SOIL *Soil forms within a sedimentary parent material over time as it accumulates organic matter and is reworked by biological agents and weathering, determined by the climate and topography*

→ Define the **horizons**, texture, and give top and bottom depths of each:

O: Organic humus (usually siltier)
A: Accumulation of organic material and/or leaching of clay minerals
(Ap: Plowed or disturbed upper horizons; not fill, but disturbed)
E: Leaching of clay and minerals without accumulation of organics (usually sandier)
B: Accumulation of clay minerals or other signs of pedogenic alterations; visible structure
C: Little to no significant alteration, source material or weathered gruss
R: Consolidated bedrock

→ Note the **color** of damp soil in the shade. Use Munsell book if available (start w/ 10YR and work from there).

→ Define the **texture** of each horizon (they may all be very similar):

Boulder (describe size, rounding and sorting) (>25.6 cm)
Cobble (describe size, rounding and sorting) (6.4 - 25.6 cm)
Large (12.8 - 25.6 cm)
Small (6.4 - 12.8 cm)
Pebble (describe size, rounding and sorting) (4 mm - 6.4 cm)
Very Large (3.2 - 6.4 cm)
Large (1.6 - 3.2 cm)
Medium (8 mm - 1.6 cm)
Small (4 - 8 mm)
Very Small (2 - 4 mm) *sometimes called a granule
Sand (describe size, rounding and sorting) (0.05 - 2.0 mm) **gritty**
Very Coarse (1.0 - 2.0 mm)
Coarse (0.5 - 1.0 mm)
Medium (0.25 - 0.5 mm)
Fine (0.1 - 0.25 mm)
Very Fine (0.05 - 0.1 mm)
Silt (0.002 - 0.05 mm) **smooth**
Clay (< 0.002 mm) **sticky**

*Use modifier first and main component last Ex/ gravelly (least), silty, fine to medium sand (most).
*Put the size modifier directly before the clast it modifies (Ex/ pebbly coarse sand; not coarse pebbly sand).
*Boulders, cobbles, and pebbles are all "Gravel," which can be confusing. Do not use the word gravel without specifically saying how big the gravel is. It can be a range.

→ Note the sorting (**well-sorted**, **moderately-sorted**, **poorly-sorted**), rounding (**angular**, **sub-angular**, **sub-rounded**, **rounded**) and abundance (**few** [5-15%], **common** [15 to 30%] or **many** [30 to 50%]) of any gravels you mentioned are present.

→ Describe the roots and burrows, if they are present:

Abundance (few [if you have to search], common [easily seen or several coarse], many [visually dominate])
Size: For roots use: rootlet [< 1 mm], fine [1-2 mm], medium [2-5 mm], coarse [5-10 mm], or very coarse [>10 mm, state diameter]
For krotovina, use "gravels" sizes.
Type of plant, rodent, worm, or insect if known
Make sure to describe the sediment in the burrow as well.

→ Describe the strength of each soil horizon

Very Weak = a few soil clods in a loose matrix
Weak = some good clods, but mostly loose matrix
Moderate =half loose matrix and half clods
Strong = Mostly clods with little loose matrix
Very Strong = All clods, no loose matrix

You can use words like **loose**, **friable**, or **compact** when these characteristics are outstanding. Compact is often associated with fill. Do not use "dense."
***The peds (clods) do not have to be big to have strong structure. Do not use "chunks."

→ Describe the structure (how it breaks up when squeezed) of the soil:

Angular blocky
Sub-angular blocky
Granular
Platy
Prismatic or Columnar
Single grains

Note if the whole soil layer is massive or if there are variations within the horizon

→ Describe any post-depositional features, like oxidation or reduction:

Abundance (few, common, many or estimate %)
Size (fine, medium, coarse, or give diameter)
Shape (round, irregular, streaks)
Type (concentration, concretion, nodules)
Source (Fe oxide, Manganese, organic)

If "haloed," describe inner, then outer, as well as thickness
Take inner and outer Munsell colors

→ Define and describe all large cobble, boulder, or foreign inclusions:

Identify the inclusion
Determine **Abundance**: Few [5-15%], Common [15-30%] or Many [30-50%]
If a **rock**, note: **size** (pebble, cobble, boulder)
roundness (angular, sub-angular, sub-rounded, rounded)
orientation (horizontal, vertical, imbricate, random, dispersed)
lithology (rock name if you can)

→ Define and describe all soil boundaries:

Sharpness

< 2 cm = **abrupt**
2 - 5 cm = **clear**
5 - 15 cm = **gradual**
> 15 cm = **diffuse**

Nature

Smooth = Flat across the profile
Wavy = Undulating or rolling across profile
Irregular = Can't simply describe, so sketch it or describe in detail following "Irregular" distinction
Broken = Not continuous across the profile, but has discrete lenses or patches
Burrowed = Burrowed matrix of one horizon intruding into another, can combine w/other boundaries
Other (describe in detail)

→ Determine context of archaeological materials:

Give the 10 or 20 cmbs interval was collected from at minimum and if possible, give the exact depth of the artifact
Note if the artifact came from the boundary between two horizons when possible
Note if the artifact was positioned in a manner that looked patterned with any of the features you described above.

