

Primary Geography

Biomes

Name:

Class:

Knowledge organiser The six major biomes

I	Tropical	 Hot all year (25–30 °C) 	
	rainforest	 Wet all year (2,000 mm of rainfall a year or more) 	
		 Dense forests with several layers of trees 	
2	Savanna	• Hot all year (25–35°C)	
		 500–1,000 mm of rainfall a year with a dry season (no rain) 	
		 Grasses, some shrubs and some trees that can cope with drought 	
3	Desert	 Very hot during the days in summer (35–40 °C) 	
		 Very low rainfall (250 mm a year or less) 	
		 Very few plants: only those that can survive without rainfall 	- All Contractions
4	Temperate deciduous forost	 Four seasons: hot in summer (25°C) and cool in winter (5°C) 	
	lorest	 Rainfall all year (around I,000 mm) 	
		 Deciduous trees (trees that lose their leaves for winter) 	
5	Coniferous forest (taiga)	 Mild summers (I0–20°C) but very cold winters (below 0°C) 	
		 Low rainfall (500 mm a year or less), usually in summer 	A REPAIR WATER AND A REAL
		• Evergreen trees (trees that keep their leaves throughout winter)	
6	Tundra	 Cold winters (below -30 °C) and cool summers (around 10 °C) 	and the second
		 Low rainfall (around 200 mm a year) 	
		 Very few plants: only those that can survive freezing temperatures and drought 	

drought

wildfire

	Vocabulary	
Adapted	Well suited to living in a particular biome	
Biome	Very large region containing the same sort of climate, plants and animals	
Climate	General or average weather conditions over a long period of time	
Drought	Long period when there is much less rain than usual, leading to there not being enough water	
Extinct	No longer alive as a species]
Fossil fuels	Resources, such as coal, oil and natural gas, that contain a lot of carbon and release it when they are burnt	
Greenhouse gases	Gases like water vapour, carbon dioxide and methane that trap heat in the atmosphere, warming it up	
Permafrost	Layer of the ground under the surface that is permanently frozen	1 acres
Wildfires	Fires that spread very quickly through forests and grasslands	



3

Lesson I

What are the Earth's biomes?



A **biome** is a huge region with the same sort of **climate**, plants and animals. This map shows the Earth's biomes.

I. Colour in the biomes map using the map on p.3 as a guide. You can use different colours or different shading. Remember to colour in the key.



2. Find out what the biomes are in these places. Write your answers in the table. (*We've done the first one to get you started*.)

Place	Biome
The far north of Russia	Tundra
Egypt	
The middle of Australia	
The east of the USA	
UK	
India	
Along the Equator	

3. Use the list of six major biomes in the Knowledge organiser to identify each of them in this table. Write your answers in the table.

Biome I	Biome 2
Biome I is:	Biome 2 is:
Biome 3	Biome 4
This biome has thick forests with several layers of trees. Millions of species of plants and animals live here. It is hot all year, with temperatures usually between 25°C and 30°C, and never below 20°C. It usually rains every day, and there is 2,000 mm of rainfall or more each year.	Very few plants can survive in this biome because it is so cold for most of the year (well below 0°C). The summer is slightly warmer (around 10°C). It is also very dry: there is often less than 250 mm of rainfall each year. Days are very long in summer but very short in winter.
Biome 3 is:	Biome 4 is:

Lesson 2

Why are the biomes where they are?



QUIZ

- I. Which biome is at the Equator? Tick the correct answer.
 - a. tropical rainforest
 - b. desert
 - c. tundra
- 2. Which biome is very hot and very dry? Tick the correct answer.
 - a. tundra
 - b. coniferous forest (taiga)
 - c. desert
- **3.** Which biome has cold winters but a lot of evergreen trees? Tick the correct answer.
 - a. coniferous forest (taiga)
 - b. temperate deciduous forest
 - c. tropical rainforest
- **4.** Which biome is so cold and dry that very few plants can live there? Tick the correct answer.
 - a. tundra
 - b. coniferous forest (taiga)
 - c. desert
- 5. Read the statements below. Tick 'True' or 'False' for each one.
 - a. The UK is in the coniferous forest (taiga) biome. True False
 - b. The UK is in the temperate deciduous forest biome.
 - c. The UK is in the tropical rainforest biome.

True

True

Temperature

The main reason why biomes are where they are is the climate. Climates are different around the world and that's what makes biomes different.

Temperature is very important for climate. Most of the Earth's heat comes from the Sun. Where the Sun's rays hit the Earth straight on, it is hottest. That is at a point called the Equator. Where the Sun's rays hit the Earth at the shallowest angle, it is coldest. That is at the North Pole and South Pole.

I. Use the information in the Knowledge organiser to order the six main biomes by summer temperature, starting with the hottest one. Write your answers in the table.

