

1.1

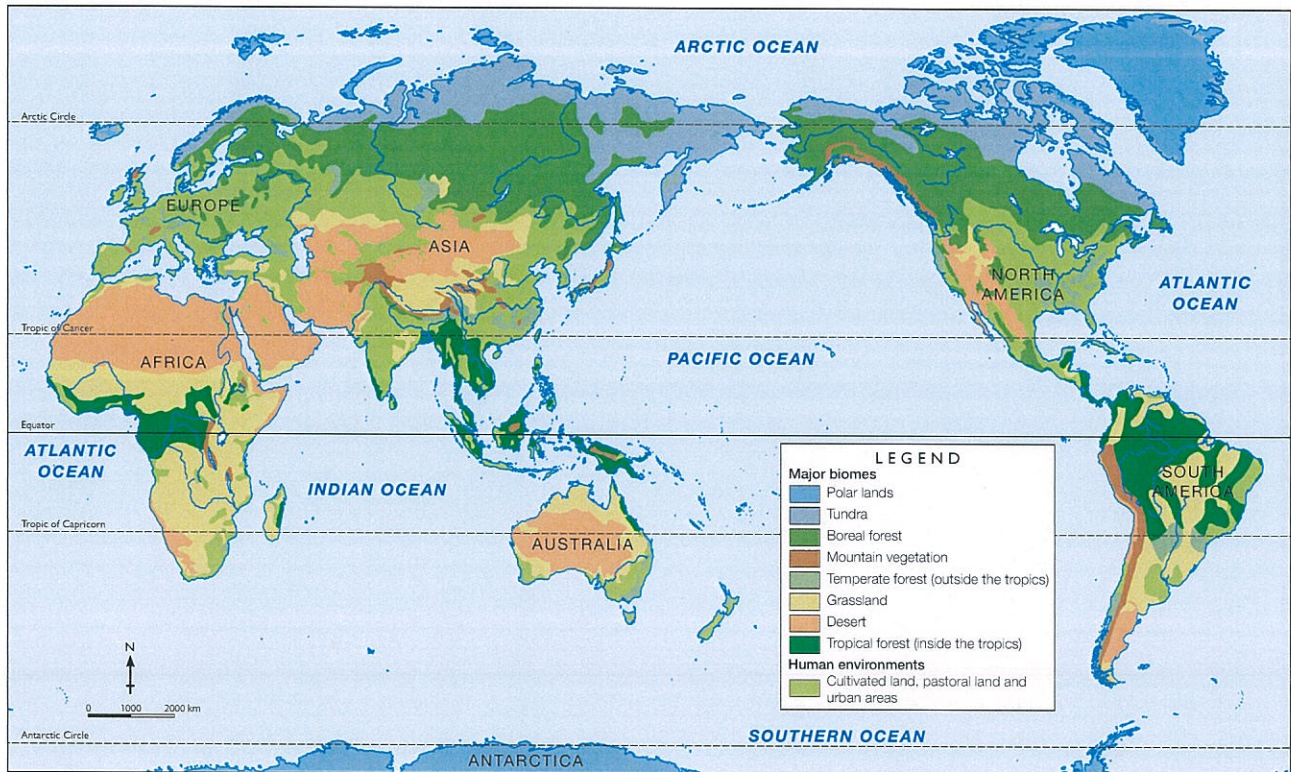
What are the world's biomes?

The world's biomes

In order to better understand the Earth's natural and human environments, geographers divide the Earth's surface into a number of distinct regions. Each region has particular features that make it different from other regions. One region may be hot and rainy most of the time, for example,

