Geography

Rivers

Atlantic Academy Portland
an Aspirations Academy




Year 5 - Spring 2

Name:_____

Class:_____

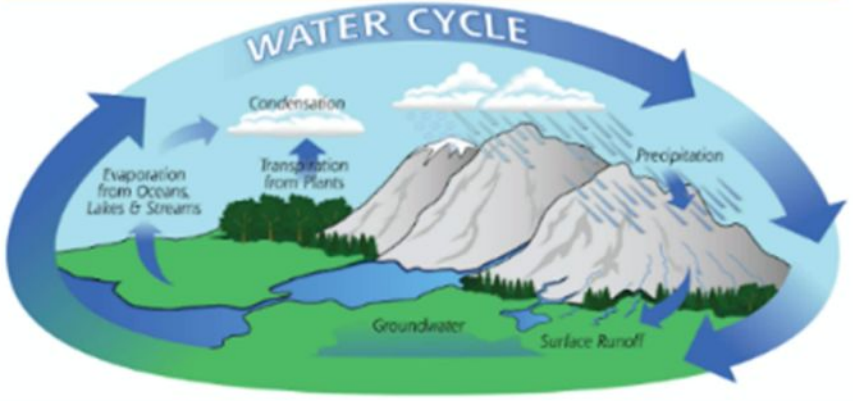
Lesson Question	You will learn:	Learning Review
Where are the world's rivers?	What a river is Where the world's rivers are Examples of famous rivers	
How do rivers shape the land?	What the four types of erosion are What the four types of transportation are What deposition is	
What landforms can a river create? (I)	What a landform is What V-shaped valleys and interlocking spurs are How V-shaped valleys and interlocking spurs form	
What landforms can a river create? (II)	What a meander is How a meander forms How an oxbow lake forms What a confluence is How a delta forms	
Why are rivers important to people?	Why people like living near rivers Why the Volga River is important for people Why the Amazon River is important for people	
What happens when a river floods?	How humans use rivers What a flood is Why rivers flood How a flood can bring advantages and disadvantages	

Keywords

River	A flow of fresh water across the land into a lake, sea or ocean.
Landscape	A part of the Earth's surface.
Lake	A large area of water, surrounded by land.
Sea	An area of salt water.
Ocean	A large area of sea. There are five oceans: Atlantic; Pacific; India; Arctic; Southern.
Source	The start of a river
Mouth	The end of a river, where it enters a lake, sea or ocean.
Erosion	The wearing away of the Earth's surface.
Transportation	The movement of sediment (material).
Sediment	Natural material that is carried and deposited by a river.
Deposition	The dropping of sediment.
Riverbed	The bottom of the river.
River banks	The sides of the river.
Landform	A feature on the Earth's surface that is part of the land.
Tributary	A smaller river that flows into a larger river.
Agriculture	Farming (growing crops, such as cereals, fruits and vegetables)

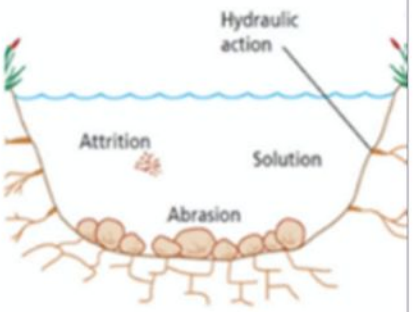
Water Cycle

The water cycle is the way in which water moves around the world.



Erosion

Abrasion	Sandpapering: rocks wear away each other and the riverbed and banks
Attrition	Crashing: rocks collide and break up
Solution	Chemical action: acids in the water dissolve the rock
Hydraulic action	Water power: the force of the water breaks down the riverbed and banks.

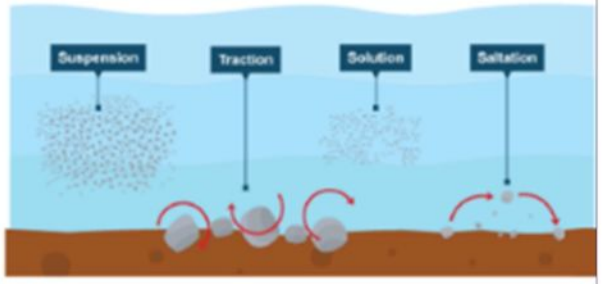


Famous Rivers

Amazon River, South America
Volga River, Russia
River Nile, Sudan & Egypt

Transportation

Traction	Tractor wheels: large rocks roll along the riverbed
Saltation	Jumping beans: pebbles bounce along the riverbed
Suspension	Hoverboard: small sediment is carried along in the flow of the river
Solution	Invisible material: the smallest sediment is dissolved into the water



The River's Course

1 - Source
2 - Interlocking spur
3 - V-shaped valley
4 - Waterfall
5 - River channel (widens in middle course)
6 - Meander (erosion on outside of bend)
7 - Meander (deposition on inside of bend)
8 - Oxbow lake
9 - Rich, fertile land either side of the river
10 - Mouth

LESSON ONE: Where are the world's rivers?