	Summer temperature	Biome
Hottest	35–40°C	
	25–35°C	
	25–30°C	
	25°C	
	10–20 °C	
Coldest	10 °C	

Latitude

The Equator is 90° N North Pole Polar zone an imaginary line 66.5° N around the middle Temperate zone of the Earth, like 23.5° N a belt. It is a line of latitude, which **Tropical zone** sunlight means it goes 0° Equator around the Earth. **Tropical zone** There are other 23.5° S lines of latitude, Temperate zone all the way to 66.5° S the North and Polar zone South Poles. We 90° S South Pole measure latitude in degrees. The Equator is at zero degrees of latitude (0°) , and

the number of degrees increases towards the Poles.

- The tropical zone is on both sides of the Equator. It is hot!
- The temperate zone is cooler because the Sun's rays are hitting the area from an angle.
- The polar zone is very cold. The Sun's rays here are very spread out.

Rainfall

When air gets warm, it rises up – like the air that lifts a hot air balloon. It carries water vapour up with it.

High up in the atmosphere, it is cold. The water vapour gets colder as it goes up and that makes it form clouds. Water droplets become heavier as they join together, and fall from the clouds as rain.



This is what happens at the Equator. The very hot air rises up, carrying more water vapour. Huge clouds form and there is a lot of rain.

That is why the tropical rainforest is warm all year and has so much rain. The clouds also block some of the Sun's rays. That keeps it from being as hot as where skies are clear, like in deserts.

2. Use the information in the Knowledge organiser to order the six main biomes by quantity of rainfall, starting with the wettest one. Write your answers in the table.

	Annual rainfall	Biome
Wettest	2,000 mm or more	
	Around I,000 mm	
	500–I,000 mm	
	500 mm or less	
	250 mm or less	
Driest	Around 200 mm	

Why are deserts so dry and hot?

After the water vapour in warm air becomes clouds and rain, the dry air becomes colder and starts to fall. The falling air has no clouds, so there is no rain and nothing to get in the way of the Sun's rays. No rain and hot temperatures make a desert.



Fill in the blanks to complete these sentences.
 Desert biomes are found north and south of the

______. This is because hot air ______ at the Equator and, by the time it comes down again, it has lost all its water _______. That means desert biomes have very low levels of ______. Because there are no clouds, the Sun makes the ______ in deserts very high during the day.

temperatures rises Equator vapour rainfall

Lesson 3

Why are biomes under threat?

👝 Quiz

- I. What is the Equator? Tick the correct answer.
 - a. a biome
 - b. a line of latitude
 - c. a Pole
- **2.** Match each biome to its average summer temperature and average annual rainfall. Draw lines between them.

Summer temperature	Biome
35–40 °C	Tropical rainforest
25–35°C	Coniferous forest (taiga)
25–30°C	Tundra
20–25°C	Savanna
10–20°C	Desert
10 °C	Temperate deciduous forest

A	nnual rainfall
2	,000 mm +
١,	000 mm
5	00–I,000 mm
L	ess than 500 mm
2	50 mm or less
15	50–250 mm

- 3. Read the statements below. Tick 'True' or 'False' for each one.
 - a. Dry air has no clouds, so deserts are very hot in the day.
 - b. Rising air with lots of water vapour makes clouds and rain.
 - c. In the tropical rainforest biome, sinking air creates clear skies and no rain.

True	False
True	False
True	False

Why is there a climate emergency?

Human activities often release gases such as carbon dioxide and methane: **greenhouse gases**. These greenhouse gases trap heat in the atmosphere so it warms up. Humans have added so much extra greenhouse gas to the atmosphere that the Earth's temperature has increased by more than I°C over the last 200 years.

Temperature differences create different climates, so when temperatures change, climates change too. This change is called the climate emergency. It is an emergency because of the bad effects for life on the Earth in the future. For example, heatwaves of 40 °C might become common in Europe. Millions of people could not have enough water to drink.

- I. Look at the following list of the impacts of climate warming.
 - **A.** All over the world, the temperature has increased.
 - **B.** Water expands when it gets warmer, so the level of the sea is rising.
 - **C**. There is less snow in the northern hemisphere (the half of the globe nearer to the North Pole).
 - D. Less of the sea in the Arctic is frozen.
 - E. Plants are flowering earlier in spring.
 - F. Glaciers around the world are getting smaller each year.
 - **G.** The **permafrost** of the tundra is melting.
 - **H.** Flooded homes are a consequence of a warming climate.
 - a. Which statement in the list explains why people are having to move away from coastal areas? Write its letter here:
 - b. Which statement in the list does this picture show? Write its letter here:



Why are some animals and plants vulnerable to climate change?

