

Fossil Evidence of Change – Teacher Notes

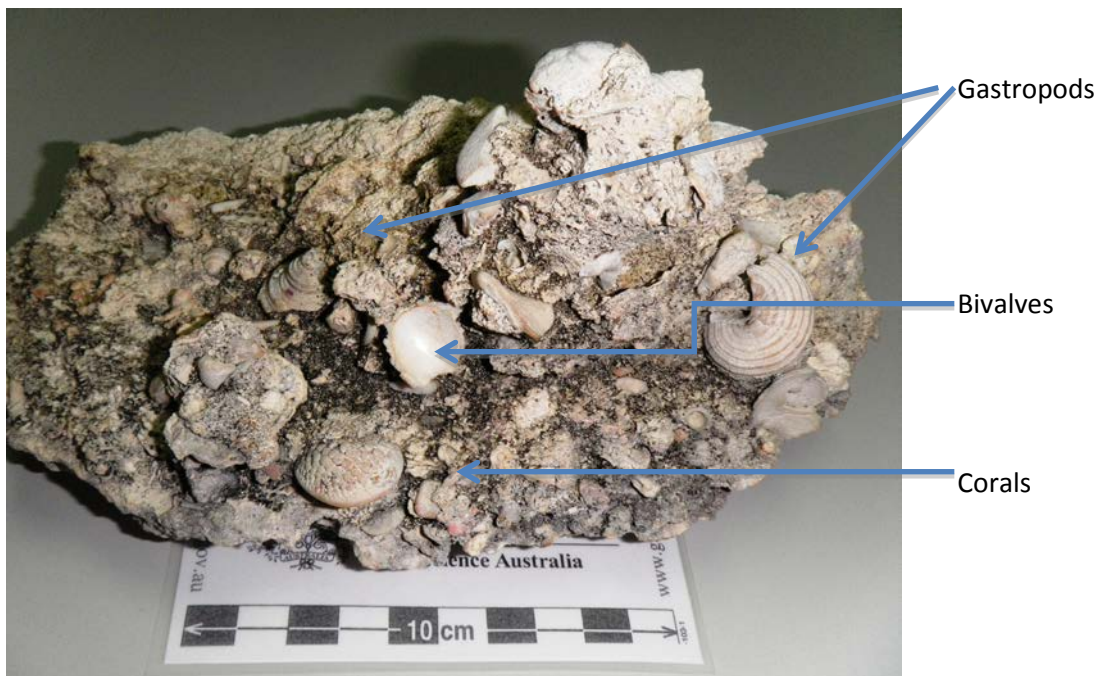
Students may need access to an atlas or map of Western Australia to find where these specimens come from.

Hutton, the father of modern geology said, **“The present is the key to the past”**.

We should be able to interpret the environment in which rocks and fossils from the past were laid down by comparing and contrasting them with ones found in our present times. Fossils are the petrified (turned into rock) remains of living things. Material is soaked in mineralised groundwater within the Earth to become fossils.

Very few remains of living things survive to be fossilised. Most are eaten by predators or broken apart by decomposers. To survive as a fossil, the living thing has to die and be rapidly buried to keep away scavengers and to exclude oxygen, restricting bacterial growth.

Fossils can tell us about changes in landscapes over geological time.

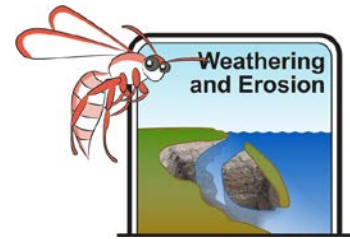


Seventy thousand year old fossiliferous limestone found 5m above present sea level near Hamelin Bay in Southwest WA

What change in landscape must have taken place to explain why fossilised beach shells lie above present day sea level? **Either the land must have risen or the sea level fallen. In this case the sea level has fallen.**

Because the fossilised (mineralised) shells are mostly whole or only broken into large pieces we can interpret that 70,000 years ago, it was a storm beach where waves only reached occasionally. Shells that wash up and down on present day beaches are quickly broken into small fragments. The shells are very similar to those that we have today but there are slight changes.

Similar, but much earlier fossil beaches are found near the top of Mt Everest at 8,400m. Everest is the tallest mountain in the world. What changes in landscape must have taken place for this to occur? **The mountain must have risen. Everest continues to rise about 4mm per year as India pushes northward under the Euro-Asian tectonic plate.**



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The fossil on the left was found in a road cutting high in the hills of Cape Range National Park east of Ningaloo Reef. The fossil has been estimated as about 23 million years old. The coral skeleton on the right was found washed up on a beach just outside Ningaloo Reef recently.

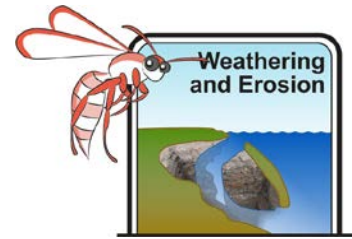
Is the modern coral skeleton similar to that of ancient fossil? **Yes. They are both of the same species.**

What can we interpret from this evidence? **The ranges were undersea about 23 million years ago and the climate in both cases must have been similar, since corals only grow in clear warm waters.**



These three teeth are from sharks. The one on the right is from a modern shark whilst the other two are probably from about 40 million years ago. The one on the left is from northern Australia, the one in the centre is from Texas in the USA and the one on the right is from New Zealand.

What can we interpret from this evidence? **Sharks have very wide ranging territories and they have changed little over a very long time. Apart from the fact that the areas the fossils came from are now on land and in the past they must have been marine, we can interpret very little.**



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EXTRA FOR EXPERTS



Some depositional features can also be “fossilised”. The wind or water laying down the silt and sand will make patterns in the sediment, which then becomes rock.

What do the sedimentary features in this 1.6 billion year old sandstone from the mountain ranges near Tom Price remind you of? [Ripples in sand near the shore.](#)

What would the landscape have been then? [The sandy edge of a shallow sea.](#)



This bed of rock lies immediately above the specimen above and so must be younger.

What do you think this pattern was created by? [The sand and mud drying out in sunshine and mud cracks forming.](#)

So, what changes happened in this very ancient landscape over the time it took these two rocks to be deposited?

[The sea dried up and the mud cracked or the land rose, exposing the sands and mud to sunshine.](#)