



## Evidence of Change from Local Landforms - Teacher's Notes

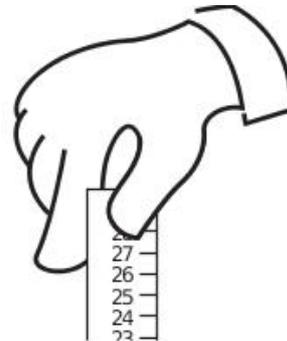
### Evidence of Change from Local Landforms

Note: This activity requires students to have internet access or a print out from these sites listed below.

#### Measuring change

Scientists only accept evidence of change if:

1. We can **sense** a change (see, hear, smell, feel and sometimes taste it).
2. We can **measure** the change using international measurements such as metres, degrees Celcius and litres.
3. The two steps above are **repeated** many times to improve accuracy and the same result is obtained by any scientist anywhere in the world.



#### A. Change due to movements within the Earth - Earthquakes

The April 2010 Boulder Earthquake occurred near the town of Kalgoorlie-Boulder in WA. Shaking lasted over 10-15 seconds and could be felt 1,007 km away. Visit

<http://www.abc.net.au/local/stories/2010/04/20/2877871.htm>

View the page and the pictures and answer the following questions.

When and where did the earthquake take place? **Boulder April 2010**

What changes did the residents see? **They saw buildings shake and some fall down.**

What changes did the residents hear? **None reported here but they must have heard the sound of damaged building parts fall. Many later reported**



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hearing the earth growl as rocks moved against each other.

What changes did the residents feel? They felt the earth shake.

Was anybody hurt when this earthquake hit? There were no reports of serious injury however an ambulance took two people to hospital with minor injuries.

How would you know if a similar earthquake hit your school? See buildings shake, parts fall down, feel the earth shake, hear the sound of falling buildings and perhaps the growl of rocks grating past each other.

What possible landscape changes could an earthquake cause to the Superpit, the enormous open cut gold mine near Boulder? The sides could fall in and collapse killing miners. Tailings dams could collapse causing local landslides and releasing contaminated water. (Most of these structures are engineered to withstand small earthquakes).

### B. Changes due to human behavior - urbanisation



Humans change their living area to suit their purposes. 120 years ago this area was bumpy scrubby bushland. It has become a flat grassy area with a concrete pavement round it, which leads to the pedestrian tunnel under the busy road in



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the background.

Why was the land flattened? To make the construction of roads, factories and housing easier and to control drainage.

Why is there no longer any scrubby bush? It was cleared away to make room for housing, roads etc.

Why is there now grass and a few non-native trees? Europeans prefer this style of controlled green open landscape.

Why is there not any grass in the strips cutting across the central area? People have taken a short cut across the park to get to the tunnel faster. Their passage has killed the grass.

Why is the ground and grass higher round the trees? Peoples feet have compacted the soil elsewhere.

List 5 things that humans have done to change this landscape.  
Leveled and sealed roads, made footpaths, dug the underpass, erected buildings, built walls, planted gardens and planted grass etc.

### **C. Changes due to the introduction of non-native animals**

Cloven-footed animals such as goats, pigs, sheep and cows compact the soil under their feet much more than native Australian macopods (big-footed animals like the kangaroo. Pressure is the result of weight (or mass) per unit area or  $P = M \times A$ . The larger the foot, the less pressure. This is well demonstrated by watching people wearing high heels try to walk across sandy or grassy areas. Their heels sink well into the sand or mud.





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### Oh the Pressure! - Student Activity of Teacher Demonstration

#### Materials

- A pencil or pen
- A brick or similarly heavy object
- Sandpit or tray with about 4cm depth of sand
- Ruler

#### Method

1. Place the heavy object on the sand.
2. Measure the depth of the indentation
3. Lift the heavy object and hold the pencil under it.
4. Lower the heavy object on to it and allow it to sink into the sand
5. Measure the depth of this indentation.

#### Observations

Depth of indentation of heavy object alone - *as measured on the day*

Depth of the same object with a much smaller base - *as measured on the day*



Which shoe will squash the ground under it more? *The one on the right.*

Native Australian animals such as kangaroos and wallabies have

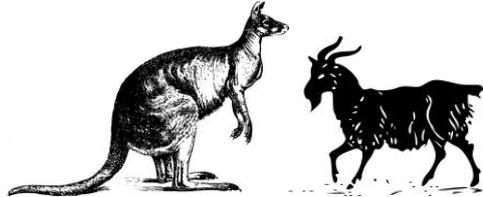


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proportionally large feet compared to European grass eaters such as sheep, goats, cows and pigs.



Compare the size of the feet of the goat and the kangaroo. What is different? **The goat has tiny hard feet. The kangaroo's foot base is about half its height. The goat's foot base however is about 1/25 of its height.**

What will happen if the goat regularly walks a pathway? **It will compact the underlying soil stopping water and air penetration and killing plants**

On pastoral stations farmers have to put in bores or water tanks for cows' drinking water. How could you tell where a bore or water tank is from an aeroplane? **You could see pathways to it of worn soil with little to no vegetation**

### **D. Changes due to flooding or storm damage.**

Strong winds and moving water can cause rapid changes to local landforms through both erosion and deposition.

In May 2016, Perth residents were warned of a major storm approaching. Visit <http://www.perthnow.com.au/news/western-australia/wild-weather-wind-gusts-heavy-rain-belt-perth-causing-power-outages/news-story/5c4168fdca29aa93c00f62a0eba82284>

What damage to the surface of the Earth is expected to happen because of this storm? **Floods and high tides may erode riverbanks and beaches. Roads may be washed away. Rainwater can cut new creeks and gutters.**





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What will the sandbags be used for? **They will be used to raise and reinforce riverbanks.**

Why did this report mostly describe changes to the human landscape? **Humans are mostly interested in things that affect them directly.**

If you view the pictures can you find three landscape changes also? **List them. Any of, floodwater washing onto the riverbank. Rocks being thrown onto the breakwater. Beaches being flooded, roofs being blown off, power lines being brought down.**

### **E. Changes due to different cultural and social expectations.**

It has been noticed that when early European artists made sketches of our landscape they were scrupulous in copying them exactly as they were. They copied the peeling bark, thin leaf cover and strange grass trees as they are. When they used these sketches later to make paintings they changed them to be more Europeanised with a thick leaf canopy, smooth barked trees surrounded by grassy parklands. This made the landscape more comfortable to possible settlers. Of course Europeans brought many of their own plants and animals with them for the same reason. It made somewhere on the other side of the Earth feel "a little bit of home".

### **Frederick Samson Park**

Samson Park is reputed to be the last piece of natural vegetation in metropolitan Perth. Aboriginal people have moved through this area for thousands of years without causing much change to the landscape.





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These two photographs were taken on the same day. The left was taken in the park and demonstrates the variety of vegetation in the overstorey (Marri, Jarrah and Bull Banksia and in the understory grass trees (Xanthorhea), banksias, grevillias, mulga and many grasses, flowers including orchids. The photograph on the right is from just across the road from the park. Here the land has been leveled for roads and building houses, vegetation is mostly not native, grass is trimmed, fertilised and watered to create lawns.

1. Spot 3 differences between the photo on the left and the one on the right  
The picture on the left has a range of trees and shrubs, on the right there are a few trees and grass visible  
The picture on the right features paths and roadways  
The landscape is very flat on the right
2. What caused these changes? People
3. Why do you think that they wanted a different landscape? People held different cultural and social expectations for the landscape.