→ You do not need to say what is not there. For example, no need to say "no gravels."

→ If using the term "loam" when describing a soil, make sure you understand what the term means and the necessary % of each sand, silt, and clay to quantify as a loam.

SEDIMENT *Sediment is clastic material that has been weathered and eroded, transported by wind, water, ice or gravity, and deposited.*

→ Note the sediment's <u>color</u>:

Colors are taken in the shade, with moist soil (note moist or dry), using **Munsell** books

Ex/ Dark grayish brown (10YR 4/2) or Dark Gray-brown (10YR 4/2)

If mottled, note dominant variations, patterns (**streaked**, **spotted**, **variegated**, **mottled**), size and abundance.

Do not hyphenate colors, or use the descriptors "creamy," "blackish," "tan" or "medium."

→ Define the <u>texture</u> of each stratum (layer):

Boulder (describe size, rounding and sorting) (>25.6 cm)

Cobble (describe size, rounding and sorting) (6.4 - 25.6 cm)

Large (12.8 - 25.6 cm)

Small (6.4 - 12.8 cm)

Pebble (describe size, rounding and sorting) (4 mm - 6.4 cm)

Very Large (3.2 - 6.4 cm)

Large (1.6 - 3.2 cm)

Medium (8 mm - 1.6 cm)

Small (4 - 8 mm)

Very Small (2 - 4 mm) *called a granule

Sand (describe size, rounding and sorting) (0.05 - 2.0 mm) **gritty**

Very Coarse (1.0 - 2.0 mm)

Coarse (0.5 - 1.0 mm)

Medium (0.25 - 0.5 mm)

Fine (0.1 - 0.25 mm)

Very Fine (0.05 - 0.1 mm)

Silt (0.002 - 0.05 mm) **smooth**

Clay (< 0.002 mm) **sticky**

*Use modifier first and main component last Ex/ gravelly (least), silty, fine to medium sand (most).

*Put the size modifier directly before the clast it modifies (Ex/ pebbly coarse sand; not coarse pebbly sand).

*Boulders, cobbles, and pebbles are all "Gravel," which can be confusing. Do not use the word gravel without specifically saying how big the gravel is. It can be a range.

*Loam is more commonly used to describe soils, so avoid "loam" when describing sediment.

→ Note the <u>sorting</u> (**well-sorted**, **moderately-sorted**, **poorly-sorted**), <u>rounding</u> (**angular**, **sub-angular**, **sub-rounded**, **rounded**) and <u>abundance</u> (**few** [5-15%], **common** [15 to 30%] or **many** [30 to 50%]) of any gravels.

→ Describe the <u>roots and burrows</u>, if they are present:

Abundance
few [if you have to search]
common [easily seen or several coarse]
many [visually dominate]

Size (roots)
rootlet [< 1 mm]
fine [1-2 mm]
medium [2-5 mm]
coarse [5-10 mm]
very coarse [>10 mm, state diameter]

Use "gravel" sizes for Krotovina or give diameter in cm (Ex/ small cobble-sized rodent burrow)

Type of plant, rodent, worm, or insect, if known

Make sure to describe the sediment in the burrow as well.

→ Determine the <u>thickness</u> of any **beds** (cm to m scale) or **laminae** (mm) and note any other sedimentary features that may be present.

→ Determine <u>consistency</u> and use modifier if noteworthy (**compact** or **loose**)

Dense, soft, slightly hard, hard, very hard, extremely hard are engineering terms.

→ Define and describe <u>boundaries</u>:

Sharpness

< 2 cm = **abrupt**
2 - 5 cm = **clear**
5 - 15 cm = **gradual**
> 15 cm = **diffuse**

Nature

Smooth = Flat across the profile
Wavy = Undulating or rolling across profile
Irregular = Can't simply describe, so sketch it or describe in detail following "Irregular" distinction
Broken = Not continuous across the profile, but has discrete lenses or patches
Burrowed = Burrowed matrix of one horizon intruding into another, can combine w/other boundaries
Other (describe in detail)

→ Describe any <u>post-depositional features</u>, like oxidation or reduction:

Abundance (few, common, many or estimate %)
Size (fine, medium, coarse, or give diameter)
Shape (round, irregular, streaks)
Type (concentration, concretion, nodules)
Source Common mottles are due to Fe oxide (orange or red), Manganese (black), or organic (dark brown, orange, or yellow)

