

What is Weathering?

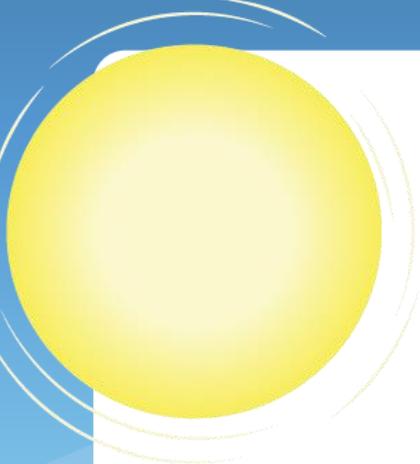
WEEK A

Weathering is the gradual destruction of rock where it stands.

It can cause pieces of rock to break off larger rock formations and change landscapes so they look different. Weathering is going on all the time but can take a very long time. The type of the rock, its location, climate and quality of air, affect how quickly rocks weather. Buildings can also show signs of weathering.

Weathering can occur in three ways.





Physical Weathering

Rocks are broken apart into smaller and smaller pieces by heat, water and pressure.

As rocks heat up during the day, they get bigger. When they cool down at night, they get smaller again. Over time, this causes them to crack. Rain water seeps into the cracks and turns to ice when it's cold enough.

Because ice takes up more space than water, it splits the cracks open even further. When the ice melts, the water can flow even deeper into the rock. Eventually, parts of the rock break off.

When the wind blows, it picks up small particles and they scratch off the rough surface layer of rock making it smooth and rounded. Wave rock in Western Australia has been moulded into its unusual shape by the action of the wind.

Water in rivers and streams smooths the surface of rocks as it gradually wears them down.

Pebbles on the beach are smoothed by waves.
Rocks in cliffs are also affected by other forms of weathering.



Chemical Weathering

Rainwater reacts with elements in the air to make an acid that eats away at the surface of rock

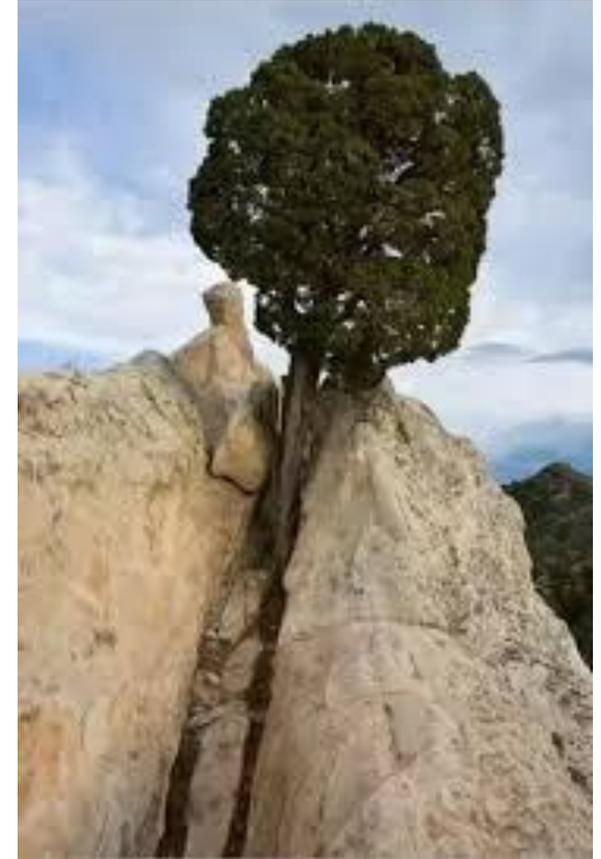
This makes it softer and more open to physical weathering. Acid rain caused by pollution in the atmosphere increases chemical weathering



Biological weathering

Plants grow in the crevices of rocks, creating a wedge. Their roots travel deeper into the crevice as they search for water. As the root grows thicker, they make these cracks bigger

Burrowing animals also increase the size of the crevices in rock. This allows water to penetrate deeper into the rock where it can freeze and expand.



