

Importance of Soils

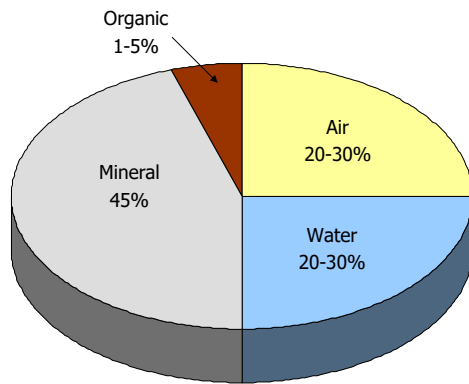
- Food – directly or indirectly
- Fiber (trees, cotton, etc.)
- Fuel (wood, ethanol, corn & pellets)
- Buildings - foundations
- Recycles and detoxifies waste

Soil Definition

- A living, naturally occurring dynamic system at the interface of air and rock. Soil forms in response to forces of climate and organisms that act on parent material in a specific landscape (topography) over a period of time.

What is soil composed of?

- Mineral material
- organic matter (dead plants, animals, microorganisms)
 - soil teaspoon -100million bacteria – 50,000 species (kinds)
- living organisms
- air
- water



How soils are formed? – Soil forming factors

- Soil forming factors
 - Climate
 - Organisms (biological factors)
 - Parent Material
 - Topography (also called relief or landscape position)
 - Time

*memory trick (Clorpt)

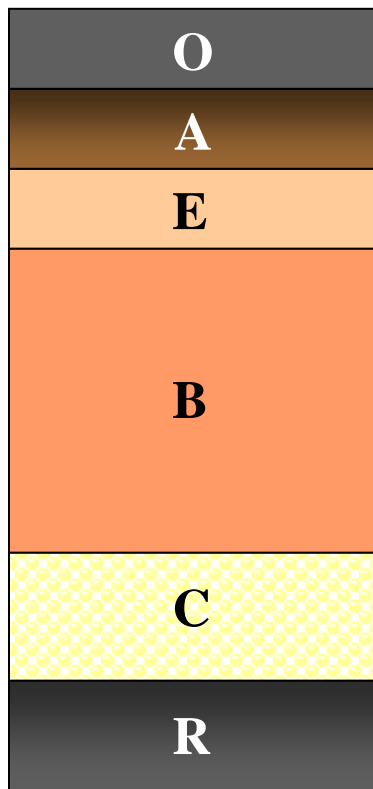
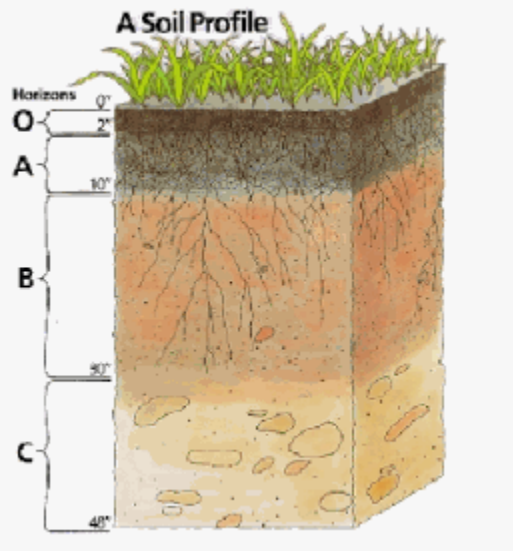
Major types of parent materials:

- Minerals and rocks
 - Residual (weathered in place)
 - Transported - Colluvial
 - Water transported – alluvial (floodplains, alluvial terraces)
 - Glacial deposits (transported by ice)
 - Wind deposits (loess, eolian sand)
 - Marine (sea) and lacustrine (freshwater lakes) deposits

Soil Horizons

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil forming processes.

Used to classify the soil and make interpretations.



Organic layer.

Organic matter accumulation.

Zone of eluviation – loss of clay, Fe, Al, etc.