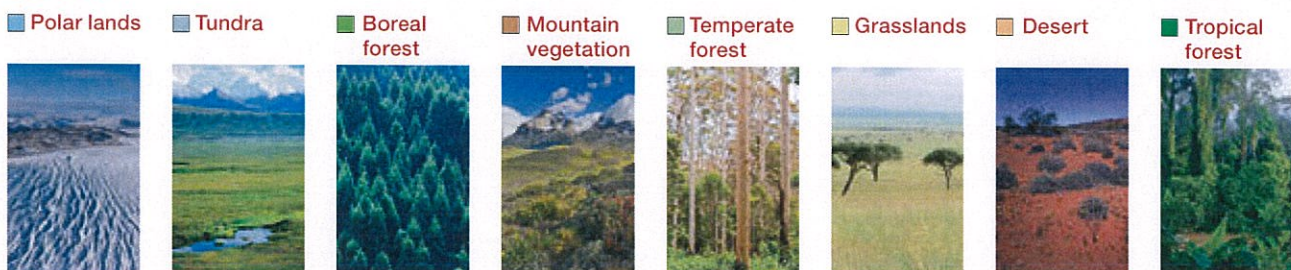
and another might be dry and cold. This means the plant and animal life found there functions, adapts, and interacts according to the conditions of the region it inhabits. Regions defined by landscapes that share similar climates and types of vegetation in this way are known as **biomes**.

WORLD: BIOMES



Source 1.2

Source: Oxford Atlas





Source 1.3 A red-eyed tree frog in the rainforest of Panama in Central America is one of the many species that lives in this rainforest biome.

In some biomes, such as **tropical forests** and **grasslands**, there is an abundance of life. This is because the conditions favour a huge variety of species. A recent study of a Colombian **rainforest**, for example, found 596 bird species, 150 different species of amphibians and more than 200 species of mammals. Scientists estimate that there are more than 100 000 insect species per hectare in this rainforest and more tree species in a single hectare here than there are in the whole of North America. This explosion of life is due to the year-round high temperatures and rainfall in the region.

At the other end of the scale are the **tundra** and the **polar lands** which are the coldest biomes. The tundra biome circles the North Pole. Tundra, meaning 'treeless plain', has short growing seasons, very little plant diversity and very low temperatures. Antarctica, twice the size of Australia, contains virtually no native land species. Only two flowering species of plants exist on the continent and the largest native land animal is a 1-centimetre-long wingless midge. There are no native mammals, amphibians or trees in Antarctica. It is simply too cold, too dry and too windy for plants and animals to flourish.

In the **mountain vegetation** biome, too, cold conditions determine plant life and the animals that live there. Plants in the mountain vegetation biome tend to be low and hug the ground to preserve warmth. The mountain vegetation biome has a long winter period, and animals that live in these areas need to be able to survive the cold and the exposure to UV radiation.

Check your learning 1.1

Remember and understand

- 1 What is a biome?
- 2 Why is there such an abundance of life in a rainforest?

Apply and analyse

- 3 Where are the world's tropical forests located? Why do you think they are located in these places?
- 4 Describe the distribution of biomes in Australia.

Evaluate and create

- 5 Design a world tour that includes at least one visit to each type of biome. Research where you will go using a map that shows the world biomes, then list the countries you would visit on this tour. Include some of the activities you might do at each place, based on the biome's climate and geographical conditions.
- 6 Work with a partner to rank the world's eight major biomes from 'home to most species' to 'home to least species'. Compare your list with other groups. Were there some rankings you all agreed on? Were there others where there was little agreement?

Boreal and temperate forests

Boreal forest biome

The largest biome on land is not the hot **desert** or treeless tundra – it is the **boreal forest** biome. Boreal forest, sometimes called **coniferous forest**, is composed of coniferous, evergreen trees that have needle-like leaves and cones, like pine cones. This biome is characterised by having a low number of species of plants when compared to other forests in more temperate regions or in the tropics.

The boreal forest biome covers vast areas in the Northern Hemisphere, between the Arctic tundra and the north of Europe, Asia and North America. While the climate in these regions is not as harsh as that experienced in the polar lands or on the tundra, it is still cold enough to limit the number of plant and animal species that can survive, and winter is long. In fact, the boreal forest's longest season is winter. Average temperatures fall to about -15°C and snow is common. In summer, which lasts only one to three months, temperatures climb towards 20°C and humidity is relatively high. The plants and animals that survive in this biome must be able to handle great variations in rainfall and temperature, as well as large areas of permanently frozen ground and poor soils.

