

# **Pennsylvania Envirothon**

## **Soil References**

**for**

## **Landforms and Geologic Terms**

## **Soil Structure**

## **Soil Texture**

**J.J. Eckenrode, USDA - NRCS, 2002**

# Pennsylvania Landforms

## and Geologic Terms

Landform is defined as *a feature of the earth's surface attributable to natural causes.*

The following landform descriptions and geologic terms are some of the major ones found in Pennsylvania. This is only a small portion of landform terms described in the National Soil Survey Handbook, part 629, Glossary of Landform and Geologic Terms.

**alluvial fan** - A low, outspread mass of soil and/or rock, deposited by a stream, shaped like an open fan or cone. Commonly found at the mouth of streams where they enter a larger valley.

**bench** - A nearly level to gently sloping platform-like surface on a steep sideslope. Generally a bedrock controlled erosional surface on a hillside or mountain side.

**bog** - A waterlogged swampy area consisting mostly of organic material such as mosses, sphagnum, sedges and woody materials.

**colluvium** - soil material that has accumulated at the footslope of a ridge or mountainside due to mass soil movement or landslide.

**depression** - A relatively sunken part of the earth's surface. A low lying area surrounded by higher ground. A closed or open depression such as a sinkhole.

**drainageway** - A general term to describe a long narrow water course, that at some time has concentrated water flow, but lacks a channel or has a small defined channel. Water flow is intermittent.

**drift (glacial)** - A general term applied to all material transported and deposited by glacial ice. The term applies to deposits that no longer contain glaciers.

**flood plain** - A nearly plain that borders a stream and is subject to flooding. Soil material has been deposited by stream overflow and deposition.

**footslope** - A gentle to moderate sloping area at the base of a side slope or mountain slope.

**headslope** - The concave surface at the head of a drainageway.

**interfluvium** - A broad upland area or ridgetop between two valleys or waterways, that sheds water into those valleys or waterways.

**karst** - Topography with sinkholes and underground drainage formed in limestone. Generally has few if any streams, except those formed by large springs.

**local alluvium** - Soil deposited in drainageways and on footslopes by sheet, rill and gully erosion of adjacent and nearby slopes. Created by stormwater runoff rather than by overflowing streams.

**loess** - Soil material transported and deposited by wind, and predominantly of silt size.

**mountain** - The natural land rising more than 300 meters (approx. 1,000 ft.) above the lowlands.

**mountain slope** - The side slope of a mountain between the summit and the foot.

**nose slope** - The projecting end of an interfluvium. Generally convex contours up and down slope.

**piedmont** - In the United States the Piedmont (noun) is a low plateau extending from New Jersey (through Pennsylvania) to Alabama and lying east of the Appalachian Mountains.

**plateau** - A relatively large flat area at high elevations near the summit and generally 100 meters ( approx. 330 ft.) above adjacent low lying areas.

**residuum** - Unconsolidated, weathered, or partly weathered soil material that accumulates in place by disintegration of the bedrock.

