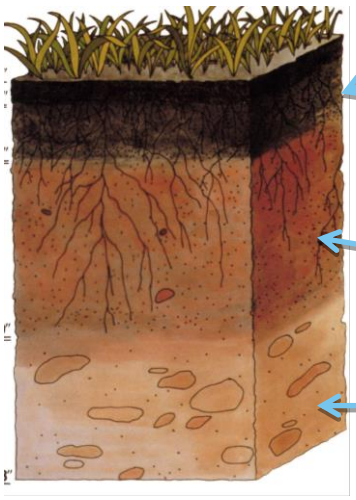
Soil Profiles - Teacher's Notes

Soil Profiles

Below is a generic soil profile where progressive weathering grades upwards from the parent rock.



Topsoil with mulch at the top and humus and broken bits of rock below. This is the most fertile part of the profile.

Less fertile subsoil

Weathered parent rock

(Credit: World Science Image Bank http://www.earthscienceworld.org/images)

This soil profile demonstrates the progressive weathering of a hard basalt rock into soil in a cool wet climate. It represents only about 20,000 years of weathering and the soil is very fertile. The dark brown layer of rich topsoil is the result of the breakdown of a rock rich in minerals such as iron and aluminium. This profile is 2m deep.
In the tropics a similar depth of weathering may take less than a hundred years.

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This profile is of yellow coastal limestone weathering to poor yellow and grey soils near Fremantle. These soils developed under drier and harsher conditions and only support Australian native plants unless fertilised, watered and mulched. This profile is 2m deep.

Inland Western Australia has soils that have been progressively weathered over millions of years. It can be very difficult to see the classic profile as water has moved minerals such as salt, gypsum and lime into and out of the rock. These regoliths (layers of unconsolidated soil) can be bleached and mottled due to water movement during different climates so that soil colour cannot be used to interpret parent rock. Geologists in Europe can often map geology by looking at aerial photographs. Movement of water between different rock types completely blurs any clues as to what lies beneath in most of inland Australia. Geologists have to rely on deep drilling and geophysical surveys to interpret the geology of this region. Dissolved materials such as salt, gypsum and lime come to the surface and dry out to form hard duricrust. They can provide a capping against later weathering.

If you have a road cutting near your school or are able to dig into the ground to produce a soil profile, students can see the progression from weathered rock through the varying layers from sub-soil to surface humus. Students are asked to create a profile sketch or annotated photograph. If a measuring tape is hung down the profile this will help students select a suitable scale.

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What scale will you use for your drawing? Consider the size of the original profile and the size of your drawing.
If the drawing is the same size as real life the scale is 1:1 or 1 to 1
If the drawing is half the size then the scale is 1:2 or 1 to 2

What words can you use to describe the differences between the layers in the soil profile? Colours such as grey, red brown and shades such as dark and light, textures such as coarse and fine.

Materials

- Spade
- Measuring tape (optional)
- Worksheet
- Pen, pencil, ruler, eraser
- Folder or book to lean on

Method

1. Write your name, location chosen and date at the top of your worksheet.
2. Observe the soil profile.
3. Discuss a reasonable scale to use and enter that at the foot of the worksheet
4. Sketch the profile to scale

Soil profile

Location	Description and comments

Scale

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Alternative Activity: If you cannot leave the classroom then use one of the photographs in these notes and either print copies or project it and ask students to draw and describe it.

Soils formed in sedimentary basins such as the Canning and Eucla basins or in present river plains.

Soils formed from sediments laid down by wind and water often exhibit layering or horizons. This layering is the result not of weathering but of deposition processes The heaviest materials are deposited first and later, higher deposits decrease in size upwards.