

AS16 - Geology & Geomorphology

Requirements:

- GIS contours map of the catchment

Geomorphology is the study of the physical features of the Earth's crust as related to its geological structures.

Provide students with a photocopy of the Catchment Contours map.

Alternatively the students can obtain GIS maps from the Upper Parramatta River Catchment Trust website.

Geomorphology of the catchment.

1. Draw a cross-section from A(Prospect Reservoir) to B(Baulkham Hills)

Note :

- contours are in metres above sea level.
 - horizontal scale is marked on the map, use another scale for the vertical eg 1 cm = 50 metres and record the vertical exaggeration.
2. Mark and label each of the following on your cross-section:
 - catchment boundaries
 - Prospect Hill
 - Prospect Reservoir
 - Cumberland Plain
 - Hornsby Plateau
 - Rivers and creeks
 - Draw blue arrows on your cross section to show the direction of water run off into the creek.
 3. Draw a cross section from B to C (Central Gardens) across the catchment.
 4. Mark and label the
 - Catchment boundaries
 - Cumberland Plain
 - Parramatta River
 - Hornsby Plateau
 - Draw blue arrows on your cross section to show the direction of water run off into the river.
 5. Where are the highest and lowest points in the catchment? Name them.
 6. Using evidence from your cross section describe the meaning of a catchment.

Note the spacing of the contours. Where in your cross section are the contours closest together? What does this indicate about the topography?

Catchment Geology.

Read the Information Sheets C3 Geology and C4 Geomorphology Overview of the Upper Parramatta River Catchment. This will tell you that the catchment can be divided into two geomorphological sections – the Cumberland Plain and the Hornsby Plateau.

1. What is the difference in geology between these two units?
2. On your cross sections mark where you think the boundary between the Cumberland Plain and the Hornsby Plateau is most likely to be, this is probably the boundary between the shale and sandstone exposures as well.
3. What rock type is exposed at Prospect Quarry? What is this rock used for?
4. Which rock unit, the Hawkesbury Sandstone or the Wianamatta Shale is the oldest?
5. Is there a relationship between the rock types exposed and the topography?
6. Do you think the topography of the Upper Parramatta River catchment has changed over time
 - in your lifetime?
 - since European occupation?
 - since the Hawkesbury Sandstone was deposited?
 - Discuss this issue.

Catchment Soils.

Collect samples of unconsolidated sediment from across the catchment eg. from your school yard, Darling Mills Creek bed, McCoy Park, local golf courses. Be sure that you gather samples from each of the sub catchments – Toongabbie Creek and tributaries and Darling Mills / Hunts Creek.

Carry out each of the following tests to describe these sediments:

- Examine each sample with a hand lens and describe colour, grain shape, texture.
- Weigh a given volume of each.
- Dry the sample in the sun or in an incubator.
- Reweigh the sample and calculate the water loss.
- Heat these samples strongly in a crucible for several minutes to burn off any organic matter.
- Reweigh and calculate the amount of organic material in the sample.
- Half fill a clear bottle or gas jar with soil. Add double (approximately) the volume of water and shake the sample thoroughly to mix. Allow the sample to settle and examine the layers which settle out. This will give an indication of grain size, composition and humus content.
- List the differences between a sandy soil and a clay based soil.
- Relate the soil types to such things as geology and land use.