

Step one, field: Observe and describe a soil profile



This step will give students more experience describing soils in the field.

Find or make an exposure that is representative of a soil type or contains characteristics to which you would like to draw your students' attention. You can choose easy access exposures such as road cuts or have the students dig their own pit. Exposures should

extend through the O, A, E, and B horizons and down into the C horizon or weathered rock. This requirement usually yields 1-1.5 meter-deep pits.

Have the students relate the five soil forming factors to the actual soil development. Students should take careful notes and describe in detail soil characteristics such as texture, color, structure, and horizonation. Information collected on this day will be used to create the descriptive placards that will accompany the finished soil monolith.

By the end of this field session, students should be able to produce the following:

- Drawing of the soil profile using shades of gray or color
- Accurate and detailed soil profile description containing as much information as possible
- Summary report of the 5SFFs acting upon this soil and an interpretation of how, and to what degree, each SFF has influenced the development of this soil
- Soil order determination

Refer to *Soils are the Pits* for an example of digging soil pits and describing soils.

Step two, field: Prepare profile face and extract monolith



This step gives students professional hands on experience as they extract a soil monolith.

Go back to the soil exposure where the students did the soil description for the previous step. If you have a large class, break them up into groups and make multiple soil monoliths so that each student can be involved in the process.

Have the students choose a section of the exposure and smooth out a vertical face in preparation for extraction. Keep in mind that this is the face that will eventually be displayed on the monolith.

Insert the metal frame from the extraction board into the profile face, cut back the sides, attach the extraction board, cut back the soil behind the frame, and as the soil is loosened, lower the extraction board and set it on flat ground.

Attach the mounting board to the extracted soil, remove the extraction board, and shave the soil down to your desired final thickness. Wrap the monolith in a sheet of plastic for transport back to your lab.

After the extraction, leave the exposure in a state as close as possible to the one in which you found it, bringing back all of your tools and filling in the pit if you dug one.

Transport the extracted soil monoliths from the field to the lab. If the soil is very moist, uncover it so it can dry until you begin the next step. If your soil is fairly dry, you can leave it covered in plastic until you can begin the next step.

For an example of these steps, see SERC's four-minute video *How to Make a Soil Monolith*.

Step three, lab: Prepare monolith face



In this step, students restore the natural appearance of the soil before applying a permanent fixative.

When the soil was cut, the natural soil structure was obliterated. Pick out the soil face to reveal the natural structure as it is found in the field. If the soil is too dry, gently remoisten it with a water

sprayer before picking out its natural structure.

When the natural soil structure is revealed, brush away any loose particles and clean the mounting boards by scraping or sanding off any dried glue.

If you have pebbles, parent material, or other loose features you want to include in the monolith, you can place them in their natural position on the profile either now or just before applying the fixative in step four.

The soil should be completely dry for the next step, so leave it out to air-dry if necessary.

For an example of these steps, see SERC's four-minute video *How to Make a Soil Monolith*.

Step four, lab: Apply fixative



This step can be completed on the same day as either step three or five, depending on soil moisture level and amount of time available.

When the soil monolith is dry, saturate it with a water-glue mixture to solidify the soil and fix it permanently to the mounting board.

The ratio of water to glue used depends on the soil texture. In general, sandy/loamy soils take 5 parts water and 1 part glue, whereas clayey soils take 10 parts water and 1 part glue.

Protect the mounting board with tape and paper and apply as many applications of the water/glue mixture as needed (2-3) to ensure complete saturation of the soil monolith. Make sure any loose pieces such as pebbles or parent material are in the correct places and that features such as burrows are visible. Do not let the fixative pond on the surface. When the soil is saturated, wipe excess glue from the mounting board and remove the tape.

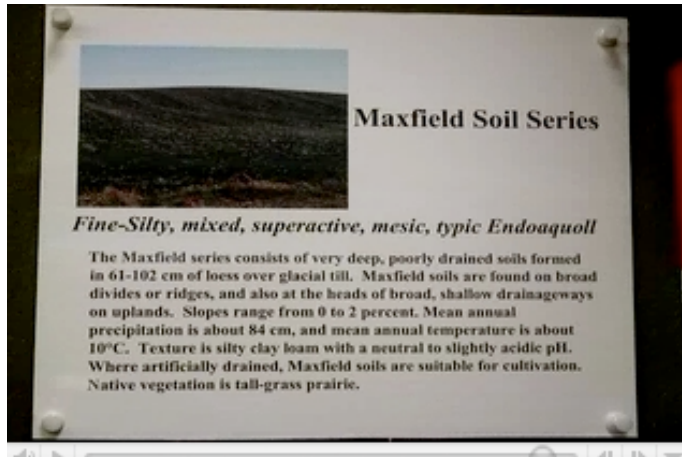


Let the profile dry completely, preferably in a ventilated area. This may take one to two weeks.

While the water/glue mixture in the soil dries, you can begin step five and create the descriptive plaques, paint the mounting board, and add hanging hardware to the mounting board.

For an example of these steps, see SERC's four-minute video *How to Make a Soil Monolith*.

Step five, lab: Create plaques, paint board, add hardware



It is time to complete the finishing touches and get the soil monolith ready for display.

Creating descriptive plaques, painting the mounting board, and adding hanging hardware are the final steps in this multi-week exercise. These final steps can be completed while the water/glue fixative dries in the soil. The information and

descriptions produced in step one will be useful here.

Descriptive Plaques

- Obtain a site location picture of where the soil occurs
- Type soil location description: general description of where the soil series is typically found
- Type soil profile description: detailed description of the representative soil profile for the soil series
- Mount soil location description with site photo and soil profile description on separate mounting boards for display alongside the finished monolith

Mounting Board

- Paint the mounting board with a flat black paint
- Add hanging hardware: attach eyehooks and chain to the top of each mounting board for hanging

Once the soil and paint are dry, your soil monolith is ready for display!

For an example of these steps, see SERC's four-minute video *How to Make a Soil Monolith*.