Question/ Activity Time

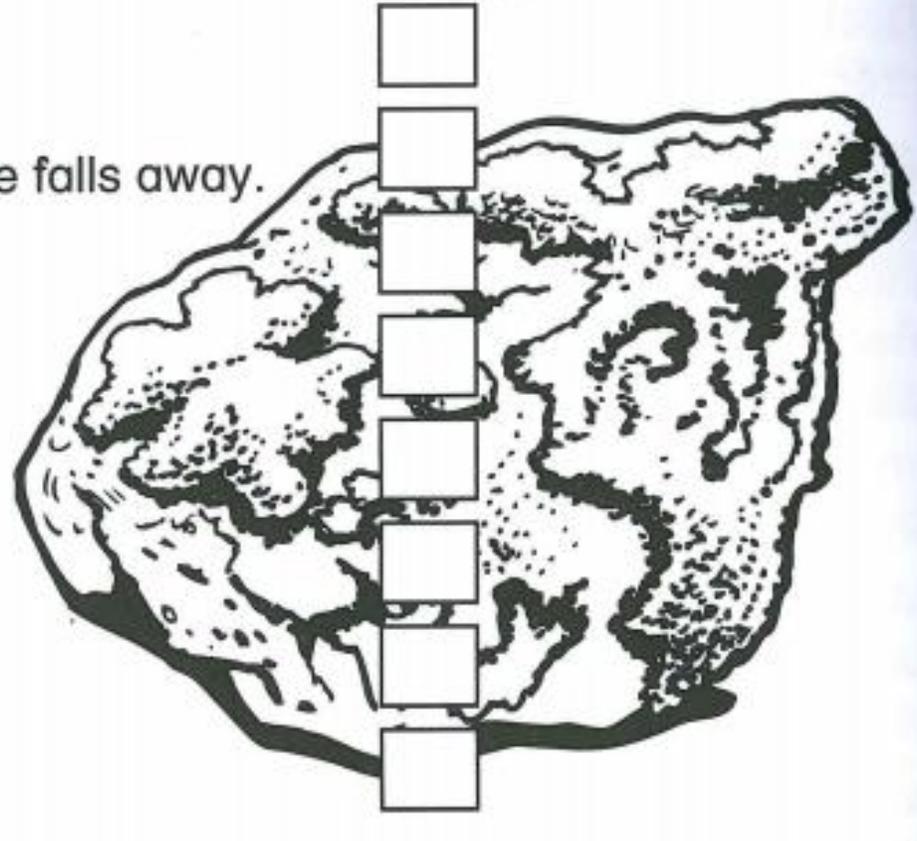
Please either print and stick in your books or rewrite and answer questions.

I. Match each type of weathering with its cause(s).

- | | | | |
|----------------|---|---|---|
| (a) Physical | • | • | plants and animals |
| (b) Chemical | • | • | heating and cooling, ice expansion, wind, water |
| (c) Biological | • | • | substances in the air and in rain |

2. Number each sentence from 1 to 8 to describe the cycle of one form of weathering.

- (a) Size of crevices increase.
- (b) Rock cracks even more and some falls away.
- (c) Rock heats up and cools down.
- (d) Water turns to ice and expands.
- (e) More ice expands.
- (f) Cracks form in the rock.
- (g) Water runs deeper into crevices.
- (h) Rainwater runs into crevices.