**side slope** - The slope between a drainageway and the summit or interfluvium.

**sinkhole** - A closed depression formed in limestone by solution of the bedrock and collapse of the overlying soil.

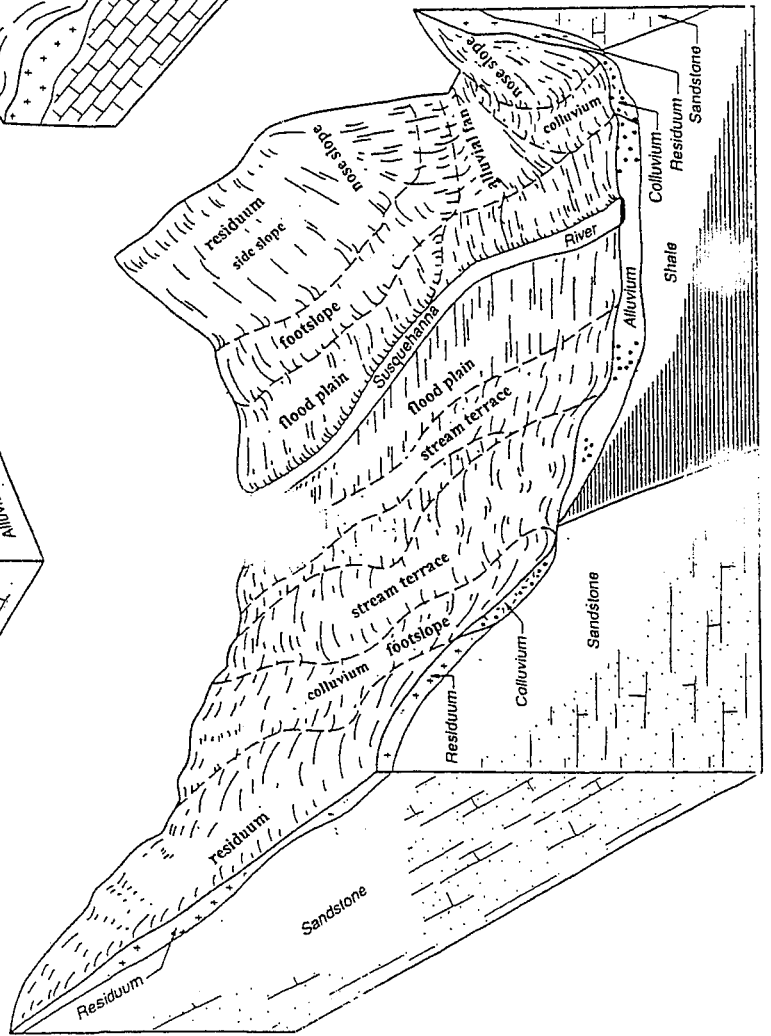
