

Year 4 Autumn Term Topic: Rivers and Lakes

Key Vocabulary

Channel	Where a river flows
Delta	A triangle-shaped area of marshy land found at the mouth of a river
Deposition	The process of material being dropped
Erosion	The process of land being worn away
Mouth	Where a river joins the sea or a lake
Pollution	The process of harmful substances being released into the environment
Sediment	Bits of soil and rock eroded, transported and deposited by a river
Source	Where a river starts
Transportation	The process of material being carried
Waste water	Water that has been used by people, e.g. for washing clothes

Key concepts

Types of erosion

Attrition is when bits of rock crash together in the water and break up.

Abrasion is when bits of rock in the water rub against the riverbed and river banks.

Solution is when acids in the water dissolve rock.

Hydraulic action is when the power of the water breaks bits off the riverbed and banks.

Types of transportation

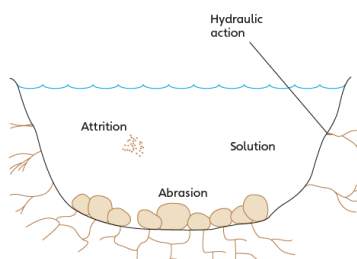
Traction is when large rocks are rolled along the riverbed.

Saltation is where bits of rock bounce and jump along the riverbed.

Suspension is when small particles of sediment are carried along in the flow of the river.

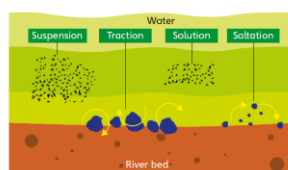
Solution is when the smallest bits of sediment are dissolved into the water and carried along.

Erosion

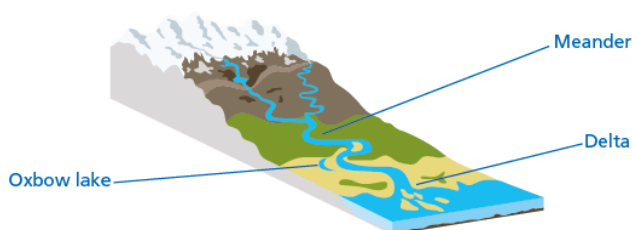
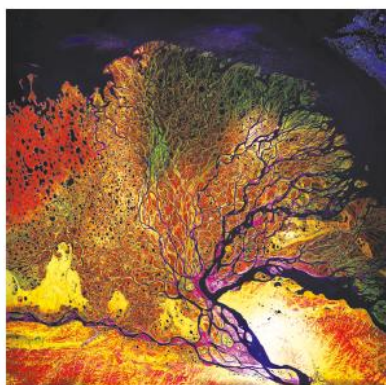
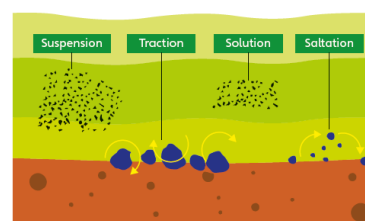


Transportation

Rivers also carry **sediment**. This process is called **transportation**. This diagram shows four ways in which rivers carry sediment.



Transportation



A delta is a triangle-shaped area of marshy land, found where

A DELTA

a river flows into the sea.

Case studies & Examples

The Volga River



The Volga River, the longest in Europe at 3,530 km, flows entirely through Russia. It is deeply important to Russians, who often call it "Mother Volga." The river supports half of the country's farming and is home to nearly half of Russia's population.

The Volga River helps farming by flooding and depositing fertile sediment, which makes the soil rich. This is why half of Russia's farming happens along the Volga. However, floods can also be dangerous, causing damage to homes and risking the lives of people and animals.

Volga River problems

The Volga River is very useful for people. But using the Volga has caused a lot of **pollution**.

Factories along the river dump waste into the water.

Ships leak fuel into the river.

Waste water from cities goes into the river.

Farming chemicals wash off the land into the river.



Pollution harms fish in the river. There are 60 per cent fewer sturgeon than there used to be

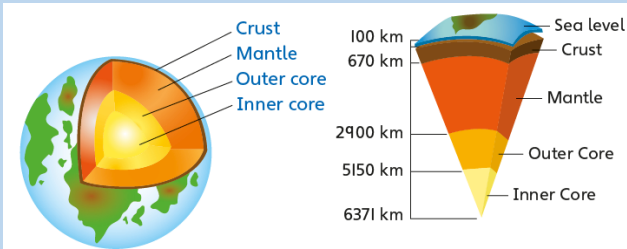
Because of farm chemicals, the water gets covered in green slime. Then the fish can't breathe and they die.