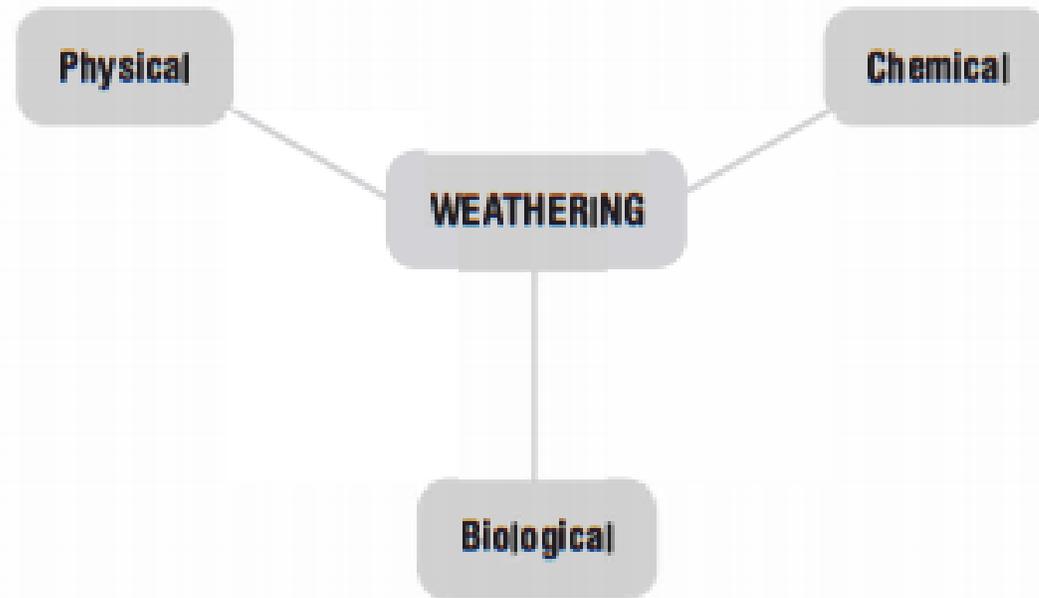
3. How can plants and animals weather rocks ?

4. How can weathering help plants?

5. Weathering is a slow process that depends on:

6. There are different types of soil formed from weathering of different types of rocks. Find out about the different soil types and the important job soil scientists do.

Do some independent research and create concept map to demonstrate your understanding of the 3 types of weathering. You can do this in your books or on popplet or mindmup. Don't forget to get a copy of your work if you do it online. Use the resources page to help you get your information



Resources

Additional Videos to watch

<https://education.abc.net.au/home#!/media/30555/turning-rock-into-soil>

BTN CLASSROOM – search for weathering stories.

Websites with good information

<https://www.bbc.co.uk/bitesize/guides/zwd2mp3/revision/1> - Why not try the quiz/test.

<https://www.geolsoc.org.uk/ks3/gsl/education/resources/rockcycle/page3461.html>

http://www.geography4kids.com/files/earth_intro.html

BRITANNICA

**Optional at home
investigations.**

Weathering investigations

What to do to show the effect of:	What I think will happen	What did happen?	Why did it happen?	Physical or chemical weathering
1. acid rain on limestone rock Add drops of vinegar to stick of chalk.				
2. water freezing Mark a plastic cup at halfway point. Add water to the mark. Freeze.				
3. constant weathering on rock Examine appearance of sugar cubes. Place 6 sugar cubes in glass jar. Put lid on jar and shake 10 times. Pour contents of jar on to dark coloured paper. Examine appearance of cubes and crumbs. Return chunks of sugar to jar and repeat.				
4. water on rock containing iron Examine the feel and appearance of steel wool pad. Cut pad in half. Place one half in ziplock bag and seal. Wet the other and place in another bag and seal. Examine daily.				

What is erosion?

WEEK B

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.



