Sedimentary Rocks

Links to Dinosaur Dreaming Project:

The rock platform and cliffs along the Bass and Otway Coasts, are composed mainly of sedimentary rocks including mudstone and sandstone, with occasional layers of conglomerate (rock made up of a mixture of sand, mud, wood and the occasional bone) and coal. Some of the cliff faces along the Bass Coast show considerable evidence of tilting of the rock layers and volcanic dykes cut through the sedimentary layers in some sections of the platform. Fossilized tree trunks and branches are also present on the platforms.

Materials needed:

- Plastic containers (buckets) of the following materials-
  gravel, sand, sawdust, soil, clay, potting mix, small pebbles (possible sediments)
- Smaller plastic containers (eg icecream containers) of the following-
  Leaves, shells, bones (to represent possible fossils)
- Plastic wide-mouthed jar with a lid for each group of students
- A 2L plastic drink bottle with top cut off for each group of students.

Procedure:
Part 1.

1. Each group places some of each of the materials in the large plastic jar with lid. Add water to cover the contents and put a lid on the jar firmly. Gently shake the jar. Allow it to settle. Observe and record the order of the layers formed in the sediment.

Observe what happens to the contents of the jar.

a. Which material ends up at the bottom?

b. Which materials ended up at the top?

c. Where did the fossils end up?

If the layers in the jar represent the way sediments settle over time (millions of years)

d. Which layer would be the oldest?

e. Which layer would be the youngest?

f. Which fossil would be the oldest?

g. Would the oldest layers always be deeper in the ground than younger layers?

The procedure above uses a model which assumes sedimentary rock forms in layers with the heaviest material at the bottom. This may not be the case in situations where layers are deposited over time due to earth movement or sediments are being moved by water or wind. In this next method the students control the order of the layers and the position of the fossils.

Part 2.

1. Each group places layers of each sediment material in the cut-off plastic bottle. They can decide which sediment layer goes first and also between which layers the fossil materials are placed.

2. Each group then explains how their layers of sediment or fossils have been placed OR each group swaps bottles with another group and after the swap they remove the layers of the swapped bottle to find out where the fossils were located. Each group then reports back to the class what they have found. ie What fossils they found and where they were located.

3. Discuss with the class how this method would be different from what actually happens when fossils form. eg time taken, hardening of the sediments, hardening of the fossil material, order of sediment layers.

Part 3. – Sedimentary Sandwiches

1. Provide each group of students with a plate, bread and butter knife, 3 slices of different bread- eg white, multigrain, wholemeal and some jam.
2. Each group then makes a three layered sandwich of bread with jam between each layer
3. In this sandwich the different breads represent the different types of rock layers and the jam between the layers represents the fossils between the rock layers.
4. Discuss the following

- which rock layer is the oldest?
- which rock layer is the youngest?
- Which layer of fossils would be the oldest?

5. Imagine there is an earthquake and the sandwich splits in half and one half moves past the other half so they are offset. This is a transverse fault. At the Caves beach near the Dinosaur Dreaming dig site we can see examples of faults and tilting of rock layers.