Pollution gets into the reservoirs. This can be dangerous for a population's water supply.

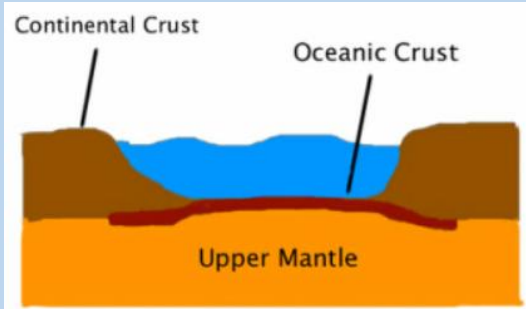
Spring Term Topic: Mountains, volcanoes and Earthquakes

Key Vocabulary	
Epicentre	The point on the Earth's surface directly above the focus. An earthquake is felt most strongly at the epicentre.
Focus	The point deep underground where an earthquake starts
Fold Mountain	A mountain created when tectonic plates collide and cause the plates to wrinkle upwards
Friction	A force between two things that are trying to move past each other
Lava	Magma that has reached the Earth's surface
Magma	Molten (melted) rock beneath the Earth's surface
Moment Magnitude Scale	A scale from 1–10 to measure the strength of earthquakes
Pressure	A physical force created when solid things push against each other, or when gasses build up inside something and push against the sides
Seismic waves	Waves of energy created by an earthquake that travel through the Earth
Tectonic plates	Large sections, or plates, that make up the surface of the Earth
Shield volcano	Largest volcanoes on Earth; wide base, low height Example: Kilauea (Hawaii) and Erta Ale (Ethiopia)
Stratovolcano	Most of the world's volcanoes are stratovolcanoes; high with steep sides Example: Mount Vesuvius (Italy) and Barðarbunga (Iceland)
Active volcano	A volcano that has erupted at least once in the last 10,000 years and still shows some signs of activity, such as movement of the plate beneath it, or gasses being released into the air.
Dormant volcano	A volcano that has erupted in the last 10,000 years but is not showing signs of activity; however, it is expected to erupt again at some point
Extinct Volcano	A volcano that has not erupted in the last 10,000 years and shows no signs of activity

Key concepts and processes



The Earth is shaped like a sphere and has four layers: the inner core, outer core, mantle, and crust. The inner core is solid and extremely hot, made of iron and nickel. The outer core is a liquid layer of the same metals but cooler. The mantle is solid rock that flows slowly and is cooler than the core. The crust is the outer layer, made of solid rock like granite and basalt, and comes in two types



The oceanic crust forms the sea floor, is up to 11 km thick, and made of volcanic rock. It is constantly renewed, making it relatively young—only up to 200 million years old.

In contrast, the continental crust forms land, can be up to 70 km thick, is made of various rocks, and contains some of the oldest rocks on Earth, up to 4 billion years old. It is not renewed like oceanic crust



This map shows where earthquakes have happened and where volcanoes are active on Earth.

Volcanoes and earthquakes happen where tectonic plates meet.



A mountain range is a group of connected mountains. Mount Everest, the tallest mountain on Earth, is in the Himalayas. Other major ranges include the Andes, Rocky Mountains, and Alps

	Shield volcanoes	Stratovolcanoes
Diagram		
Formation	Lava flows easily, so a broad volcanic mountain builds up after repeated eruptions	Lava does not flow far, so layers of hardened lava build up a steep volcano after repeated eruptions
Height	Low with shallow sides	High with steep sides
Eruption	Thin, liquid lava is erupted	Thick, sticky lava and explosive debris are erupted
Example	Kilauea (Hawaii) and Erta Ale (Ethiopia)	Mount Vesuvius (Italy) and Barðarbunga (Iceland)

There are two main types of volcanoes: shield volcanoes and stratovolcanoes. They differ in their shapes and features, which are shown in a comparison table

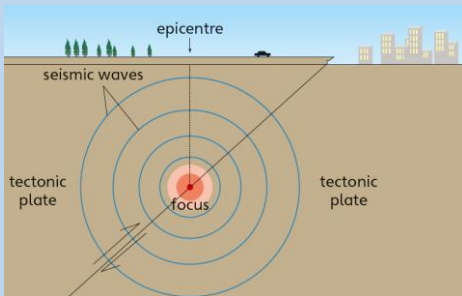


Stratovolcanoes are found where oceanic crust sinks beneath continental crust at plate boundaries. They often form in chains along continental edges, like in the Pacific Ring of Fire, which contains 75% of the world's volcanoes.