Threats to the forest

Boreal forests have provided many important resources for people both in the past and the present. Historically, wood for construction, heating and cooking came from boreal forest trees. More recently, boreal forests have supplied the increased global demand for cheap wood and paper, spurred by population growth and a change in global markets.

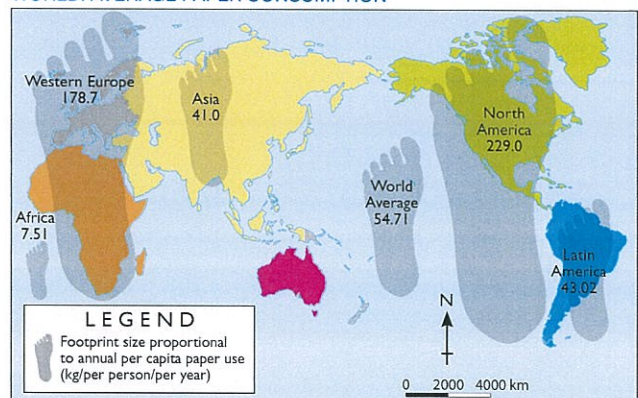
However, many boreal forests are under threat. One of the main threats to the boreal forest biome is the clearing of trees to make way for oil and gas exploration. It is estimated that huge reserves of petroleum products lie under the forests, and the ever-increasing demand is pushing exploration into these areas.

In Canada and Russia, forests are logged extensively and many are being attacked by insect plagues and acid rain. Forests are also at risk from bushfires during the summer period. Climate change is causing some forest areas to spread further north. Rising temperatures in the Arctic region have seen the edge of the boreal forest slowly advancing northward, replacing tundra in some places.



Source 1.4 This Canadian paper mill is situated by a large body of water. Paper is made by pulping woodchips from logs and mixing the pulp with water.

WORLD: AVERAGE PAPER CONSUMPTION



Source 1.5

Source: Oxford University Press



Source 1.6 The spectacular deciduous trees in the town of Bright in Victoria's high country are mainly oaks and elms, native to England half a world away.

Temperate forest biome

Between the tropics and the cold polar regions is a large zone that is neither excessively hot nor excessively cold. For this reason it is called the temperate zone. The forests that grow in the temperate zone experience a range of seasonal climate conditions. In winter, temperatures may fall below freezing and in summer they can climb above 40°C. In some temperate forests, rain falls reliably throughout the year. In others, there are more distinct wet and dry seasons.

Most of the world's population lives in the temperate zone and this has had a huge impact on the **temperate forest** biome over time. As the world's population spread and grew,

temperate forest biome areas gradually became smaller. Cities were formed on land that was once covered in forest, and trees were cut down to clear land and to provide fuel and building materials. The forests gradually disappeared from these places. This happened in Europe, then in Western Asia and North America. Currently, little temperate forest remains in some of these places.

However, as explorers set out from Europe to colonise new lands, they often carried with them seeds and saplings of the trees with which they were familiar. They planted these in the places they travelled to, such as Australia, New Zealand and South Africa, and in this way temperate forest trees were spread around the world.

Check your learning 1.2

Remember and understand

- 1 Describe the temperature variations experienced in the boreal forest biome.
- 2 How have trees from temperate forests spread around the world?

Apply and analyse

- 3 What are some of the differences between boreal and temperate forests? What are some of the similarities?
- 4 Use the map in Source 1.2 to compare the distribution of temperate and boreal forests.

- 5 Why do you think the consumption of paper has increased dramatically in the last 50 years? What influence has this growth in demand had on the world's forests?

Evaluate and create

- 6 Examine Source 1.5, showing the average consumption of paper by person in each continent.
 - a Who are the biggest paper users? Who are the smallest?
 - b Australian consumption is not shown on this graphic. Draw the size you estimate Australia's paper footprint to be compared to one other continent. Explain how you decided on the size of Australia's footprint.