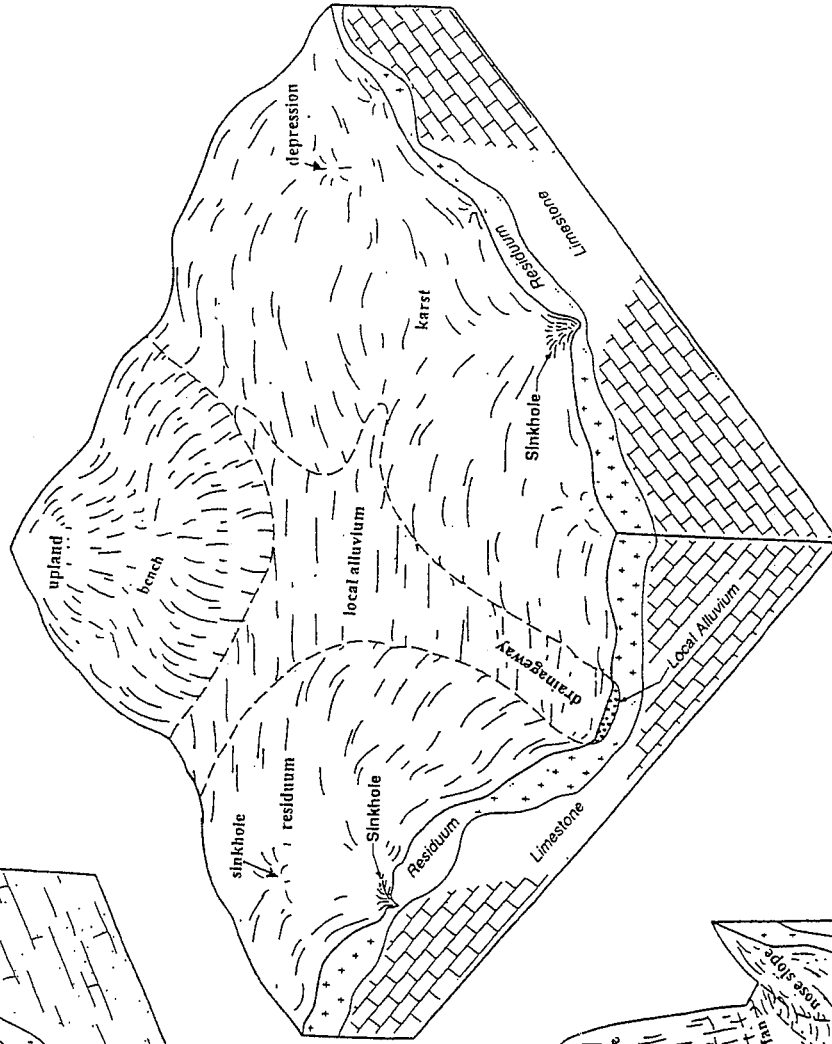
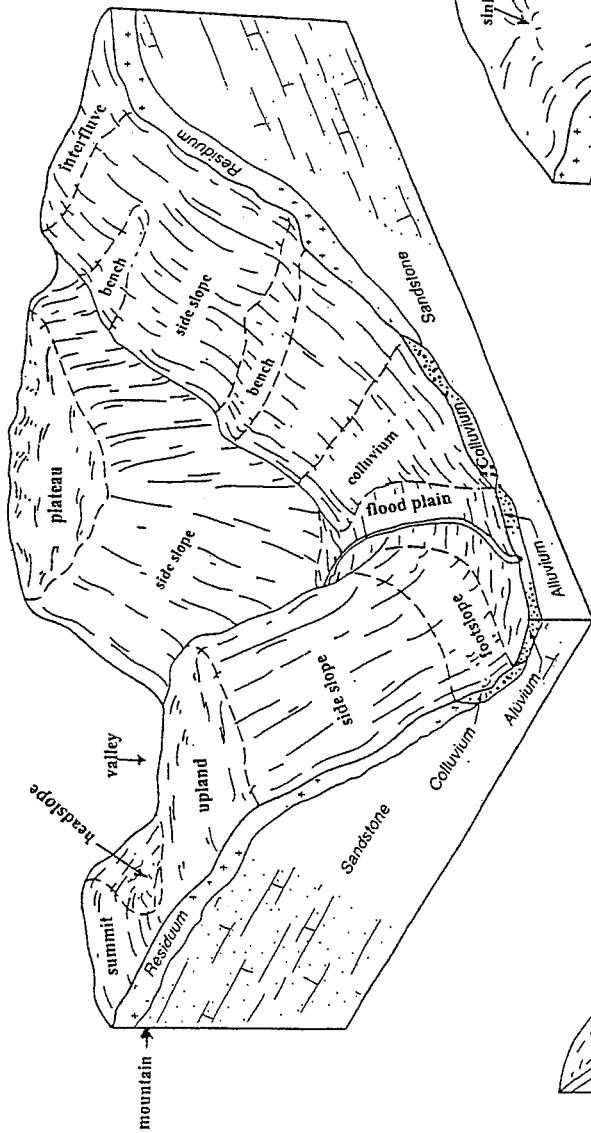
**stream terrace** - A platform in a stream valley parallel to the stream, representing an abandoned floodplain, at higher elevation than current day flood plains.