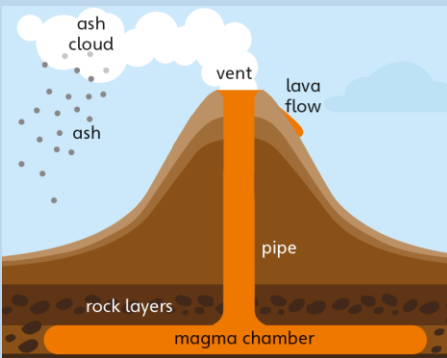
Shield volcanoes are found where tectonic plates are moving apart, such as at the Mid-Atlantic Ridge between the North American and Eurasian plates.



An earthquake is when the ground shakes, measured on the moment magnitude scale from 1 to 10. Weak quakes often go unnoticed, but those over 5 can cause serious damage. Strong earthquakes can also trigger tsunamis—huge, fast waves caused by earthquakes, eruptions, or landslides.



Earthquakes are caused by tectonic plates rubbing against each other and getting stuck. As pressure builds, the plates suddenly move, releasing energy. The starting point underground is called the focus, and the point above it on the surface is the epicentre. Seismic waves spread from the epicentre, shaking the ground.



Volcanic eruptions happen when magma rises through gaps in the Earth's crust. This magma forms from melted mantle due to tectonic plate movement. As pressure builds in the magma chamber, it eventually forces the magma out as lava.



- **It is dangerous to live near a volcano because** eruptions can occur unexpectedly, causing harm and destruction.
- **It is dangerous to live near a volcano but** the fertile soil and energy opportunities can benefit communities.
- **It is dangerous to live near a volcano so** precautions like monitoring and evacuation plans are essential

Case Studies & Examples

Case Study:



Tohoku Earthquake – Japan, 11 March 2011

Size: 9 on the magnitude scale

What happened:

- Many people died, were hurt, or went missing
- Buildings and farms were destroyed
- A huge tsunami flooded land and damaged roads
- A nuclear power station was damaged

Immediate help:

- Planes looked for areas needing help
- Roads were cleared to bring food, water, and medicine

Long-term help:

- Roads and power lines were fixed
- People were trained for future earthquakes
- Safety drills were held regularly



Fuego Volcano Eruption – Guatemala, 3 June 2018

- **Location:** Guatemala, Central America
- **Volcano:** Volcán de Fuego
- **Eruption Level:** VEI 3 (moderate)
- **Start Time:** Around 12:00 local time
- **Affected Areas:** Sacatepéquez, Escuintla, and Chimaltenango departments

Immediate Effects

- **Casualties:** At least 165 people killed and 260 missing
- **Injuries:** Hundreds injured
- **Damage:** Entire villages destroyed by pyroclastic flows; significant damage to homes and infrastructure
- **Evacuations:** Approximately 3,100 people evacuated

Secondary Effects

- **Landslides:** Heavy rainfall triggered lahars (volcanic mudflows), causing further destruction
- **Agriculture:** Over 8,500 hectares of crops, including corn, beans, and coffee, destroyed, leading to food shortages
- **Infrastructure:** Major disruption to roads and transport links
- **Air Travel:** La Aurora International Airport temporarily closed due to ashfall

Immediate Response

- **Search and Rescue:** Emergency teams deployed to locate and assist survivors
- **Aid Delivery:** Roads cleared to bring in water, food, medical supplies, and tents for those affected
- **Evacuations:** Residents in high-risk areas evacuated to safety
- **State of Emergency:** Declared in affected departments; three days of national mourning observed

Long-Term Response

- **Infrastructure Rebuilding:** Efforts initiated to rebuild roads, railways, and power supplies
- **Emergency Systems:** Development of improved emergency response systems
- **Community Preparedness:** Implementation of regular evacuation drills and public education on volcanic hazards
- **Housing:** Programs launched to repair and rebuild homes damaged by the eruption

Summer Term Topic: Natural Resources

Key Vocabulary	
Clean Energy	Energy processed in a way that does not cause pollution or release much carbon dioxide
Climate	General or average weather conditions over a very long period of time
Exports	Products that a country produces and sells to other countries
Fossil Fuels	Coal, oil and gas: fuels that are formed from the remains of plants and animals changed by millions of years of heat and pressure.
Mining	Digging up natural resources so they can be used
Natural Resources	Materials used by humans that are formed naturally
Non- renewable	Able to run out; not able to be reproduced effectively
Pollution	Harmful substances released into the environment
Renewable	Not able to run out; always available
Reserves	Quantities of a substance not yet used