Use your knowledge organiser to complete the definition.

A river is

_____

_____

Read the passage about rivers.

Rivers form an important part of the water cycle, which is the continuous cycling of water around the planet. Rivers come in different shapes and sizes, but all rivers have a source (where they start) and a mouth (where they end). Rivers are also important because they shape the landscape through erosion, transportation of sediment, and deposition.

This photograph shows part of the Grand Canyon, which is a large and deep valley that the Colorado River has eroded over millions of years. Some geologists (scientists who study the rocks of the Earth) think parts of the Grand Canyon may be up to 70 million years old.

Use the passage above to answer the questions.

What is the start of a river called? _____

What is the end of a river called? _____

Give one reason why rivers are important.

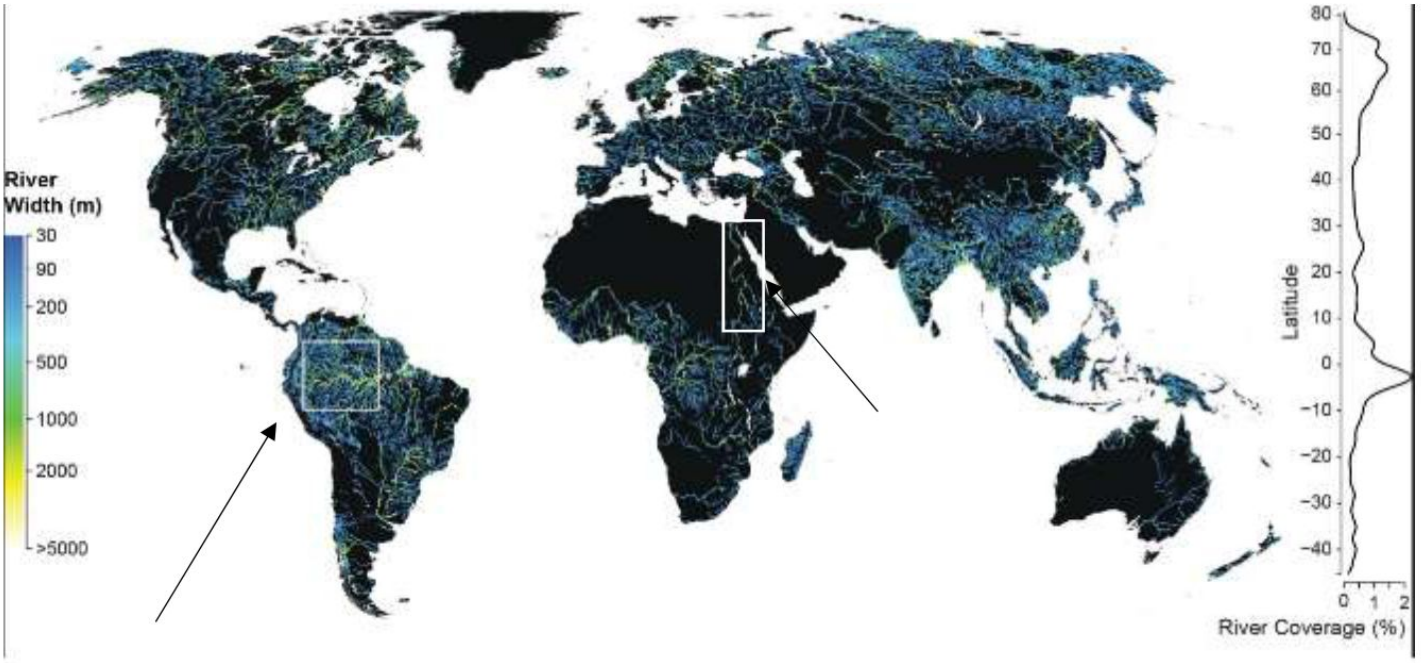
Rivers are important because

_____

_____

Study the map of the world's rivers and answer the questions below.