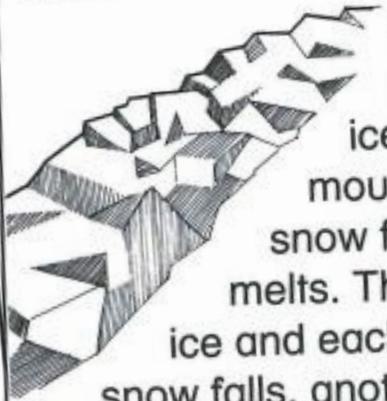
Rivers

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

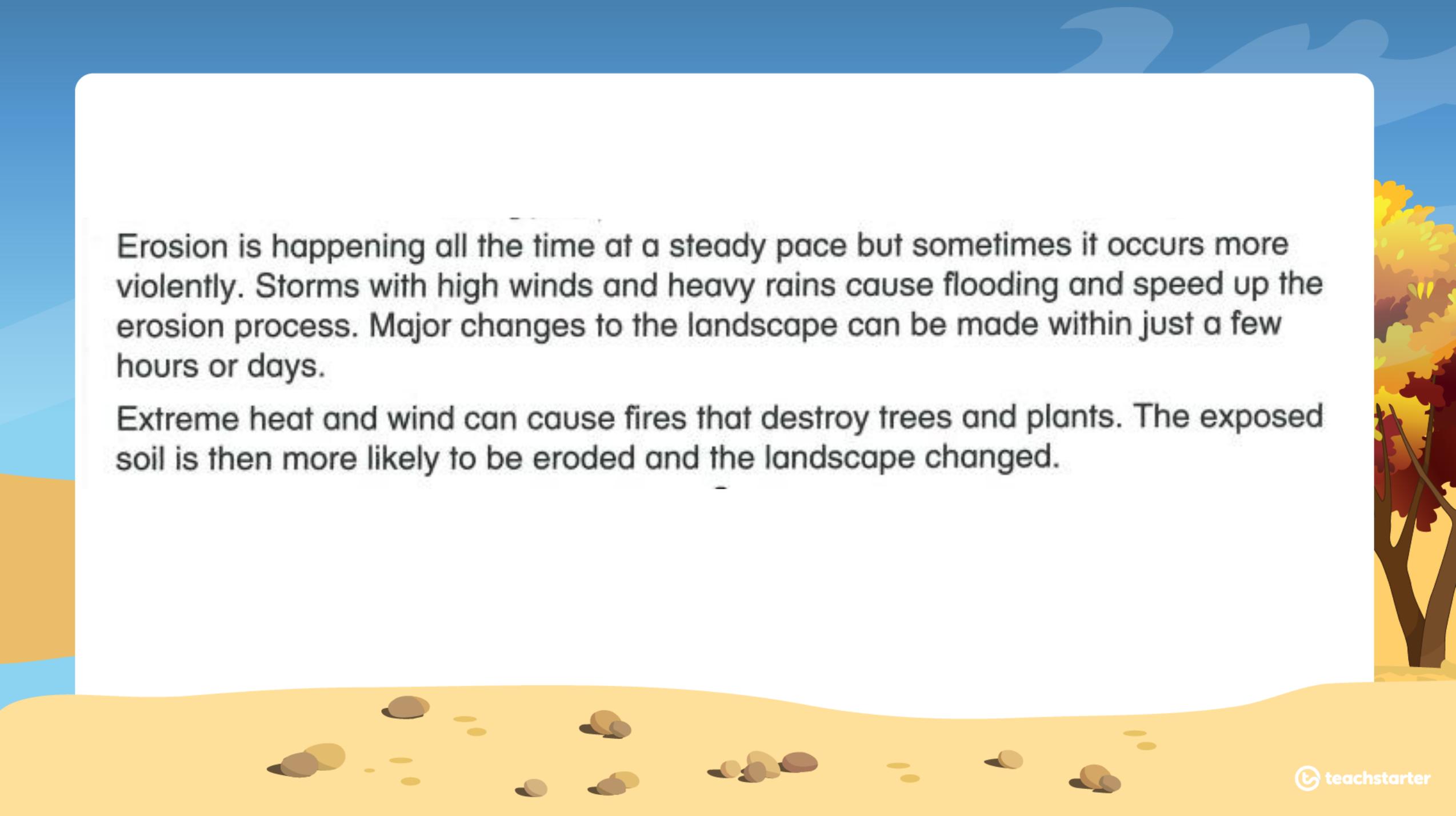
The energy of the sea as it pounds against the shore erodes beaches and coastlines. Even a calm sea moves the sand as the water rises and falls up the beach. Stronger waves have enough power to lift and move rocks lying at the foot of cliffs.