Key concepts																																			
Natural resources can be renewable or non-renewable. Renewable resources, like air, water, and wood, can naturally replenish and won't run out. Non-renewable resources, such as coal, oil, and gold, exist in limited amounts and will eventually run out if overused.	Ten important natural resources <table border="1"> <thead> <tr> <th>Natural resource</th><th>What is it?</th><th>What is it usually used for?</th></tr> </thead> <tbody> <tr> <td>Air</td><td>Mixture of gases</td><td>Breathing and photosynthesis</td></tr> <tr> <td>Coal</td><td>Fossil fuel: solid</td><td>Energy</td></tr> <tr> <td>Cobalt</td><td>Metal</td><td>Engines</td></tr> <tr> <td>Gold</td><td>Metal</td><td>Jewellery and electronics</td></tr> <tr> <td>Natural gas (mainly methane)</td><td>Fossil fuel: gas</td><td>Energy</td></tr> <tr> <td>Oil</td><td>Fossil fuel: liquid</td><td>Energy</td></tr> <tr> <td>Soil</td><td>Biomass</td><td>Agriculture</td></tr> <tr> <td>Uranium</td><td>Metal</td><td>Nuclear energy</td></tr> <tr> <td>Water</td><td>Liquid</td><td>Sustaining life on the planet</td></tr> <tr> <td>Wood</td><td>Biomass</td><td>Building homes and burning for fuel</td></tr> </tbody> </table>	Natural resource	What is it?	What is it usually used for?	Air	Mixture of gases	Breathing and photosynthesis	Coal	Fossil fuel: solid	Energy	Cobalt	Metal	Engines	Gold	Metal	Jewellery and electronics	Natural gas (mainly methane)	Fossil fuel: gas	Energy	Oil	Fossil fuel: liquid	Energy	Soil	Biomass	Agriculture	Uranium	Metal	Nuclear energy	Water	Liquid	Sustaining life on the planet	Wood	Biomass	Building homes and burning for fuel	People use more natural resources now, especially in richer countries. As people get richer, they buy and throw away more things.
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Some natural resources, like diamonds, are rare and found only in specific places, making them expensive. Others, like water, are widespread and less costly, but still extremely valuable because life depends on them.	       Coal Oil Gas Wood Water	Fossil fuels like coal, oil, and gas make the Earth warmer when burned because they release carbon dioxide. This changes the weather and can make it harder to grow food. Burning them also makes air dirty and can harm people and animals. Digging them up can also pollute water.																																	

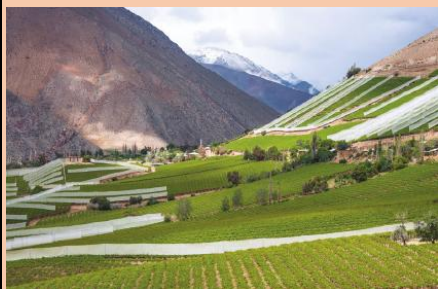
Case studies & Examples



A miner being rescued in Chile in 2010

Mining incident in Chile

Mining means digging up natural resources, but it can be very dangerous. Miners can get hurt or sick from accidents or breathing in harmful dust. In 2010, 33 miners in Chile were trapped deep underground for two months but were saved with a special rescue machine.



Chile's geography-

Chile is a long, thin country with a very long coastline. In the north, it has the world's driest desert, and in the south, there are icy glaciers. The Andes Mountains, full of volcanoes, separate Chile from Argentina.

Chile has many natural resources because of its special land. It has valuable metals like copper and gold, and the soil is great for growing fruits and vegetables like grapes and tomatoes. In the south, there are lots of sheep and cows, and trees grow well for wood. Chile also has a lot of natural gas.



Escondida copper mine

Chile is the world's biggest producer of copper, which is used in electrical wires and electronics. The largest copper mine in Chile is Escondida, located in the Atacama Desert. It's a huge pit, not underground. Copper is very important to Chile, as it makes up about one-third of the country's money from selling it to other countries.



The UK has many natural resources. Coal helped it become wealthy in the 1800s. Limestone and iron were important for making steel and ships. Oil was found in the North Sea in the 1970s. The UK also has great soil for farming, growing crops like wheat and potatoes. In the past, the UK took control of other countries' resources, like cotton and sugar.