Zone of accumulation (clay, Fe, Al, CaCO₃, salts...). Forms below O, A, or E horizon.

Little pedogenic alteration.. Commonly it is undonsolidated parent material or soft bedrock.

Hard, continuous bedrock.

- The above horizons are common in Pennsylvania. Most soils do not contain every horizon.

- How do we differentiate horizons? (changes in color, texture, structure, roots, redoximorphic features (mottling) or other.

Soil Texture – sand, silt, clay

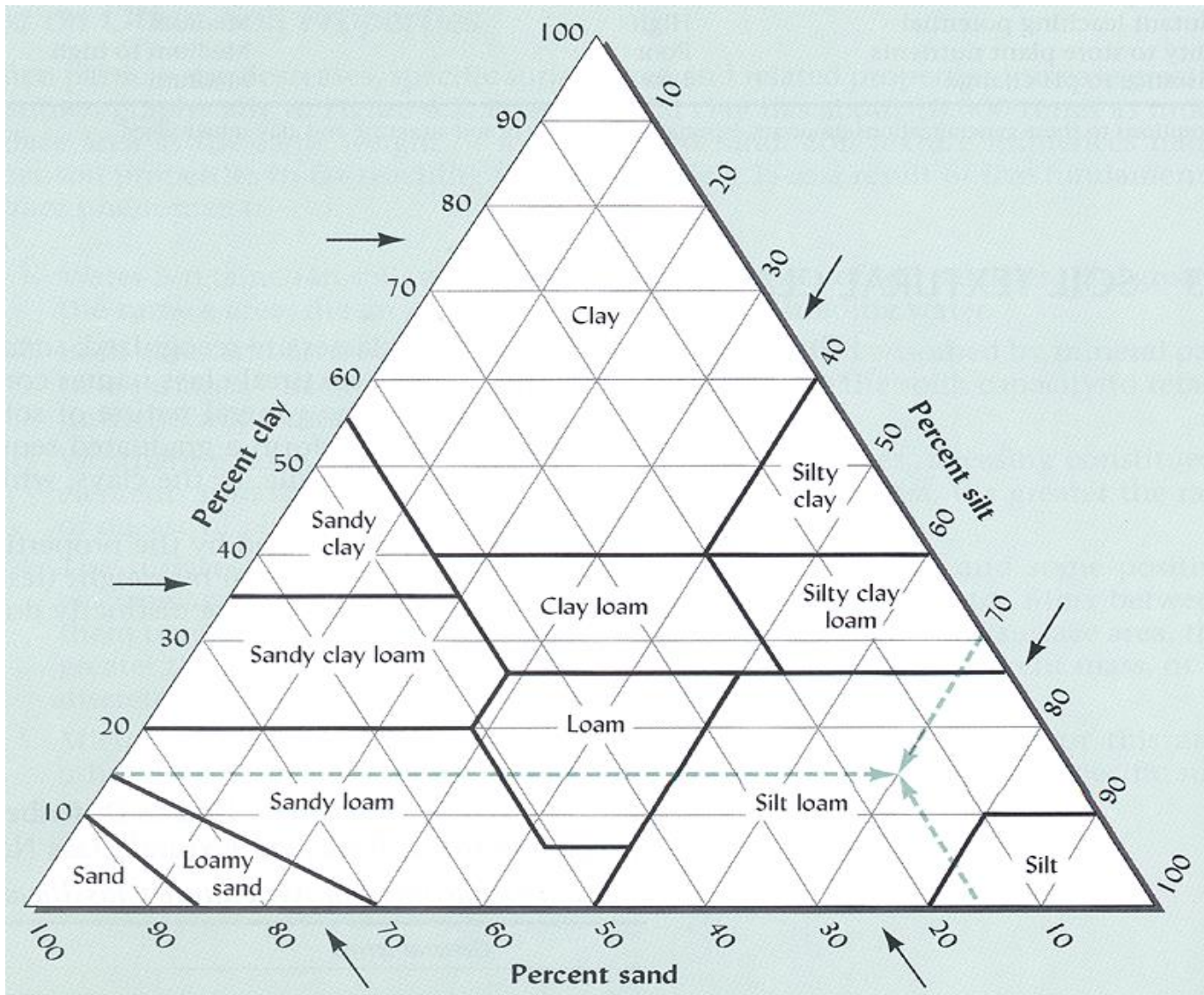
Sand - feels gritty

Silt - feels floury

Clay - sticky when wet

Loams – mixture of materials

- high silt soils and loams are most conducive to plant growth
- How does texture affect water in soils?
The soil textural triangle and the key to soil texture by feel are to be available for the test.

