



Our Changing Surface- Teacher's Notes

Many different processes have shaped the surface of the Earth over billions of years to make the landscapes that we see today. Surface features such as mountains, craters, floodplains and sand dunes impact the way that humans interact with their environment. This may be evident in the choice of locations where settlements are established, where farms are most successful or where mining operations are economically viable. Surface landforms we can see now, give clues as to what has happened on our planet in the past, and even how it was formed approximately 4.6 billion years ago. This also helps scientists understand discoveries they make on other rocky planets, by comparing extra-terrestrial landscapes with our own. By understanding how these landscape features are formed on Earth, scientists can form hypotheses about weather and conditions on other planets. For example, knowing about impact craters helped in the design of vehicles for the Moon landings and understanding how dunes form informed specific design features of the Mars rovers.

This section will examine some of these different landforms and introduce the students to four main ways they are created: by impact, volcanic, fluvial or aeolian processes.

There are many objects travelling through our universe that, at times, will make it to the surface of the planet as meteors. When this occurs, the surface is changed due to **IMPACT** processes. The result of these processes is impact craters which can vary greatly in diameter and depth according to the size of the meteor and the speed with which it hits. An example of this surface landform in Western Australia is the famous Wolfe Creek Crater, south of Halls Creek. Our Moon also has many impact craters dotting its surface as it has been frequently bombarded due to its very thin





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atmosphere not protecting it like Earth's atmosphere does. It's interesting to note that craters on the moon are very well preserved as there is very little erosion occurring there.

As the name suggests, **VOLCANIC** processes are caused by volcanoes and include landforms and features such as calderas, lava and ash flows and volcanoes themselves. There are no active volcanoes left on mainland Australia; the most recently active volcano in Australian territory is Big Ben, on Heard Island in the southern Indian Ocean, which last erupted in 2016. There is evidence of very ancient volcanic activity in Western Australia which formed the basalt rocks around Bunbury and brought the diamonds in the Argyle Diamond Mine in the Kimberley closer to the



surface. The lakes around the town of Mt Gambier in South Australia were formed in the craters of dormant volcanoes and the Glasshouse Mountains in

Queensland are cores of volcanoes that erupted around 26-27 million years ago.

FLUVIAL processes (*floo-vee-al*) are caused by the movement of flowing





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water in rivers. Surface features such as channels, valleys and deltas are created by fluvial processes. They will vary in shape and size depending on the type of rocks in the area, how much water is flowing through, and the topography of the area. The gorges in the Karijini National Park in north-west WA are stunning examples of surface landforms formed by fluvial processes. The Swan Valley on the outskirts of Perth is also an example and the fertile soils of this area can be attributed to mineral-rich sediments (broken rock material) being deposited here over a long time.

Wind can wear away (weather), move (erode) and deposit sediments. These are called **AEOLIAN** processes (*ay-oh-lee-an*). Landscape features such as sand dunes (eg. Yeagarup dunes near Pemberton) and rock formations such as the Pinnacles near Cervantes are formed, or shaped by, these processes. The Yeagarup dunes are particularly interesting as they are currently situated about eight kilometres inland from the coast and are moving further inland, through the action of the wind, at an approximate rate of four metres per year.



The NASA website has a search engine for photos taken of other planets:

<https://nasasearch.nasa.gov/search/images?affiliate=nasa&query=>

There is also a page where you can search for images taken from the International Space Station (ISS) and you can even submit a request for a photograph to be taken!

<https://eol.jsc.nasa.gov/Collections/EarthFromSpace/>



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