Soil/Land Use Station PRACTICE TEST ANSWER KEY

- Use the location map, information sign, and pictures of the soil profile and the area surrounding the soil pit to select your answers for Parts A and B.
- In Part C (Soil and Site Interpretations) use your answers from Parts A and B and the information given to assess the site and soil suitability for Agricultural and Urban uses.
- You may need to adjust your monitor brightness to best see the soil colors in the photos. We do realize that there will some differences in how the photos appear on different screens and will allow for a range of answers where appropriate.
- Use the yellow tape measure in the soil profile photo for all depth and thickness measurements.
- Assume what you can see at the bottom of the soil profile (approximately 41 inches) extends to 72 inches.
- There are no surface stones or rock outcrops at this site. The surface horizon has no rock fragments.

Part A – Landscape Features

Use the location map, information sign, and pictures of the soil profile and the area surrounding the soil pit to select your answers.

1. Position

□ Upland
□ Upland depression or drainageway
□ Terrace
□ Floodplain

This site is an Upland. According to the information sign, the site doesn't flood, so it is not a floodplain. Floodplain soils also have minimal development and would not have the B horizon that we see in this soil. A Terrace is an old floodplain, that because of changes in the landscape only floods rarely or never. A soil in a terrace position (formed in older alluvial deposits) will show more development (such as a B horizon) than the soils on the floodplain position. An upland depression or drainage way is an area that collects water. These areas are concave or bowl-shaped. In a depression, water drains towards the site from 3 or more sides. A drainageway conveys water, and water drains through the site from 2 or more sides. This site is on a slope, but the slope is linear and water flow does not concentrate (as in a drainageway). The Upland landscape position is the default position, meaning that the site is not a floodplain, terrace, or upland depression or drainageway.

2. Parent Material

□ Residual
□ Colluvium
□ Recent alluvium
□ Old alluvium
□ Coastal plain sediments

From the site location map, you can determine that this site is located in the Coastal Plain region of Maryland. Coastal Plain sediments are the dominant parent material for soils in this region. Coastal Plain sediments are water deposited sediments left by previous changes in sea level. They are much older than alluvial deposits found along streams. Alluvium describes soil parent materials that were deposited by water (streams and/or rivers). They may have stratified layers that are sorted by size. Since the sediments are deposited by water, any rock fragments are smooth and rounded because they have been shaped by flowing water. Soils formed in alluvium are found on Floodplains and Terrace positions.

Colluvium is deposited by gravity and can be found at the base of slopes or in depressions. Rock fragments in colluvium tend to angular because they have not been weather by water like alluvial deposits. Because they are moved by gravity, they also aren't sorted like alluvium. The coarse fragments can be a mix of sizes and all oriented differently. Residual soils are those that form from the weathering of bedrock (e.g., limestone, sandstone, shale, granite, gneiss, schist, etc.). On the Coastal Plain, bedrock is buried beneath thick deposits of Coastal Plain sediments. On the Coastal Plain, there are no soils that form in Residual parent material.

3. Slope Characteristics

Slope Class	Piedmont-Appalachian	Coastal Plain	Letter Designation
□ Nearly level	0-3%	0-2%	A
□ Gently sloping	3-8%	2-5%	B
□ Strongly sloping	8-15%	5-10%	C
□ Moderately steep	15-25%	10-15%	D
□ Steep	25-50%	15-25%	E
□ Very steep	50+%	25+%	F

Use the landscape photo showing the clinometer view to read the slope. The slope at this site is 4%. Since this site is on the Coastal Plain, it is Gently Sloping.