Map: World map showing rivers and streams. Source: G Allen and T Pavelsky,



What do the blue, green and yellow lines represent? _____

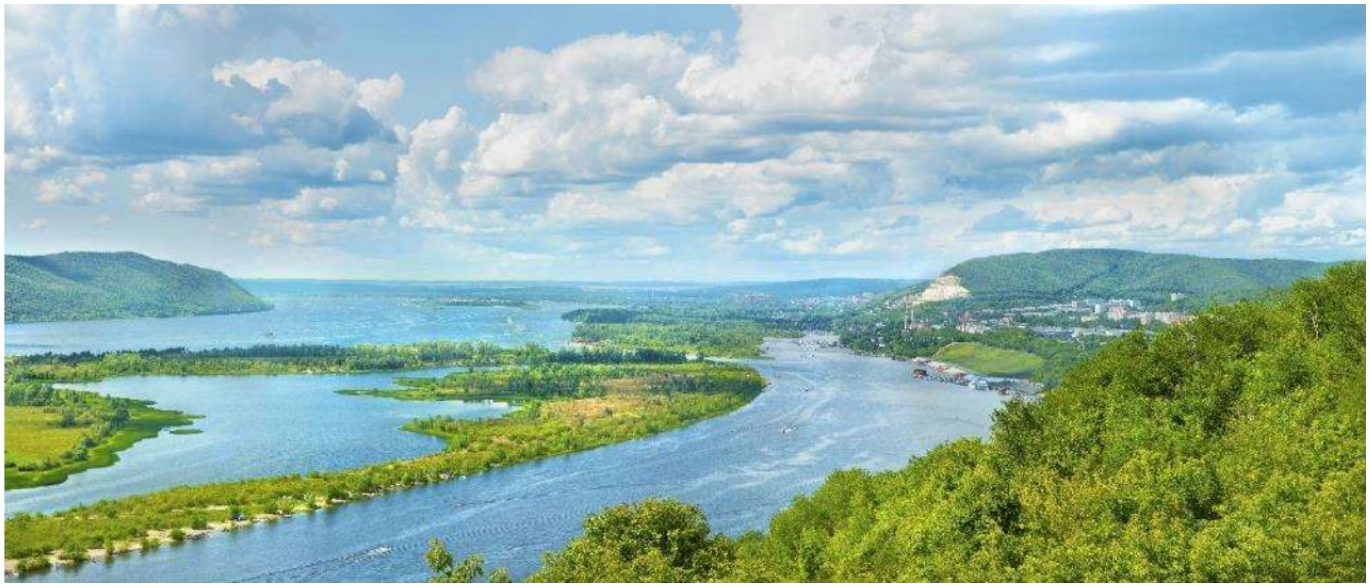
If an area is coloured black, what does that mean?
_____

Which of the following countries are almost completely covered in rivers?

a. Libya (Africa)
b. India (Asia)
c. Australia
d. Russia (Europe / Asia)
e. Peru (South America)

There are two white outline boxes on the map, showing a famous South American river and a famous African river. Do you know their names? Label them on the map

Study the photographs of the two rivers. What similarities do you see?



The Volga River (Europe's longest river: approximately 3,530 km long)

The Amazon River (South America's longest river and the second longest river in the world: approximately 6,575 km long))

Why do you think both rivers are so important?

I think the rivers are important
because

Return to page 3 and complete the Learning Review.

LESSON TWO: How do rivers shape the land?

Retrieval Practise

What is the name for the start of a river?

_____

What is the name for the point where the river enters a lake, sea or ocean?

_____

Name one famous river in South America or Africa.

_____

State one reason why rivers are important.

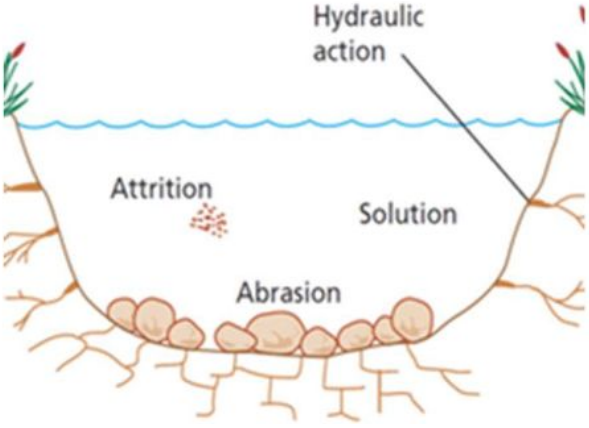
_____

What is the name of the longest river in Europe?

_____

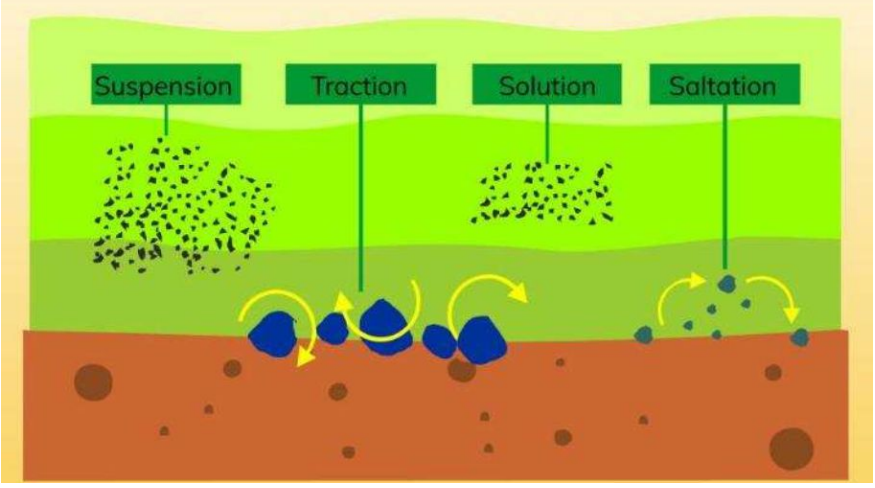
Rivers erode the land in four main ways. Match the summary word to the definition.