If "haloed," describe inner, then outer, as well as thickness. Take inner and outer Munsell colors

→ Define and describe all large rock or foreign <u>inclusions</u>:

Identify the inclusion
Determine **Abundance**: Few [5-15%], Common [15-30%] or Many [30-50%]
If a **rock**, note: **size** (pebble, cobble, boulder)
roundness (angular, sub-angular, sub-rounded, rounded)
orientation (horizontal, vertical, imbricate, random, dispersed)
lithology (rock name if you can)

→ Determine <u>context</u> of archaeological materials:

Give the exact depth or **10 or 20 cmbs interval** was collected from.
Note if the artifact came from the boundary between two horizons when possible.
Note if the artifact was **position**ed **relative to** any of the **features** you described above.
Note any **charcoal flecks or staining** by 20 cm interval unless you can be more specific.
Note if there is **fill, or** if the surface sediments are **disturbed** in any way.
Note ideas about what the sediments are, how they got there, or why they look the way they do.
Give any ideas you may have about the depositional context of the sediment; for example, alluvium, or wetland deposit, or beach sands, or varved like lake deposits.

→ You do not need to say what is not there. For example, no need to say "no gravels."

EXAMPLES

Soil :

0-10: O horizon (O); dark brown (10YR6/2), fine sandy silt with many fine rootlets of grasses; weak soil structure; gradual smooth lower boundary; no cultural material.

10-29: A Horizon (Ap); possibly plowed; brown (10YR4/4), fine to medium sandy silt with many medium roots of bushes and grasses and 10 cm diameter rodent burrows filled with O horizon soil from above; moderately strong soil structure; clear, burrowed lower boundary; no cultural material.

29-45: B horizon (B); reddish brown (10YR4/3), silty fine to medium sand with few fine rootlets and one 8 cm diameter rodent burrow filled with A horizon soil; strong, medium, sub-angular blocky soil structure; few, sub-angular, small cobbles of basalt concentrated at 32 cmbs; slight graded bedding on the order of 4 cm evident below 38 cmbs; clear, wavy lower boundary; no cultural material.

45-57: Buried A horizon (Ab); brown (10YR4/4), fine to medium sandy silt with few fine roots; moderate soil structure; clear lower boundary; no cultural material.

57-70: Buried B horizon (2Bwb); mottled gray and reddish brown (mainly 10YR4/3), slightly gravelly, fine to medium sand; very strong, medium, sub-angular blocky soil structure; mottling concentrated between 65 to 70 cmbs; gravels are very few, sub-rounded, medium to large pebbles below 65 cmbs; abrupt wavy lower boundary; no cultural material.

70-85: C horizon (2C); yellowish gray (10YR2/4), medium to coarse sandy, poorly-sorted, sub-rounded, small to large pebbles.

Probe terminated due to impenetrable gravels in sterile glacial parent material.

Sediment :

0-5: Dark brown, gravelly, silty, fine to medium sand with common small and medium roots; heavily bioturbated by worms; moderately-sorted and loose; gravels are very few, sub-angular, very small pebbles; clear, smooth lower boundary; fill; no cultural material.

5-15: Dark brown, gravelly, silty, fine to medium sand with many small roots and 2 cm diameter insect burrows (possibly from cicadas); gravels are common, rounded, small to large pebbles; poorly-sorted and loose; abrupt, wavy lower boundary; fill; one small, clear glass fragment.

15-20: Mottled black and very dark gray, gravelly, fine sandy silt with many white and gray broken shells and shell fragments of blue mussel and clam; the smallest shell fragments are laminated within the black matrix; common fine charcoal fragments throughout; gravels are few, sub-rounded, medium pebbles; few to common, very small (< 1 cm) fish bones and sea-urchin spines throughout; loose consistency; abrupt, smooth lower boundary; midden.

20-24: Black silt with few small (1-2 cm) shell fragments; charcoal flecks and organic staining throughout; compact; abrupt, smooth lower boundary; midden.

24-38: White, large pebble- to granule-sized shell fragments of blue mussel and clam in an organic-rich, silty, fine to medium sand matrix; clast-supported; few fine charcoal pieces and few small (1 cm) fish bones; friable; gradual, wavy lower boundary; midden.

38-50: Black silt with few small (1-2 cm wide) shell fragments; charcoal flecks and organic staining throughout; compact; abrupt, smooth lower boundary; midden.

50-100: Mottled light brown and reddish brown, gravelly, silty, fine sand; gravels are common, rounded to sub-rounded, small to very large pebbles; poorly-sorted; sterile glacial sediment.

Probe terminated in sterile glacial sediment below the expected depth of project ground disturbance.