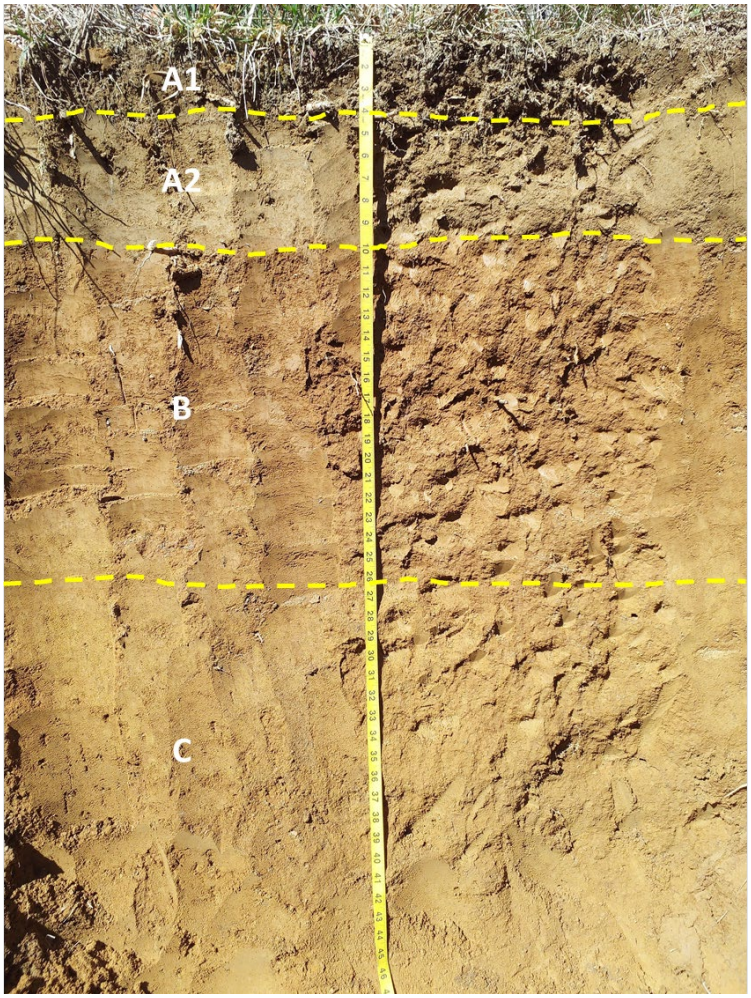
Part B – Soil Profile Features

Use the pictures from the soil pit and reference information to select your answers.

4. Check the major soil horizons visible in this profile (check all that are present):

□ O
□ A
□ E (ok if marked)
□ B
□ C
□ R

The major horizons in this soil are A, B, and C. The A horizon has two parts (A1 and A2). The second, lower A horizon is slightly lighter in color and could be mistaken for an E horizon. We decided that this was a second A horizon and not an E horizon because of the abrupt, distinct boundary that occurs at 10 inches. This boundary is characteristic of the plow layer. When this site was farmed the upper part of the soil (topsoil) was mixed by tillage. Soil scientists call this an Ap horizon (the p is for plowed). This created an abrupt boundary between the topsoil and the subsoil. The presence of an abrupt boundary is a good indication of the Ap horizon and can be used as a clue to distinguish between a lighter colored A horizon and an E horizon.



5. What is the current topsoil thickness, O and/or A horizon(s)?

____10_____ inches

The topsoil includes both A horizons and is 10 inches thick.
If the A2 horizon was identified as an E horizon, the topsoil would only include the upper part of the A horizon (A1) and would be 4 inches thick.

6. Soil Color

a. Topsoil – A Horizon

□ Brown or dark brown
□ Reddish brown
□ Gray or grayish brown
□ Black

Topsoil is brown from the accumulation of organic matter.

b. Subsoil and Substratum – B and/or C horizon

□ Yellowish brown or red, no redox depletions (gray colors due to wetness)
□ Yellowish brown or red, some redox depletions (gray colors due to wetness)
□ Dominantly gray, with redox concentrations (brownish red colors due to wetness)

The subsoil and substratum are yellowish brown to brown. There are no redox depletions that would signify a seasonally high-water table. Redox depletions are gray in color.

7. Soil Drainage

a. Depth to Redox Depletions

□ Directly under a thick black colored surface
□ 0 to less than 10 inches
□ 10 to less than 20 inches
□ 20 to less than 40 inches
□ 40 to less than 72 inches
□ 72 inches or greater

No redox depletions are visible within the soil profile. The information sign tells you that if there are no redox depletions observed within the profile to assume there are no depletions within 72 inches.

b. Natural soil drainage class

□ Excessively well drained
□ Well drained
□ Moderately well drained
□ Somewhat poorly drained
□ Poorly drained
□ Very poorly drained

Since the redox depletions occur below 40 inches and it does not have a coarse textured topsoil and subsoil, the drainage class is Well Drained.

8. Soil Depth

a. Effective rooting depth

□ Very shallow (less than 10 inches)
□ Shallow (10 to less than 20 inches)

□ Moderately deep (20 to less than 40 inches)
□ Deep (40 to less than 60 inches)
□ Very deep (60 inches or greater)

The soil does not contain any layers that would restrict root growth. This information is provided on the information sign. Additionally, there is no observable evidence of a root restricting layer (e.g., fragipan, a cemented layer, bedrock, etc.).

b. Depth to bedrock

□ Very shallow (less than 10 inches)
□ Shallow (10 to less than 20 inches)
□ Moderately deep (20 to less than 40 inches)
□ Deep (40 to less than 60 inches)
□ Very deep (60 inches or greater)

There is no bedrock within 60 inches of the soil surface. Bedrock is not visible in the soil profile. Additionally, this soil is in the Coastal Plain region, which does not have soils derived from bedrock.