Attrition: rocks collide and break up	Chemical action
Abrasion: rocks wear away each other and the riverbed (bottom) and banks (sides)	Water power
Solution: acids in the water dissolve the rock	Crashing
Hydraulic action: the force of the water breaks down the riverbed and banks.	Sandpapering (rubbing)



Rivers transport sediment that they erode in four main ways. Match the word clue to the definition.

Traction: large rocks are rolled along the riverbed.	Invisible material
Saltation: pebbles bounce along the riverbed	Hoverboard
Suspension: small sediment is carried along in the flow of the river.	Jumping beans
Solution: the smallest sediment is dissolved into the water.	Tractor wheels



Rivers deposit material when they don't have enough energy left to carry it.

Rivers lose energy when they ***[slow down / speed up].***

Rivers lose energy when the sediment they are carrying is ***[very small / very big].***

Rivers lose energy when the river becomes ***[shallower / deeper].***

Read this passage about river processes and use it to label where erosion, transportation and deposition are occurring in the river in the photograph.

Rivers erode, transport and deposit material all along their length, and whether they are eroding, transporting or depositing depends on many factors, such as river velocity (speed) and river depth (how deep the river is). Rivers can do more erosion when they have more energy and they have more energy when they are travelling fastest. This is also when rivers are able to transport the most sediment. Rivers will deposit material when they are moving slowest, because this is when they have the least energy to carry the sediment.

On a river bend, the water moves fastest on the outside of the bend. This is where the water will be deepest because more erosion has taken place. The water moves more slowly on the inside of the bend and so this is where deposition takes place. The deposition also makes the river more shallow, which takes away even more of the river's energy.

Labels:

Erosion on the outside of the bend

Fastest flowing part of the river (where transportation occurs)

Deposition on the inside of the bend

Return to page 3 and complete the Learning Review.

LESSON THREE: What landforms can a river create? (I)

Retrieval Practice

What is the name of the start of the river?

_____

Which erosion process is similar to sandpapering?

_____

Which transportation process is similar to tractor wheels rolling along?

_____

When do rivers deposit sediment?

- When they gain more energy
- When they lose energy

When does a river have the most energy? (Choose two.)

- When it is very deep
- When it is very shallow
- When it is flowing very quickly
- When the velocity is slow

Read this passage about landforms and link the photograph to the process.

A landform is a feature on the Earth's surface that is part of the land. Mountains, hills and valleys are all types of landform. Landforms can be created by the movement of tectonic plates, for example to create mountains like the Himalaya. Landforms can also be created by oceans, for example to create cliffs. Glaciers (big bodies of ice) create landforms, such as deep valleys. Wind can create dramatic landforms, such as rock bridges.

Read this passage about landforms formed by rivers.

Rivers also create dramatic landforms. Erosion, transportation and deposition create landforms of varying shapes and sizes. Horseshoe Bend in the Grand Canyon has been formed by erosion over millions of years.

Some landforms are so big they can be seen from space, such as the Nile Delta which has been formed by thousands of years of deposition.

Rivers can create beautiful landforms that drastically change the landscape. For example, the Fairy Pools on the Isle of Skye.

Photograph: Horseshoe Bend, Grand Canyon, Colorado River, Arizona, USA

Photograph: The Fairy Pools, Isle of Skye, UK

Nile Delta, Nile River, Egypt

Study this photograph of a small V-shaped valley in the Brecon Beacons, Wales and answer the questions.

Where is the "V" that makes it a V-shaped valley? Draw it on the photograph.

How do you think the V-shaped valley formed? Erosion? Transportation? Deposition?

Use the information to label the photograph.

In the part of the river closest to the source (the upper course), where the river is still flowing through mountains and hills, the river does a lot of vertical erosion (downwards erosion), cutting into the rock. In the middle and lower course of the river (further away from the source, closer to the mouth), the river does more lateral (sideways) erosion, which makes the river channel wider. The process of vertical erosion in the upper course creates a V-shaped valley, by deepening the river channel and cutting down into the rock.

The river finds it easier to erode rock that is less resistant (softer) than it does to erode more resistant (harder) rock, so the river bends around areas of more resistant rock. These sections of rock that stick out, that the river has not been able to erode as easily, are called interlocking spurs.

Labels:

- River
- Two "V" shapes
- Three interlocking spurs

Use the information above to answer the questions.

What sort of erosion is the river doing in the upper course?

_____

_____

Where does lateral erosion take place?