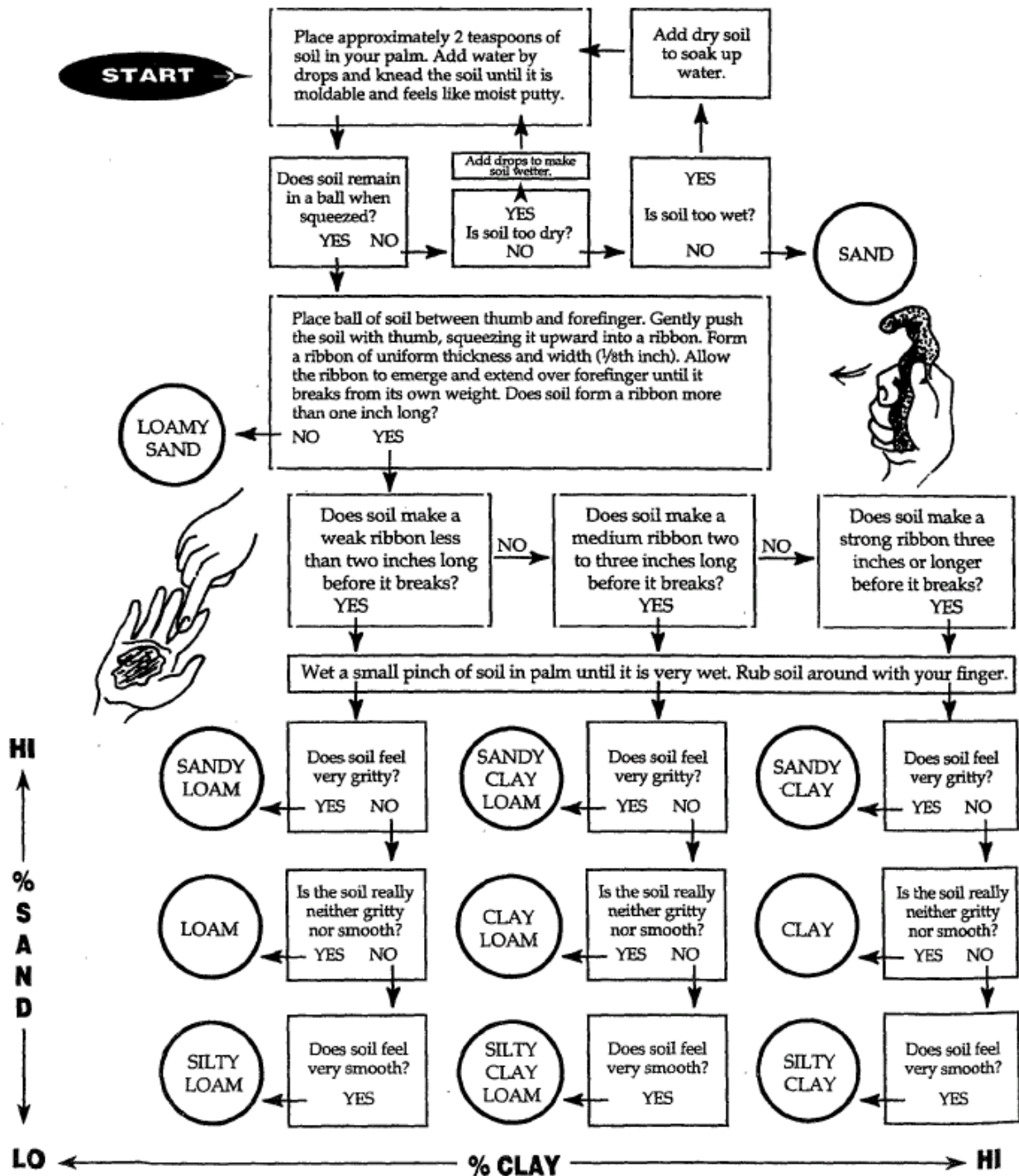


Soil Textural Triangle



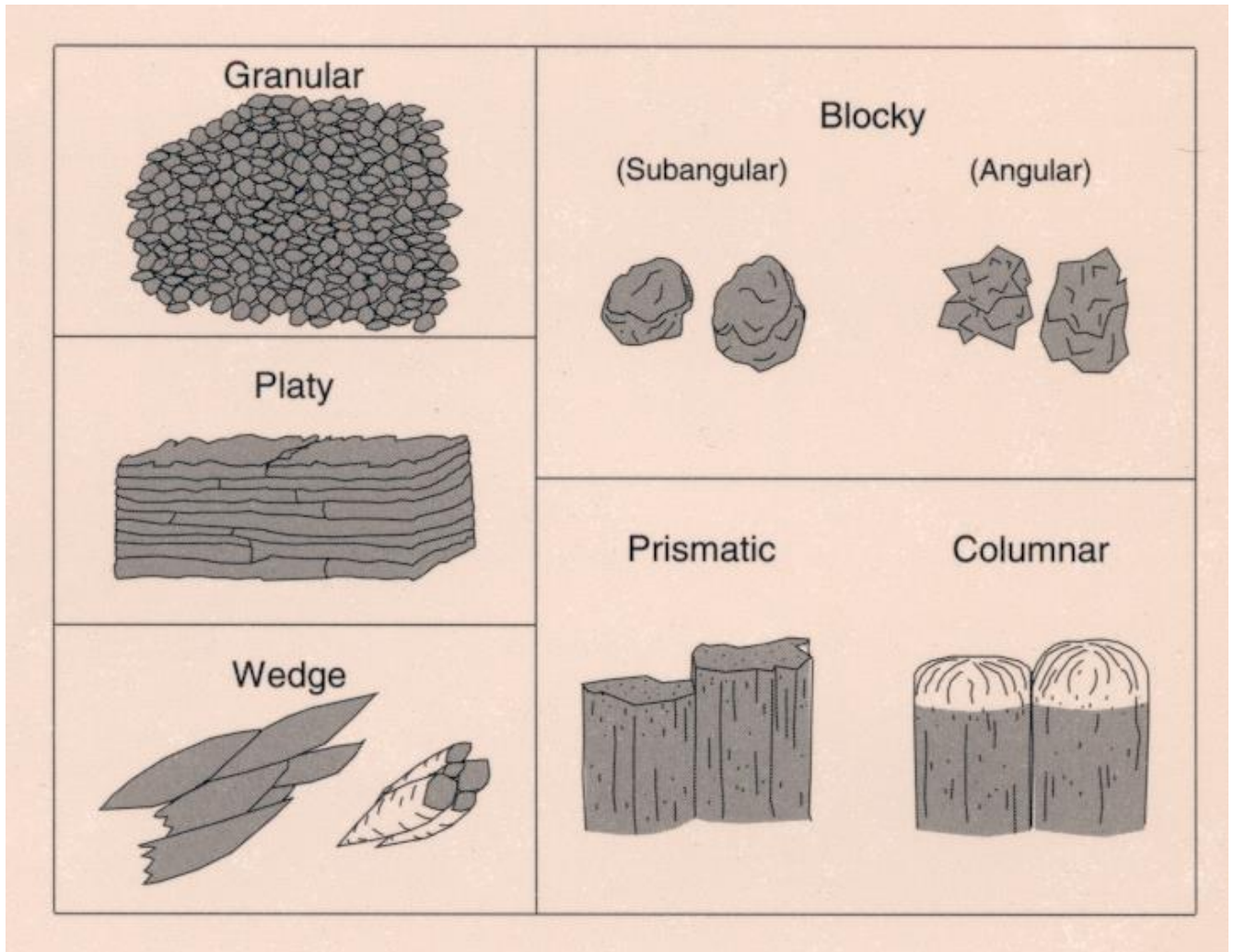
Key to Soil Texture by Feel

Begin at the place marked "Start" and follow the flow chart by answering the questions, until you identify the soil sample.



Soil Structure

The naturally occurring arrangement of soil particles. Each individual unit is called a ped. Near surface soil structure is often influenced by land use and management.



Soil Color

Determined by air and water drainage, organic matter, parent material

Topsoil – dark organic matter – vegetation, soil critters,

Subsoil – less OM

Red soils – often high iron, well-drained (example of a rusty pipe)

Wet Soil - Lack of oxygen (air) – leads to grey colors and redoximorphic concentrations and depletions (mottling)

Soil pH

Soil pH thus affects the availability of several plant nutrients.

A pH range of 6 to 7 is generally most favorable for plant growth sources. This is considered neutral to slightly acidic.

Great diversity of pH difference in Pennsylvania, although soils are more likely to be acidic than alkaline.

Low pH soils can be adjusted by adding lime. High pH soils can be adjusted by adding sulfur or sulfuric acid.

