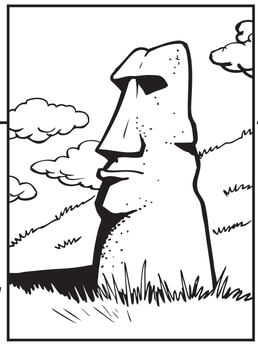
# Could Earth’s resources run out? – I

**Read the text.**



*People first came to Easter Island about 1500 years ago. The island had plants, animals and palm tree forests. The people cut down trees—to build houses, to burn for warmth, to clear land to farm and to help move heavy stone statues. Slowly the forests disappeared, until there were no trees left.*

*Without trees or tree roots to hold the good soil for growing plants, it blew away or washed into the sea. This meant the plants on the farms couldn’t grow. The animals had no food and soon were gone. The people had little food. But they were stuck on Easter Island ... with no wood left to build boats, they could not escape.*

Sadly, this is a true story. Because the people who lived on Easter Island did not use its resources carefully, many of them ran out. We have to use Earth’s resources carefully or some of them, too, could run out. We can reduce, reuse and recycle to **conserve** resources and make sure there are enough for everyone.

Recycling means using old things to make new things. For example, used paper and cardboard can be recycled into new paper so that fewer trees are cut down. Old glass can be made into new glass so less silica is dug up. Old plastic can be made into new plastic so less petroleum is used. When things are recycled, fewer new resources are used.

Instead of throwing things out after they have been used once, we can **reuse** them. We can use both sides of a sheet of paper, use plastic bags many times, fix old furniture and use some containers more than once.


We can **reduce** the amount of rubbish we make and the power and water we use. We can turn off lights and appliances when we do not need them on (to save power) and use public transport, walk or ride bikes instead of driving (to use less petroleum resources).

We can be careful about how much fresh water we use. We only have a limited supply of cheap, freely available water. Turning off dripping taps, having short showers and turning off the tap when we brush our teeth are ways we can help to use a very precious resource carefully.

# Could Earth's resources run out? – 2

**Use the text on page 59 to complete the following.**

1. What caused all the good soil on Easter Island to go away?

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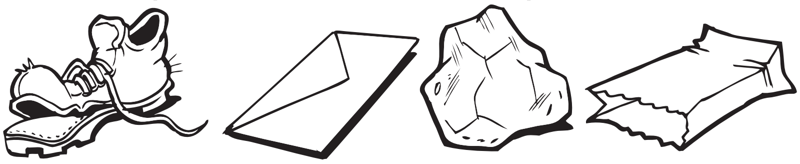
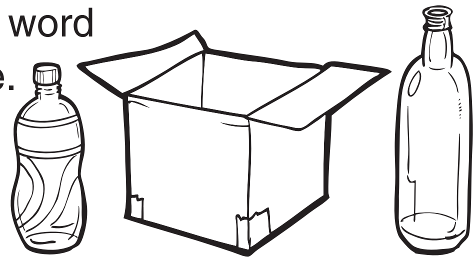
2. Can these things be recycled? How? Write the word for each picture in the correct place in the table.

| Recycled into paper | Recycled into glass | Cannot be recycled |
|---|---|---|
| | | |

3. How can recycling paper help save Earth's tree resources?

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4. (a) Write two ways you could reuse this sheet of paper.

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(b) Write two more things you can see that can be recycled or reused.

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5. Imagine you could go 1500 years back in time to Easter Island and speak to its people. What advice could you give them?

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*Use the internet to find out the water supply levels in your state.*

# What is erosion? – 1

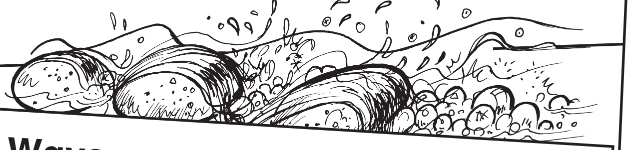
**Read the text.**

Erosion is one of Earth's natural processes. It changes the landscape by moving rock, soil and sediment from one place to another. Coastlines, hillsides and valleys have been created by the action of wind, water in rivers and waves, and ice in glaciers.