_____

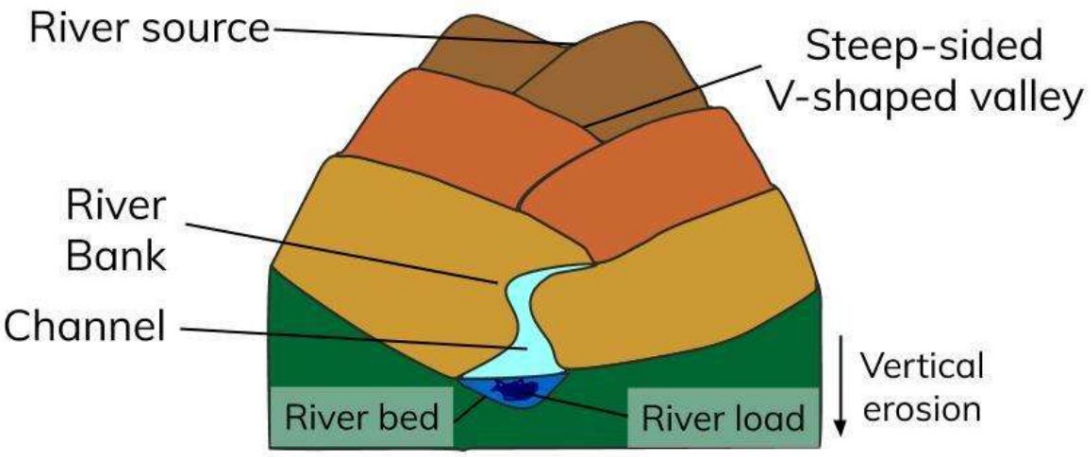
_____

What effect does the vertical erosion have on the valley?

What type of rock does the river find it easier to erode?

What are interlocking spurs?

How do interlocking spurs form?



Return to page 3 and complete the Learning Review.

LESSON FOUR: What landforms can rivers create? (II)

Retrieval Practise

Where does the river form a V-shaped valley and interlocking spurs?

a. Upper course
b. Middle course
c. Lower course

Name three types of erosion.

Name 3 types of transportation.

Which type of erosion helps form V-shaped valleys?

a. Lateral (sideways) erosion
b. Vertical (downwards) erosion

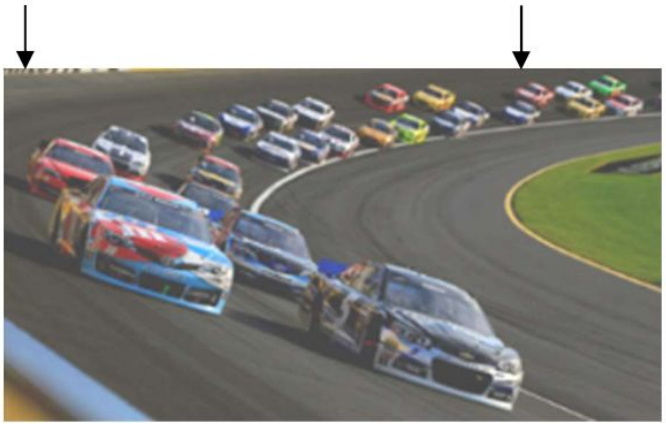
What is the name of the place where the river starts?

What does this photograph reveal about the Amazon River?

Photograph: The Amazon River, from Space (source: NASA)

Read the passage about meanders.

In the middle course, rivers usually have more energy and so they do a lot of erosion, but now it is more lateral (sideways) erosion. This makes the river channel wider. As the river erodes laterally, it forms big bends in the river, called meanders. Meanders form, change and migrate (move around) because of lateral erosion and deposition. When a car goes around a bend, the speed is greatest on the outside of the bend, which is why the driver and passengers are pushed to the outside of the bend. The faster the car goes around the bend, the more the driver and passengers will be pushed to the outside of the bend.



Rivers work in a similar way. When the water goes around a bend, the water on the outside of the bend moves fastest, meaning the river has the most energy to erode on the outside of the bend (stage A). This means that the outside of the bend is continually eroded, making the bend bigger (stage B).

Water on the inside of the bend moves more slowly and so this is where more deposition occurs.

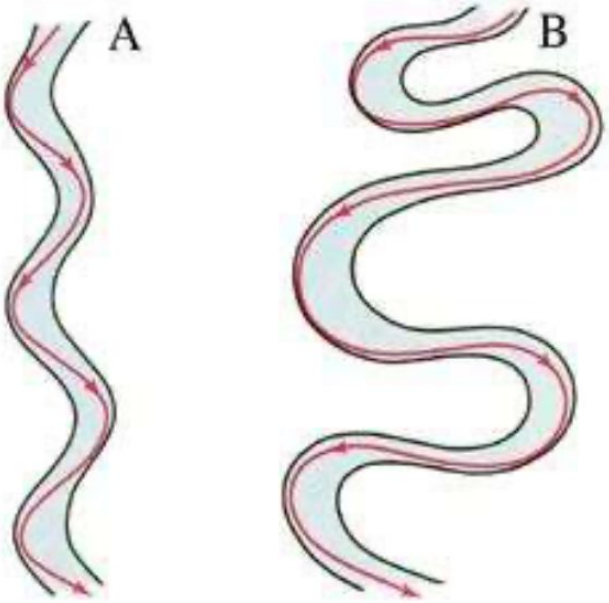


Diagram: Meander formation

What might happen eventually, as the meanders get bigger and bigger, becoming increasingly close together?