9. Topsoil Texture (A horizon)

□ Coarse – sand, loamy sand
□ Moderately coarse – sandy loam
□ Medium – loam, silt loam, sandy clay loam
□ Moderately fine – silty clay loam, clay loam
□ Fine – clay, silty clay, sandy clay

Use the written descriptions and pictures to walk through the Guide for Estimating Soil Texture by Feel. This soil forms a stable ball and forms ribbons greater than ½" long, so it is not Coarse. The ribbons are less than 2", so look in the first column at the bottom of the flow chart. The soil is described as not being dominantly gritty or smooth, so the soil texture is Medium (loam).

10. Topsoil Permeability (A horizon)

□ Rapid, >6.0 in/hr (coarse texture)
□ Moderately rapid, 2.0-6.0 in/hr (moderately coarse texture)
□ Moderate, 0.6-2.0 in/hr (medium texture)
□ Moderately slow, 0.2-0.6 in/hr (moderately fine texture)
□ Slow, <0.2 in/hr (fine texture)

Use the textural class determined in question 9 to evaluate permeability. Soils with Medium texture have Moderate permeability. The corresponding texture classes are showing for each of the Permeability classes.

Part C – Soil and Site Interpretations

Use your determinations of the Landscape and Soil Profile Features (Parts A and B) to answer questions about soil and site interpretations.

Agricultural Suitability

11. Past Soil Erosion

Past Soil Erosion = Original topsoil thickness (from information sign) minus current topsoil thickness

- □ Slight (less than 3 inches of the original soil lost)
- □ Moderate (3-8 inches of the original soil lost)
- □ Severe (greater than 8 inches of the original soil lost)

The Information sign says that the original topsoil thickness was 11 inches. The current topsoil thickness (Question 5) was 10 inches. 11-10 = 1 inch of topsoil lost. Past Erosion at this site has been slight.

12. Major limiting factors (check all that apply):

- □ None
- □ Flooding or ponding (Occasional or Frequent)
- □ Slope (Gently sloping or greater)
- □ Past erosion (Severe)
- □ Effective rooting depth (less than 40 inches deep)
- □ Drainage (less than 40 inches to redox depletions, gray colors due to wetness)
- □ Coarse textures (Topsoil and Subsoil)
- □ Very stony or Rock outcrop

Look at the Information Sign (flooding frequency and presence of stones or rock outcrops), Slope (Question 3), Past Erosion (Question 11), Effective Rooting Depth (Question 8a), Drainage Class (Question 7b), and Soil Texture (Questions 6a and 6b) to identify the limiting factors. Since the slope was Gently sloping, this site has slope as a limiting factor. There are no other limiting factors at this site.

13. Land Capability Class

□	I	No limiting factors and nearly level
□	II	Gently sloping, or Moderately well drained, or Moderately deep
□	III	Strongly sloping, or Somewhat poorly drained, or Poorly drained, or Shallow, or Coarse textures
□	IV	Moderately steep, or Very poorly drained, or Occasionally flooded
□	V	Nearly level and very stony surface or rock outcrop, or frequently flooded
□	VI	Steep, or Gently sloping through steep and very stony surface or rock outcrop
□	VII	Very steep, or Very shallow
□	VIII	Swamp, tidal marsh, coastal beach, areas with >90% rock outcrop, or urban land

Use the limiting factors identified in Question 12 to assign the Land Capability Class. The only limitation at this site was the slope (Gently sloping), so this soil has a Land Capability Class of II.

14. Is this Prime Farmland, i.e., Land Capability Class I or II?

□ Yes
□ No

Prime Farmland has a Land Capability Class of I or II. Since this site has a Land Capability Class of II (Question 13), it is considered Prime Farmland.

Urban Suitability

15. Suitability for Lawns:

Check the appropriate suitability rating based on the most limiting soil property:

	Soil Properties					
More Limiting ↓	**Slope**	**Topsoil Texture**	**Rock Fragments in/on Surface**	**Past Erosion**	**Depth to Redox Depletions**	**Suitability: (check one)**
	Nearly level, gently sloping	Moderately coarse, Medium	< 15% gravel	Slight	> 24 inches	□ Slight
	Strongly sloping	Moderately Fine, Coarse	15-35% gravel	Moderate	12-24 inches	□ Moderate
	Moderately steep to very steep	Fine	> 35% gravel, or Very stony, or Rock outcrop	Severe	< 12 inches	□ Severe

Look at each of the soil properties to determine which is the most limiting.
Slope – Question 3
Topsoil Texture – Question 6a
Rock Fragments in/or Surface – given on Information Sign
Past Erosion – Question 11
Depth to Redox Depletions – Question 7a
Since all of the soil properties had only Slight limitations, the overall Suitability/Limitation rating is Slight