**summit** - The topographically highest position with a plain to convex , nearly level to sloping surface.

**upland** - A general term for higher ground in contrast to valley, floodplain or other low lying ground.

**valley** - An elongated, relatively large, externally drained depression of the earth, primarily formed between mountains by erosion or glacial activity.

# Landforms and Geologic terms



# SOIL STRUCTURE

**Soil Structure** is the naturally occurring arrangement of soil particles into aggregates that result from the soil forming processes. Structure is described by three terms. They are **grade**, **size** and **shape**.

**Grade** describes the distinctness of the aggregates. **Size** of aggregates is divided into five categories, and **shape** is divided into four basic structural units.

**Grade:** **Structureless** - No units observable in place or in a hand sample. Sand is an example of "structureless-single grain" soil when the individual grains are loose and do not form aggregates. "Structureless-massive" is continuous layers of soil that do not show aggregates in place or in a hand sample. Dense glacial till and the interior of some fragipans are massive, single units showing no structural development.

**Weak** - Structural units are barely observable in place or in a hand sample.

**Moderate** - Units are well formed and evident in place or in a hand sample.

**Strong** - Units are distinct in place and separate easily when disturbed.

Size:	Granular	Prismatic	Angular and Subangular blocky	Platy
	mm	mm	mm	mm
Very fine (very thin) <sup>1</sup>	<1	<10	<5	<1
Fine (thin) <sup>1</sup>	1-2	10-20	5-10	1-2
Medium	2-5	20-50	10-20	2-5
Coarse (thick) <sup>1</sup>	5-10	50-100	20-50	5-10
Very coarse (very thick) <sup>1</sup>	>10	>100	>50	>10

<sup>1</sup>) For platy structure substitute very thin, thin, thick and very thick for size names.

## Soil structure continued

### Shape:

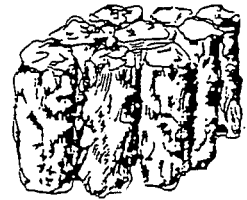
**Granular** - The individual units are approximately spherical or polyhedral and are curved or very irregular faces. Common in surface horizons.

Granular



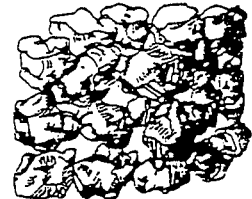
**Prismatic** - Units are elongated vertically with flat to rounded vertical surfaces. Tops are generally flat. Common structure of fragipans.

Prismatic



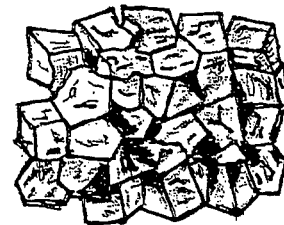
**Subangular blocky** - Units are somewhat rounded block like or with flat to slightly rounded polyhedral surfaces. Common in subsurface horizons.