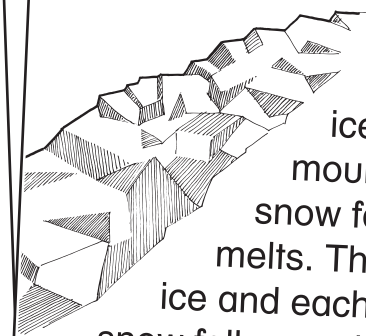
### Rivers

A river begins on high ground where it is narrow, shallow and fast flowing. In its swift current, it picks up gravel and silt from the riverbanks and riverbed, and rolls large stones along as it carves out its path.

A river never runs in a straight line towards the sea or a lake. Currents force the water in different directions so erosion on each side of the river is different. This is what causes a river to bend. When a river reaches its end, it is wider, deeper and slower.



### Glaciers

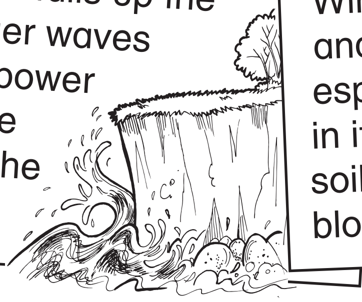


Glaciers are slow moving rivers of ice. They form in mountain areas where snow falls but never melts. The snow turns to ice and each winter as more snow falls, another layer of ice is formed. Eventually, the glacier is pulled down the mountainside by the force of gravity.

As it moves, the glacier carves out a deep, wide path. It rubs against the floor and sides of the valley, picking up everything in its way, from tiny pebbles to large boulders. Glaciers can be found in mountain areas all over the world. They may be as short as one hundred metres or as long as one hundred kilometres.

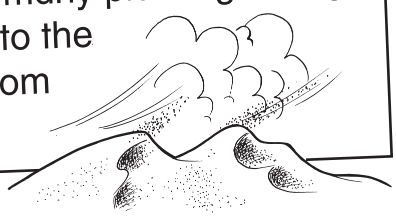
### Waves

The energy of the sea as it pounds against the shore erodes beaches and coastlines. Even a calm sea moves the sand as the water rises and falls up the beach. Stronger waves have enough power to lift and move rocks lying at the foot of cliffs.



### Wind

Wind erosion creates sand dunes in deserts and on beaches. It can also erode soil especially if there aren't many plants growing in it. Plant roots hold on to the soil, stopping the wind from blowing it away.



Erosion is happening all the time at a steady pace but sometimes it occurs more violently. Storms with high winds and heavy rains cause flooding and speed up the erosion process. Major changes to the landscape can be made within just a few hours or days.

Extreme heat and wind can cause fires that destroy trees and plants. The exposed soil is then more likely to be eroded and the landscape changed.

# What is erosion? – 2

**Use the text on page 59 to complete the following.**

**1.** (a) What does erosion do?

(b) What causes erosion?

**2.** Explain why rivers have bends in them.

**3.** Why do glaciers move?

**4.** How does the sea's energy change a coastline?

**5.** Why are there lots of rocks underneath and at the sides of glaciers?

**6.** (a) If there are plants growing in the soil, is it more or less of it likely to be eroded by the wind?

(b) Give the reason for your answer.