Wind

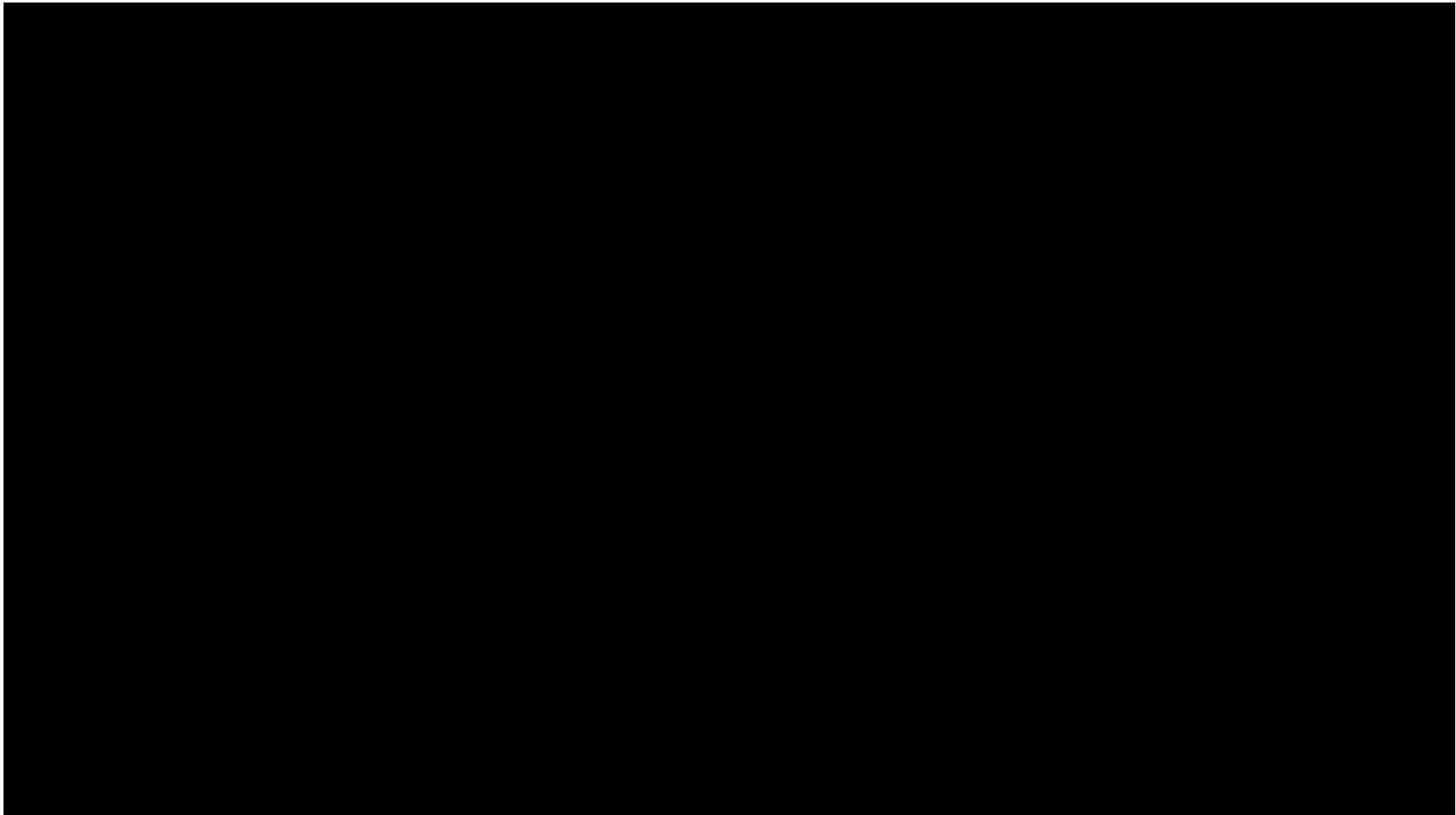
Wind erosion creates sand dunes in deserts and on beaches. It can also erode soil especially if there aren't many plants growing in it. Plant roots hold on to the soil, stopping the wind from blowing it away.