Tip: Look back at the photograph of the Amazon River from space. What clues are there?

Use words or a diagram to note down your predictions.

Complete the sentences, using the diagram to explain what happens.

As the meanders get bigger, the neck of the meander becomes	
When the neck of the meander is very narrow, it is easier for the river to	
When the river cuts through the neck, it forms a new path and leaves an	
The oxbow lake is sealed off by sediment that the river	

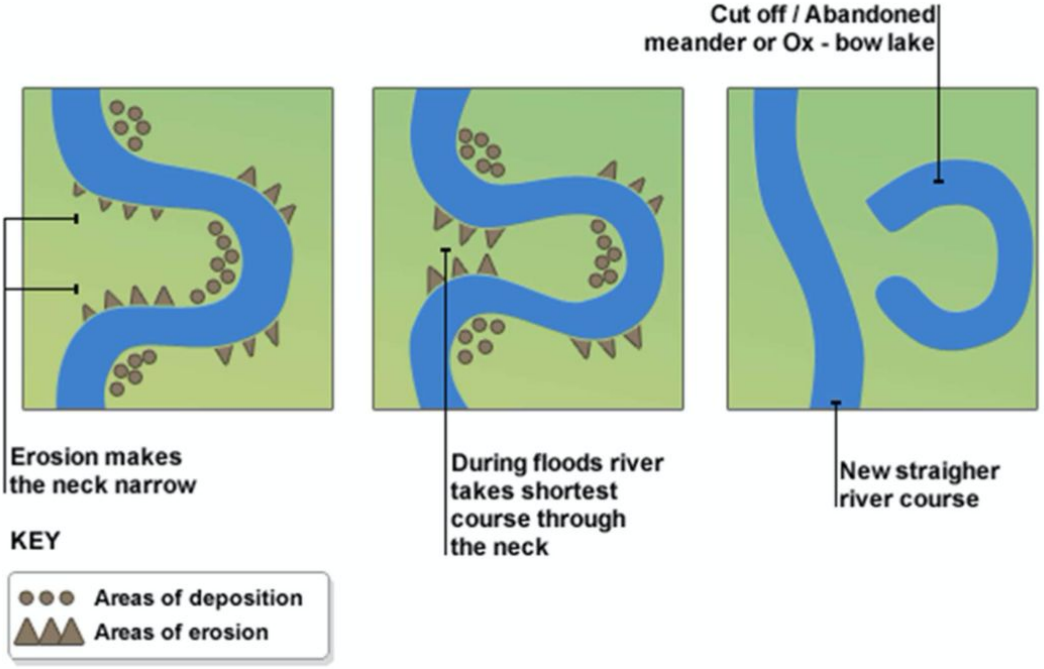


Diagram: Formation of an oxbow lake

Photograph: Oxbow lake, Amazon River

Describe how an oxbow lake forms.

Structure:

- Type of erosion
- Explain how meanders form
- What happens to meanders?
- Describe how the river can cut through the neck to form an oxbow lake
- Which process seals off the oxbow lake and with what material?

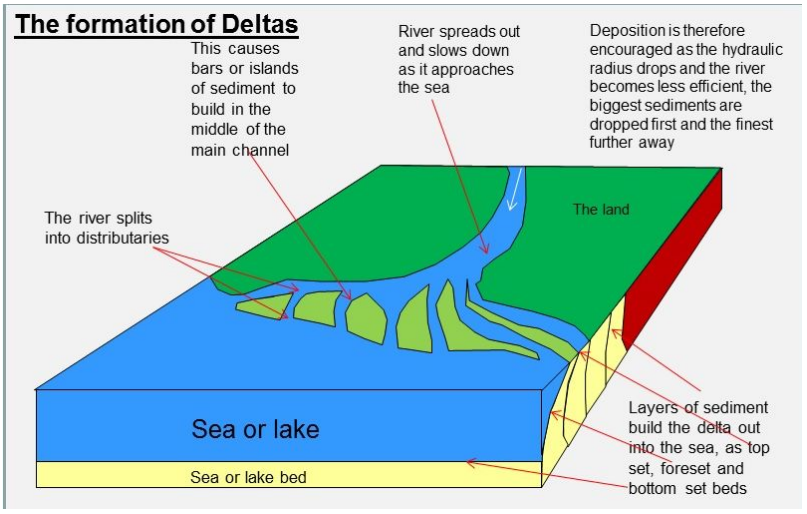
Read the passage about confluences and deltas.

