

Indiana Registry of Soil Scientists
Performance Objectives for the Indiana Soils and Field Skills
Exam

You should be able to do the tasks indicated by the verbs in bold type in the objectives listed below by topic.

I. Indiana Soils, written exam section

FACTORS OF SOIL FORMATION IN INDIANA

1. **List** the five factors of soil formation.
2. **Describe** the conditions of each soil formation factor in the Soil Regions (using the Soil Regions of Indiana map). Some examples follow.

Climate

(Variability of climate within the state has little effect on soil differences)

Vegetation

(Prairie areas are shown by cross hatch pattern on map; the rest was forested.)

Parent material

SR 5: Loess

SR 4: Eolian sand

SR 8: Wisconsinan till (lower part of pedons)

SR 3: Alluvium, Outwash

Topography

SR 2: Flat

SR 6: Rolling

SR 11: Steep, hilly

Time

SR 3: Young. Holocene flood plains and Wisconsinan terraces

SR 9: Moderately young. Wisconsinan loess and till

SR 13: Old, Ordovician and Silurian age bedrock

PROCESSES OF SOIL FORMATION

1. **List** four kinds of changes that take place during soil formation.
2. **Name** the four kinds of changes that take place during soil formation, according to Simonson, **provide** examples for each.
3. **List and explain** the major process of soil formation in Indiana (two examples given)
Dissolution of carbonate minerals in solum.
Translocation of silicate clay from A and E horizons to B horizons
4. **List** the four conditions necessary for reduction to occur in soils.
5. **Explain** the process of reduction in soil; using gain and loss of electrons
6. From a pedon description, **determine** the relative degree of reduction that has occurred in the soil.

SOIL MORPHOLOGY

1. In horizon designations, **explain** the significance of the following elements (example; 2Btb3):
Initial number
Uppercase letter
Lower case letter(s),
Addition number
2. **List** the master horizons used for Indiana soils (upper case letters).
3. **Explain** the meaning of the subordinate distinctions (lower case letters) in horizon designations used in Indiana.

SOIL CLASSIFICATION

1. **Distinguish** between class and category in any classification system.
Objectives 2 to XX refer to *Soil Taxonomy*
2. **List** the categories in *Soil Taxonomy*.
3. **Recognize** the category from a class name.
4. From the name of its soil class, **list** its category and **describe** the major properties of the soil. Examples follow:
Aquoll: (suborder category) Wet soil with thick dark surface horizon.

Typic Hapludalf (subgroup) Well drained soil with subsoil accumulation of clay, and high base saturation

Fine-silty, mixed, active, mesic Aeric Fragic Glossaqualf (family):

Subsoil clay accumulation, fragipan-like horizon, moderate wetness features, E tongues into Bt, approximately silty clay loam subsoil, mixed mineralogy (whole soil basis) fairly high CEC/clay ratio, mesic (medium) temperature regime

5. **Name** the soil temperature regimes in Indiana.
6. **Name** the soil moisture regimes in Indiana, and **explain** the differences among them.

LANDSCAPES

1. **Differentiate** among hills, bevels, and plains
2. **Explain** how landform components relate to landforms
3. **Identify** landforms and landform components on a cross-section diagram and on a block diagram.

MAPS AND THEIR USE

1. **Use** the rectangular land survey system in Indiana to:
Locate a township and a section within that system
Locate a point within a section using the five-point system
2. **Explain** what *northing* and *easting* mean in the Universal Transverse Mercator map projection

II. Field Skills section

1. **Estimate** the percent of sand, silt, and clay, and **list** the texture class, for several soil samples, using a texture triangle. The score for each sample will be based on the distance between a point on a texture triangle representing the lab results and a point representing the applicant's estimate. If the two are the same, the score is 100%. If they are as far away as possible, (100% clay vs 100% sand the score is zero).
2. From a core of a soil horizon, or similar undisturbed sample, **describe**:
Texture
Color of matrix
Major color

Minor color (mottles)
Structure
 Shape
 Size
 Degree of development
Consistence
Additional features (e.g., clay films, Mn concretions)