Biomes depend on the climate, so climate change means biome change.

The animals and plants of biomes are often **adapted** to live in their biomes. If the climate changes rapidly, they might not be able to survive there.



- 2. Cross out the incorrect words to complete these sentences.
 - a. If the tundra became warmer, it would be **good / bad** for Arctic foxes because they would be too hot and they would not be camouflaged against the snow.
 - b. If the tropical rainforest became drier, many trees would **die** / **flourish** because they are not adapted for dry conditions.
 - c. If temperatures became warmer in northern Europe, the mosquitos that carry malaria **could / could not** spread there.
 - d. If temperatures became warmer in the coniferous forest biome, deciduous trees could **replace / help** the conifers because they grow more quickly.

How might biomes change?

A warming climate has big impacts on biomes. Here are three examples.

Warming tundra

In the tundra, a warmer climate will melt more of the permafrost. Unfortunately, this releases more greenhouse gases that were frozen in the soil. More plants will be able to grow in the tundra and the lichens that reindeer eat will be crowded out. **Wildfires** will become more common.

Drying tropical rainforest

Climate change is reducing rainfall in tropical rainforest biomes. Trees are dying as they cannot cope with **drought**, and forest fires are more common. As the rainforests dry out, they will become more like savanna, with dry bushes and grasses.

Desertifying the savanna

Climate change is reducing rainfall in the savanna biome, too. Droughts are getting more common and lasting longer. This means areas of savanna are turning into deserts. This is called desertification.



Desertification in northern Africa

- **3.** Climate change means biome change. Fill in in the blanks to complete these sentences. The first one has been done for you, as an example of how a sentence should be completed.
 - a. Tundra will become more like <u>coniferous forests</u>.
 - b. Some tropical rainforests will become more like
 - c. Some savannas will become more like
 - d. Some temperate deciduous forests will become more like

Unit progress check in

I. Choose one phrase to complete each of the following sentences. Cross out the incorrect options.

Trees in **coniferous forests / deciduous forests / rainforests** grow densely, in several layers.

Trees in **coniferous forests / deciduous forests / rainforests** have tough, needle-like leaves.

Trees in **coniferous forests / deciduous forests / rainforests** lose their leaves for winter.

2. Write one term to complete this sentence.

'The UK is in the	biome.'

3. Put these three biomes in order of summer temperature, starting with the hottest. Write I, 2, or 3 next to each.

Temperate deciduous forest	
Savanna	

Tundra

4. Put these three biomes in order of annual rainfall, starting with the wettest. Write I, 2, or 3 next to each.

Tropical rainforest	
Desert	

Coniferous forest

- 5. What is causing the climate emergency? Tick the correct answer.
 - a. ocean tides
 - b. human activity
 - c. plant growth
- 6. Describe one impact of the climate emergency.

Lesson 4

What are the features of your favourite biome?

_RQuiz

Ι.	Re	Read the statements below. Tick 'True' or 'False' for each one.				
	a.	Humans are causing the climate		. —		
		emergency by releasing greenhouse gases.	True	False		
	b.	Trees are causing the climate emergency				
		by storing carbon dioxide.	True	False		
	c.	The oceans are causing the climate				
		emergency by getting warmer.	True	False		
2.	Wł	Which one of the following is an impact of climate warming? Tick the				
	CO		ſ			
	a.	The permatrost of the tundra is melting.				
	b.	Glaciers around the world are getting bigger	each year.			
	c. More of the sea in the Arctic is frozen over each year.					
3.	De wi	scribe one way in which the Arctic fox is adapt nters of the tundra. Write your answer.	ed to the ve	ery cold		
		ad the statements helper. Tick 'True' or 'Ealse'	for each on			
4.	ке			2.		
	a.	for drought.	True	False		
	b.	Some parts of savanna biomes might become more like tropical rainforests as	Truce			
			irue	raise		
	c.	Tundra will become more like coniferous forests as climates warm.	True	False		

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Biomes
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Your favourite biome



 You have learnt about six biomes in this unit. Which is your favourite one – one that you would like to learn more about? Why is that? Write your answers.

My favourite biome is: _____

This is because: ____

2. Where is your biome found in the world? Colour or shade it on this map and write its name in the key.



3. Fill in the blanks and cross out the incorrect words to complete these sentences about your favourite biome. You could look back at the Knowledge organiser to help you.

My favourite biome is: ______ mm of rainfall. Every year, this biome has ______ mm of rainfall. Its climate is **very rainy / quite rainy / not very rainy / dry**. The summer temperature in the biome is: ______ °C. Its climate is **very hot / hot / warm / cool / cold**.

How are polar bears adapted to their tundra biome?

These labels show how polar bears are adapted to their climate.



swimming.