A confluence is the meeting of two waterways. It usually means the point where a smaller river joins a major river.

This image shows several smaller rivers meeting the river Thames. These smaller rivers are called tributaries. The place where each tributary meets is called the confluence.

A river delta is a landform created by deposition of sediment that is carried by a river as the flow leaves its mouth and enters slower-moving or stagnant water. This occurs where a river enters an ocean, sea, estuary, lake, reservoir, or (more rarely) another river that cannot carry away the supplied sediment.

This diagram shows how the delta is formed as the river flows to the sea. As the river meets the sea and the flow slows down, it deposits the sediment to create sand bars. The larger particles of sediment are deposited first as they are heavier.



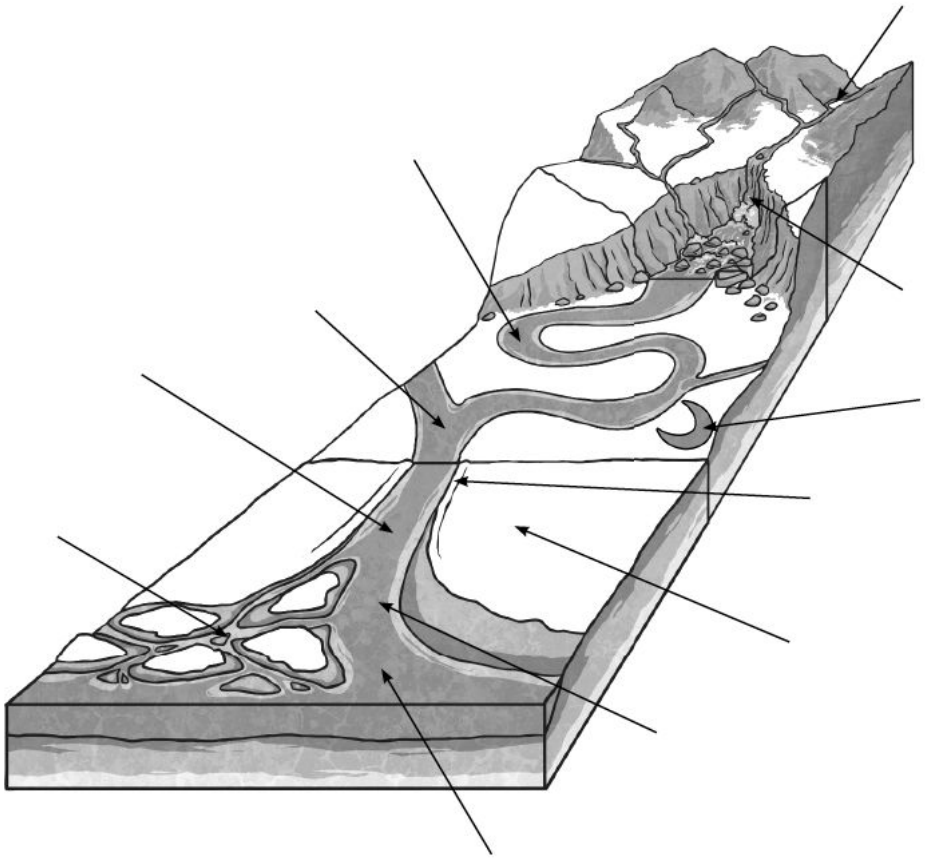
This satellite photograph shows the delta of the River Nile in Egypt. The flow of the river can be seen as it travels through Egypt's very dry terrain. The banks of the Nile and the delta are very green as vegetation has the water supply from the river to thrive. The delta is a triangular shape.

Not all deltas are triangular. This delta is of the Indus River which flows into the Indian Ocean on the border of Pakistan and India.

What is the name of the deposition from the faster flowing river?

_____

Complete the diagram including all the features of a river that you have learnt about:



channel	confluence	delta	estuary	floodplain	levee
meander	mouth	oxbow lake	source	waterfall	

Return to page 3 and complete the Learning Review.

LESSON FIVE: Why are rivers important to people?

Retrieval Practise

Where is the Amazon River?

a. North America
b. South America
c. Africa
d. Asia

Where is the Volga River?

a. India
b. China
c. UK
d. Russia

Order the stages to describe how a meander forms. (1-4)

	Erosion happens on the outside of the bends, making the bends bigger
	The river does a lot of lateral erosion in the middle course, creating gentle bends.
	Over time, the meander develops and grows bigger.
	Deposition occurs on the inside of the bend, where the water moves more slowly.

Which type of transportation does the phrase "jumping beans" help you remember?

_____

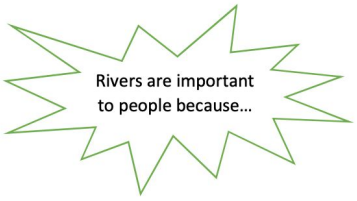
Which type of erosion does the phrase "water power" help you remember?

