, Indiana Soil Survey United States Department of Agriculture Soil Conservation Service in cooperation with Purdue University Agriculture Experiment Station, 1974

Summary Table

MUSYM	Drainage Class	Soil Texture	Available Water Capacity	Slope
Ay Ayrshire fine sandy loam	Somewhat poorly drained. Comments:			
Ls Lyles fine sandy loam	Poorly drained. Comments:			
Ly Lyles loam	Poorly drained Comments:			
BIB Bloomfield loamy fine sand	Somewhat excessively drained. Comments:			

In the space provided, write a short paragraph summarizing the information from the summary table. This summary paragraph should be comprised of five to six sentences that draw together the information obtained from the table.

What soil type is likely to be least productive in planting corn?

Explain why you selected this soil zone. Explain in terms of drainage class, soil texture, available water capacity and slope.