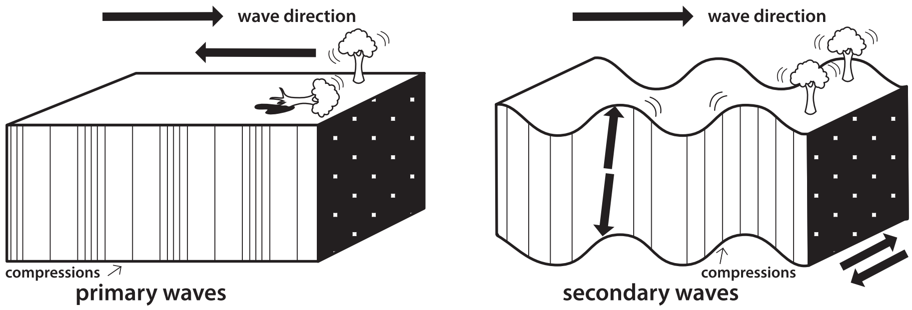
**7.** Why does soil erode faster when there is a storm?

# How are earthquakes measured? – I

The strength or magnitude of an earthquake is measured in two ways. Firstly, by the total energy released by the activity of the tectonic plates, and, secondly, by the structural damage and landscape changes the earthquake creates.

When an earthquake occurs, it releases a massive amount of energy. This energy creates seismic waves that radiate away from the fault in all directions. The earth shakes as the waves travel through it, and on the surface the ground begins to break apart. The intensity of the seismic waves can be recorded on a seismograph. Shallow peaks and troughs on the graph indicate a low-magnitude earthquake. Deep peaks and troughs indicate one of higher magnitude.

There are both primary and secondary seismic waves, each shaking the ground in different ways. Primary waves, which travel faster, shake the ground back and forth. Secondary waves shake it up and down and side to side.




At the epicentre of an earthquake, the ground can been seen as moving back and forth and up and down and/or side to side at the same time. A seismograph located at the epicentre will show both primary and secondary wave types occurring at the same time. At locations further from the epicentre, seismographs will show secondary waves arriving after primary waves because they travel slower.

The Richter scale gives an earthquake a value from zero upwards (usually between zero and ten). It is based on information recorded by seismographs. The Richter scale is a base 10 logarithmic scale. This means that every whole number jump on the scale represents a tenfold jump in the intensity of seismic activity. An earthquake that measures 7 on the Richter scale is ten times greater in magnitude than one that measures 6 (and one hundred times greater than one that measures 5).

As an earthquake strikes, it creates most devastation at the epicentre. This lessens as the distance from the epicentre increases. The effect of the earthquake can be described and matched to a scale that indicates what was felt and what damage was done when the earthquake struck. This is known as the Mercalli scale. It has 12 levels of intensity. At Level One, little, if anything, is felt or seen. At Level 12, massive shaking occurs and widespread destruction happens.

The Mercalli scale measurement of an earthquake often does not match the Richter scale magnitude because there are other factors to consider which may increase or decrease the scale given. These include the density of population of the affected site and the depth below ground where the fault line began to rupture (which is known as the hypocentre).

This distance below ground can be calculated by seismologists, who study the length and intensity of the seismic waves the earthquake produced. The closer to the surface the hypocentre is, the greater the damage. It is possible for a strong earthquake with a deep hypocentre to cause much less damage than a weaker earthquake with its hypocentre closer to the surface.

# How are earthquakes measured? – 2

**Use the text on page 47 to complete the following.**

**1.** (a) Complete the table to describe the two scales of measurement of earthquakes.

| | ________________ scale | ________________ scale |
|---|---|---|
| Measures | | |

(b) The Richter scale is a base 10 logarithmic scale. Explain what this means.

(c) Why are the two scales not truly compatible?

**2.** A seismograph records the movement of the earth during an earthquake. How do the peaks and troughs match the magnitude of the earthquake?

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**3.** (a) Two types of seismic waves radiate from an earthquake fault. Describe how each makes the ground shake.

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(b) At the epicentre of an earthquake, the two types of seismic wave are recorded at the surface at the same time. What would a seismograph located 10 km from the epicentre show and why would this happen?

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**4.** Why might an earthquake with a lower magnitude on the Richter scale have a higher Mercalli scale level?

*Earthquakes can not be predicted, but scientists are trying to find clues that will help them do this. Research to find out about Professor Brian Kennett of the Australian National University.*