4. Find out about the adaptations of an animal or a plant from your favourite biome. Draw it and label its adaptations.

How well will polar bears cope with a changing climate?

As climate warms up in the tundra and polar biomes, polar bears are in trouble. They are not adapted to living in warmer winters.

- Polar bears' white fur is not good camouflage when there is no snow or ice.
- Their thick fur and fatty layers mean they can get too hot in warmer temperatures.
- They are used to hunting on the ice. They cannot catch their food in areas with no ice.

How will your favourite biome change?



5. How will your favourite biome change as climate change continues? Cross out the incorrect words to complete these sentences.

My favourite biome is: ____

- Because of climate change, temperatures in this biome are increasing / decreasing.
- Its climate is becoming extremely hot / very hot / hot / warm / cool.
- Because of climate change, rainfall in this biome is **decreasing** / **increasing**.
- Its climate is becoming quite rainy / not very rainy / dry / very dry.

Lesson 5

How can we persuade people to protect biomes?

Quiz

I.	What biome did you choose as your favourite one? Tick the correct answer.			
	a.	Tundra	d.	Tropical rainforest
	b.	Coniferous forest (taiga)	e.	Savanna
	c.	Deciduous temperate forest	f.	Desert
2.	Ide Tic	entify one continent that has your k the correct answer.	bio	me in it.
	a.	Antarctica	e.	Europe
	b.	Africa	f.	North America
	c.	Asia	g.	South America
	d.	Australasia		
3.	Reo	ad the statements below. Tick 'Tru	ie' c	or 'False' for each one.
a. Polar bears have thick fur that keeps them				them
		warm in the tundra winters.		True False
	b. Polar bears would have more to eat if there			
		was no ice on which to hunt.		True False
	c.	Polar bears are very well adapted	d fo	r life in
		the coniferous forest biome.		True False
4.	Giv	e an example of another animal'	s or	plant's adaptions and name

its biome. Write your answer.

Reasons for protecting biomes

- Biomes store carbon for us: in trees, in peat bogs, in ocean kelp (seaweed) forests, for example.
- Forest biomes clean our air and our water.
- Plants in biomes create the oxygen we need to breathe.
- Changes in the biomes means more animal and plant species will become **extinct**.
- Many of our medicines come from plants. If more plant species become extinct, we will lose the possibility of creating new medicines from them.
 - I. a. Which one of the statements in the list above do you think is the most convincing reason to protect biomes? Underline it.
 - b. Why do you find this reason the most convincing? Write your answer.

What can we do to protect biomes from climate change?

The climate emergency is caused by humans producing too much greenhouse gas. Humans are also destroying and damaging biomes directly, for example by cutting down rainforests in order to make farmland. Three important things we can do, therefore, are:

- I. leave **fossil fuels** in the ground burning oil, coal and gas is the main reason that we produce too much greenhouse gas
- 2. protect biomes from being damaged by human activity, for example, by setting up forest reserves
- 3. help repair biomes that have been damaged, for example, by planting more trees.



2. Look at the photos below.



- a. Which one of the photos above shows a way of protecting a biome from being damaged by human activity: A, B or C? Write your answer.
- b. Which one of the photos shows a way of repairing a biome that humans have already damaged: A, B or C? Write your answer.
- c. Which one of the photos shows an alternative to using fossil fuels: A, B or C? Write your answer.
- 3. Plan a speech you could make to persuade people to help you protect your favourite biome, using the following prompts. Write your answers.
 - a. Why the biome is interesting or special:
 - b. Why biomes are important to us all:
 - c. How the biome is threatened by climate change:
 - d. What you want people to do to help defend the biome:

Lesson 6

Unit check out



How much do you agree with the following statement? 'It is already too late to protect biomes from climate change.' Write your answer.

Key words			
adapted	drought	greenhouse gases	
biome	extinct	permafrost	
climate	fossil fuels	wildfires	

Title: How much do you agree with the following statement? 'It is already too late to protect biomes from climate change.'	
IntroductionWhat is a biome?What is climate change?	
 Paragraph I Why is climate change a threat to biomes? Give an example of a species that is vulnerable to climate change. 	

 Paragraph 2 Give an example of a biome. Describe its climate and vegetation. Explain why biomes are important. 	
 Paragraph 3 In what ways have biomes already changed? (For example, consider glaciers, permafrost and ice sheets.) 	
Extension Paragraph	
 What is needed for biomes to be protected? 	
 How can we achieve this protection? 	
 How can we reduce climate change? 	
 How can we repair biomes that have been damaged already? 	
Conclusion	
 State whether you think it is already too late to protect biomes. 	
 If you think it is too late, explain why using evidence from earlier in your writing. 	
 If you think it is not too late, explain what needs to happen and how this could be achieved. 	

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Biomes

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