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.



Question/ Activity Time

1a) What does erosion do?

b) What causes erosion?

2.Explain why rivers have bends in them

3.Why do glaciers move?

Watch - <https://www.abc.net.au/btn/classroom/coastal-erosion/11958874>

4. How does the sea's energy change a coast line?
5. Why are there lots of rocks underneath and at the sides of glaciers?
- 6a) If there are plants growing in the soil, is it more or less 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?

Where does soil come from?

WEEK C

Soil is found on land all over the planet. It is the loose top layer of the Earth's crust and most of the planet's plant life need it to live. This is because most plants have their root systems in soil. The soil stops them from blowing away and the food they need comes up from the soil through their roots. Without this important natural resource, life as we know it wouldn't exist on Earth. Animals, including humans, also depend on soil.

Thousands of years ago, as rocks were broken up by weathering, they formed piles of smaller rocks and rock dust. As dead plants and animals decayed nearby, microbes caused them to break down. This organic matter then mixed with the rock dust to form soil. Soil is a mixture of mineral and organic materials, water and air. Both living and nonliving matter can be found in soil. Examples include, earthworms, insects and bacteria and pebbles and decaying matter.

Earth is covered in many different types of soil. The type of soil found in an area depends on the type of rock and the local climate. Some soils are very different in colour and texture and different types of plants grow in them.

Soil can be classified into one of three types, based on the size of rock grains.

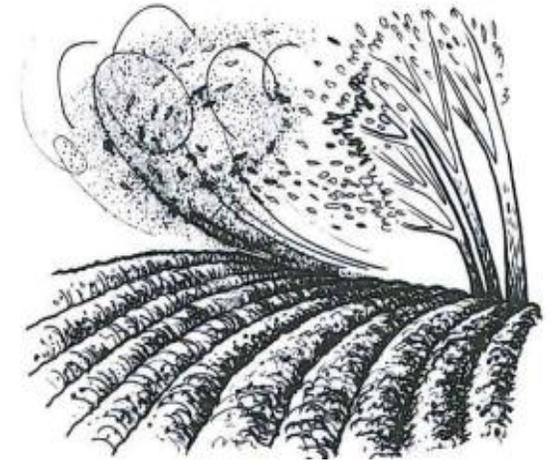
Clay has the smallest rock grains. They stick together when wet and form a hard crust when dried. Water does not drain away from clay soil and air can't get into it very well. Although there are many nutrients in clay, plants can become waterlogged because water doesn't drain away from their roots. Wet clay feels sticky.

Silt has slightly larger rock grains than clay, which allow better drainage. There are good nutrients in silt which is often washed downstream and deposited as a river's water flow slows down. Many plants grow well in silt.

Sand has the largest grains. It contains tiny bits of rock and feels gritty. Sand doesn't hold water well and there are fewer nutrients in it. This type of soil heats up quickly and plants growing in it need to be watered regularly.

The best soil for growing things can be **loam**, which is a mixture of all three.

Although soil is formed slowly, it can easily be destroyed. This can happen through natural events such as erosion by very heavy rain, strong wind and waves or by humans removing the top and best layer of soil on building sites and by removing trees for timber or to grow crops. If the condition of the soil is poor, it can lead to water pollution. This is a problem on many farms where nutrients in the soil have been used up. Almost nothing will grow in this soil and water on it can become very salty.



Questions

1. Explain why soil is so important
2. Soil is a mixture of _____, _____ and _____.
3. Explain how soil is formed
4. Give two examples of: (a) living and (b) nonliving materials found in soil.

(a) _____

(b) _____

5. Which type of soils:

(a) have the largest grains? _____

(b) are washed downstream? _____

(c) are sticky when wet? _____

6. What is loam? Loam is ...

7. How can soil be damaged by:

(a) nature?

(b) humans?