Subangular  
blocky



**Angular blocky** - Units are block like with sharp edges. Common in heavy textured subsurface horizons.

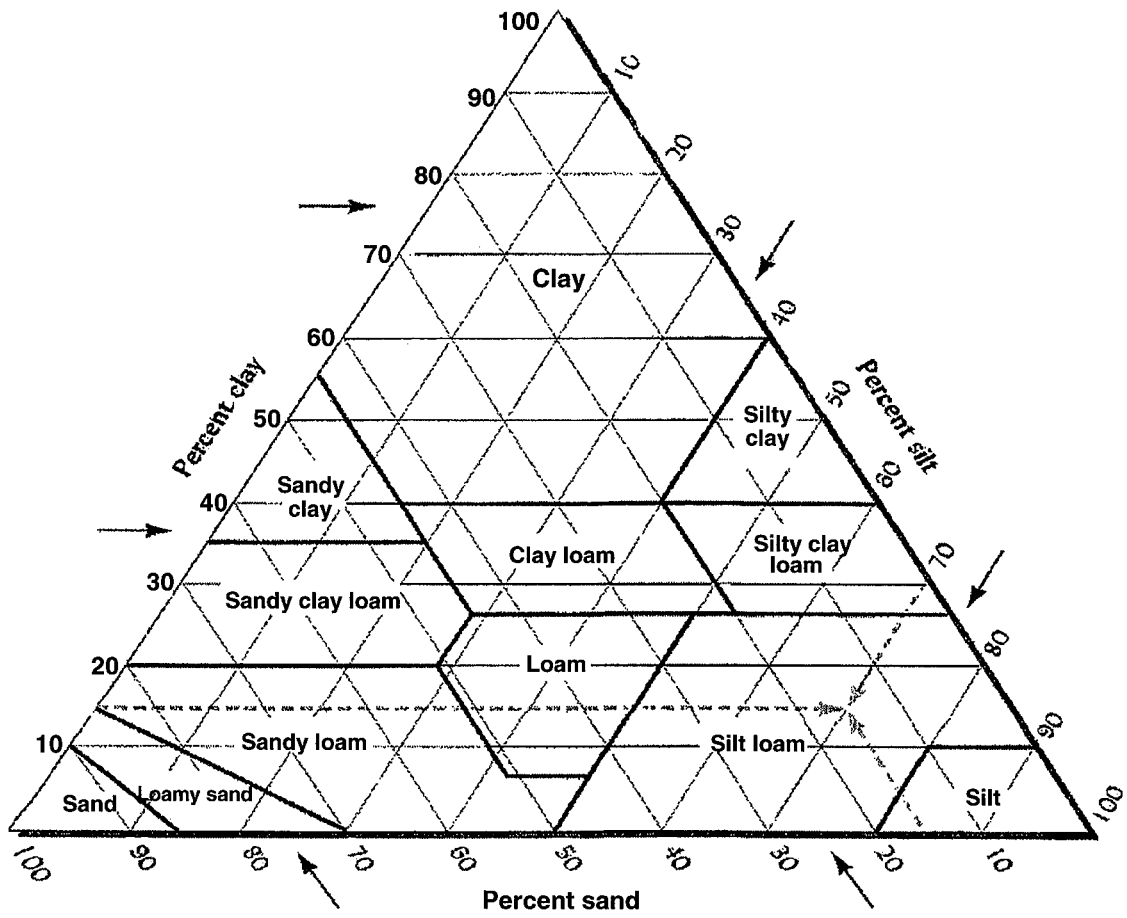
Angular  
blocky

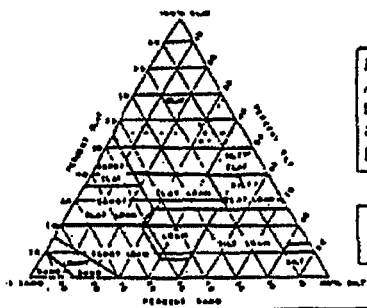


**Platy** - The units are flat and platelike, generally oriented horizontally. Common in compacted surface layers and in plow pans.

Platy







**Start**

Place approximately 25 g soil in palm. Add water dropwise and knead the soil to break down all aggregates. Soil is at the proper consistency when plastic and moldable, like moist putty.

Add dry soil to soak up water

Does soil remain in a ball when squeezed?

Is soil too dry?

Is soil too wet?

**SAND**

Place ball of soil between thumb and forefinger gently pushing the soil with the thumb, squeezing it upward into a ribbon. Form a ribbon of uniform thickness and width. Allow the ribbon to emerge and extend over the forefinger, breaking from its own weight.



**LOAMY SAND**

Does soil form a ribbon?

Does soil make a weak ribbon less than 1 inch long before breaking?

Does soil make a medium ribbon 1-2 inches long before breaking?

Does soil make a strong ribbon 2 in. or longer before breaking?



Excessively wet a small pinch of soil in palm and rub with forefinger

Does soil feel very gritty?

Does soil feel very gritty?

Does soil feel very gritty?

**SANDY LOAM**

**SANDY CLAY LOAM**

**SANDY CLAY**

Does soil feel very smooth?

Does soil feel very smooth?

Does soil feel very smooth?

**SILT LOAM**

**SILTY CLAY LOAM**

**SILTY CLAY**

Neither grittiness nor smoothness predominates

Neither grittiness nor smoothness predominates

Neither grittiness nor smoothness predominates

**LOAM**

**CLAY LOAM**

**CLAY**