FORCES IN NATURE

The Earth beneath your feet – it's always there! So much so, that we forget about it most of the time. It is only when it does something that we remember that it is so important to us. Tremendous forces are at work in the Earth - building up, breaking down and carrying away material.

The Earth's crust can be altered by forces of nature that cause:

- volcanoes
- earthquakes
- folding
- faulting
- weathering
- erosion

Volcanoes

Most volcanoes can be found near plate boundaries. They are formed when huge forces within the mantle cause one plate to be forced down below another and in the process melt rock from the heat the force produces. This melted rock is the magma that forces its way to the surface.

Earthquakes

Earthquakes are generally caused by the movement of the crustal plates. This results in a tremor if there is a small movement or a shock if there is a large movement.

The exact point at where an earthquake occurs is called the focus. The point on the earth's surface directly above the focus is called the epicentre. If the epicentre is under or near the ocean a tsunami could be produced similar to the one that occur on Boxing Day 2004.

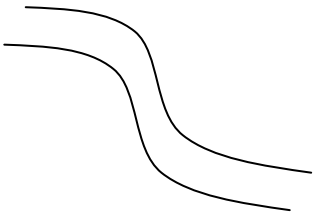
Folding

If rocks move gradually towards each other then the layers of rock can form folds.

If a fold is ∪-shaped it is called a **syncline**. (trough)

If a fold is ∩-shaped it is called an **anticline**. (arch)

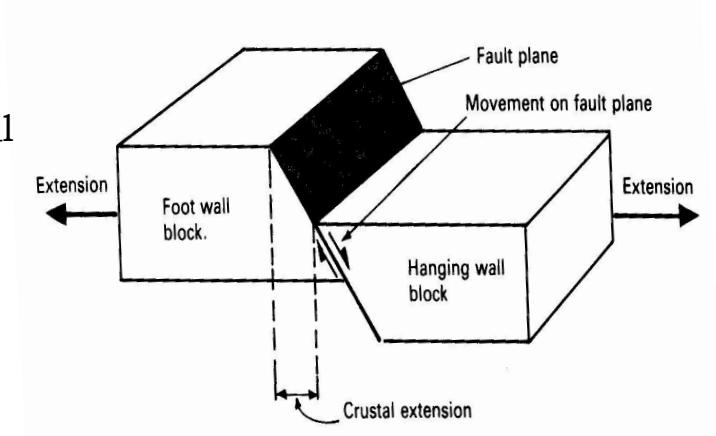
A single sided bend with a ⌞-shape is called a **monocline.**



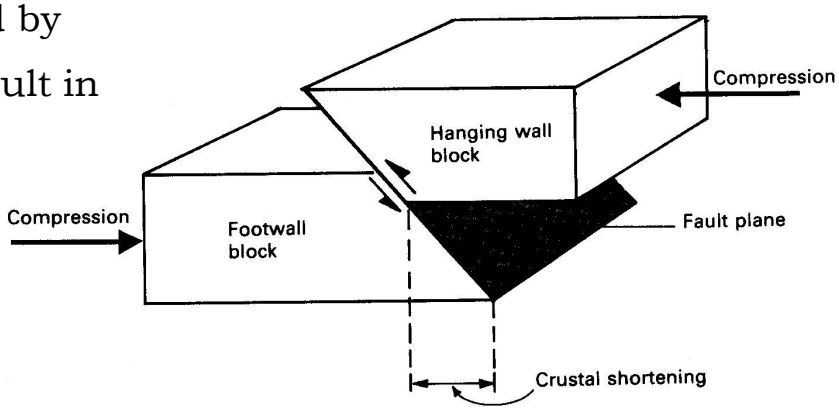
Faulting

Sudden movements, such as earthquakes, can cause breaks or cracks in rocks called **faults.** They can be on a small scale or like the Darling Fault scarp can be hundreds of kilometres long.

Normal faults are produced by tension forces that result in crustal extension. The formation of the Darling Scarp is an excellent example.



Reverse faults are produced by compression forces that result in crustal shortening



Weathering

Weathering is the process by which rock breaks down. After they have formed, rocks far below the surface of the Earth do not change much. It is only when they are at or near the surface that weathering of rocks can begin. There are two types of weathering:

- Physical (or mechanical) - The breakdown of large pieces of rock into smaller pieces and then eventually soil particles. Caused by:
    - Temperature change
    - Action of water
    - Wind
    - Ice – glacial due to friction and/or expansion of ice
    - Crystallisation of salts
    - Due to plants and animals (eg roots growing through rocks and animals burrowing.)
- Chemical - The breakdown of rock by chemicals such as acids to form new substances. Involves chemicals in the water and air reacting with rock and changing it.
    - Acid rain – pollution from fossil fuels
    - Weak acids produced by moss and lichen

Biological weathering: the action of living organisms in weathering. As shown above it can be both physical and chemical in nature.

Erosion

Rocks broken down by the weathering processes can be moved to other areas by the forces of wind and water. This process is known as EROSION.