_____

What is the confluence of a river?

_____

Why are rivers important to people? Why have people built their communities and cities along rivers?



Read the passage about the Volga River in Russia.

The Volga River is a very important river in Russia. Nearly 40% of the Russian population live within the area of land that is affected by the Volga River and over 50% of Russia's agriculture takes place along the Volga River. The river has produced very fertile soil (rich, good for growing plants) either side, and so farmers are able to grow cereals such as wheat and barley, along with various types of fruit and vegetables.

The Volga River is also very important for Russia's fishing industry. There are over 120 species of fish in the Volga River, including the sturgeon. The largest sturgeon to ever be caught was from the Volga River in 1827. It weighed 1,570kg and was over 7 m long.

Russia is famous for caviar, which is fish eggs. The caviar comes from fish that live in the Volga River. The Beluga sturgeon from the Volga River produces the most valuable caviar, but the Beluga sturgeon become endangered from overfishing and so this caviar is very hard to come by now.

Photograph: Sturgeon from the Volga River

Photograph: A jar of caviar

Read the passage about the Amazon River in South America.

The Amazon River has its source in Peru and then travels eastwards through Brazil, before meeting the Atlantic Ocean. The Amazon River's tributaries (smaller rivers that flow into a larger river) pass through Bolivia, Venezuela, Colombia and Ecuador. Many of the areas through which the Amazon River and its tributaries pass are hard to access by road, and so the rivers are used for transporting goods by boat. Farmers are able to transport their produce from deep within the Amazon Rainforest to other communities, so that they can sell the products and earn a living. Companies are able to use larger boats to tow (pull) larger amounts of goods (such as logs). This is a cheaper way of transporting large goods. Cruise boats also use the river so that tourists can explore the Amazon River.

Photograph: Small boat transporting bananas logs

Photograph: Tug boat towing

Answer the questions using the text and images above.

Why does a lot of agriculture take place along the Volga River?

Apart from farming, describe one other reason why the Volga River is important to people.

Describe one reason why the Volga River is famous.

Why are rivers so important for transportation?

How do farmers make use of the river?

Apart from agricultural produce, what else is transported along the Amazon River?

Return to page 3 and complete the Learning Review.

LESSON SIX: How do humans affect a river?

Retrieval Practise

What is a tributary?

State one reason why the Volga River is important to people.

State one reason why the Amazon River is important to people.

Name one river landform.

Which of the following are not types of erosion?

a. Traction
b. Abrasion
c. Hydraulic action
d. Saltation
e. Vertical
f. Solution
g. Lateral
h. Transportation

How many different ways can rivers be used?

Write your ideas in the boxes in this table:	

Read the paragraph about human use of the river.

People have used rivers for thousands of years. They have been used for fishing, by factory owners, for power generation, by tourists and water sports groups.

Thinking about today, why might rivers be used for these activities?

Can you think of one positive effect and one negative effect of people carrying out these activities on the river today?

	A positive impact	A negative impact
Fishing		
factory owner		
power generation		
tourists		
water sports groups		

Read the passage about river flooding

A flood is when a river's water spills out over its banks (sides) and spreads out over the surrounding area. A river can flood because of heavy rainfall or when there has been rainfall for a very long period of time. If snow and ice melt suddenly in the mountains, this can also lead to rivers flooding, or if the river is surrounded by very steep land, as the water runs very quickly into the river. Humans can cause flooding by building too close to the river or by cutting down trees. Trees catch lots of rain and slow down the movement of water on the land, which helps reduce flooding.

Rivers have always flooded and humans have actually depended on rivers flooding, because each time a river floods it deposits important sediments on the surrounding land, making the soil rich and fertile. Rich and fertile soil is important for successful agriculture (farming).

However, flooding can also cause many problems for people who live close to the river. Each year, homes are destroyed and people lose their lives when rivers flood. Cleaning up flooded areas and rebuilding communities takes a long time and costs a lot of money.

Photograph: The River Thames (London) spilling out over its banks.

Answer the questions using the text and image above.

What is a flood?

Explain two reasons that could lead to a river flooding.

Describe one benefit of rivers flooding.

Describe one disadvantage of rivers flooding.

Study these photographs. Annotate each one with ways in which the community might be affected.

Read the text and answer the question.

The Aswan High Dam was completed in 1970 and was built across the Nile River in Egypt. The dam is a wall across the river. In the map you can see the reservoir (lake) that has built up behind the dam.

The reservoir is an important store of water during times of drought (lack of rain). The dam allows electricity to be generated and it stopped the annual flood. The annual flood caused lots of problems each year but it also brought important nutrients to the farmland along the river. Farmers must now use lots of irrigation (watering) systems to water their farmland.

Should all rivers be controlled to prevent flooding?

On the one hand, I think that rivers should be controlled to prevent flooding because

On the other hand, I think that rivers should not be controlled to prevent flooding because

Overall, I think that