Soil Survey

Designed to:

- Delineate different soils across the landscape
- Predict soil behavior for different uses
- Highlight limitations and hazards inherent in the soil

Includes:

- Text
 - General description
 - Map units descriptions
 - Use and Management
- Interpretive tables
- Maps

Over 70,000 different kinds of soil have been delineated in the United States

In a soil survey, soils are classified into map units which consist of one or more soil series within a slope class.

A soil series (or soil type) has a combination of traits unique to it such as parent material, texture, drainage, and landscape position.

Slope gradient (or slope) is the steepness of the land. It is the rise or fall in a given distance and is usually measured in percent. Example: If a hillside is 100 feet long and drops 10 feet in elevation from the top of the slope to the bottom of the slope, then the slope is 10%.

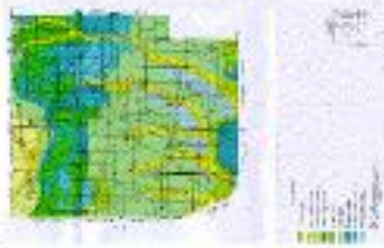
Delineated on the maps are individual Map units. These show the different soil series (types) across the landscape. The first letter denotes the soil series and special feature, the last large letter denotes the slope phase.

Note the document entitled "How do I use a soil survey" to be available to use on the test.

How Do I Use a Soil Survey?

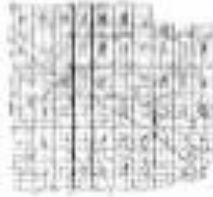
Step 1:

Look at the General Soils Map



Step 2:

Identify the desired area on the Map Index



General maps made possible by the support of
USDA, and the National Conservation Service
Address: International Research Council
Alabama, Cahoon Professor
Professor of Soil Chemistry, University of Alabama
Address: 1000 University of Alabama, Tuscaloosa, AL 35487
Address: 1000 University of Alabama, Tuscaloosa, Alabama



Step 3:

Look at the detailed soil map. Note the map unit symbols.



Soil Surveys are used to

- Predict
- Estimate
- the
- Potential
- Limitations
- of soil

Step 4:

Turn to the Contents to find the location of the map unit description.

Page	Description
1	Introduction
2	Map Unit Descriptions
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Step 5:

Check the Tables

Table	Description
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Supplies

Soil samples for question

Soil profiles

Small display board

Rusty pipe

Water and buckets for cleaning

33 copies handouts

8 copies of test

33 answer sheets