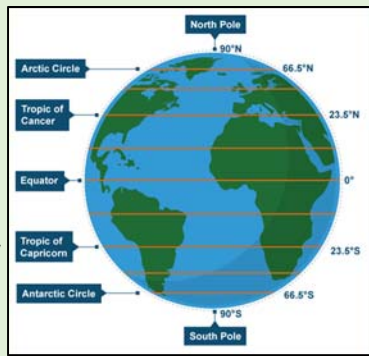


## Location and Climate

- Located in the Antarctic Circle between the latitudes of 66.5° and 90° south.
- Average annual temperatures of -50°C.
- Precipitation falls mainly as snow, and the area experiences strong winds.



## Causes

- The angle of the sun is low in the sky. This means the energy from the Sun diffuses over a large area.
- The surface of Antarctica has a high albedo. This means that a lot of the energy received from the sun is reflected back into space.
- Almost 99% of the continent is covered by an ice sheet. The high altitude of the land means temperatures decrease approximately 1°C for every 100m increase in height.

## Tourism: a threat to Antarctica?

- Tourism in Antarctica has increased rapidly over the last decade. In 2017/18, almost 45,000 tourists visited Antarctica, travelling by cruise ship or plane.
- Some believe tourism in Antarctica to offer huge opportunities for its protection, whilst others are concerned about the threat it poses to the continent's unique landscape and wildlife.

Threats	Opportunities
The ecosystem is very fragile, and too many people will disrupt the delicate balance it has. It can take many years to recover, if at all.	International agreements limiting the number of tourists visiting Antarctica have been put in place during the last 10 years.
In 2007, the tourist ship MV Explorer sank near the South Shetland Islands, leaking 178,000 litres of fuel and 24 tons of oil into the Southern Ocean.	Many tourists return from Antarctica determined to take action to preserve the continent's unique environment. This might include reducing their use of plastics, being more energy efficient, or donating to environmental charities.
Tourists currently have to reach Antarctica by ship, but there were tests in 2016 to land a Boeing 757 directly onto Antarctic ice.	In April 2009, a law was passed banning ships carrying more than 500 passengers from landing in Antarctica.
Tourists, along with research scientists, may unknowingly bring seeds and spores of plants from other areas. For example, invasive Arctic species such as chickweed and yellow bog sedge have been found in Antarctica.	Around 88% of waste (other than sewage or food waste) produced in Antarctica is recycled. Some is sent to landfill in the Falkland Islands.
Increasing numbers of tourists bring challenges for litter and waste disposal and mean new accommodation and roads need to be developed.	Recent research by the British Antarctic Survey has found no obvious impact of tourism on penguin breeding patterns.

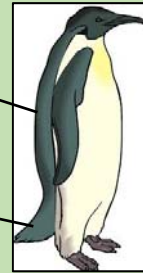
# Antarctica

## Memory Organiser

### Adaptations and Biodiversity

Thick waterproof and windproof coats to **keep out snow and wind**

A short, stiff tail for balance and to **minimise contact with the ice**



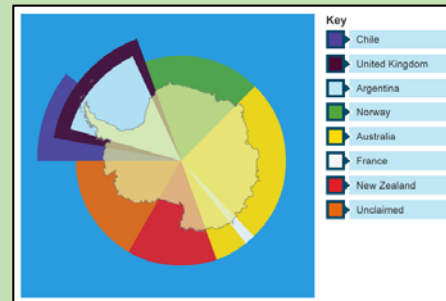
Colonies huddle together to **protect themselves from the extreme conditions**

Adults breed in winter to **ensure chicks are born in summer months when there is plenty of food**

- Biodiversity in polar regions is lower than in other biomes due to the harsh climate. However, the seas around Antarctica are a rich marine habitat.
- Antarctica makes up for having fewer species by having an abundance of each animal (e.g. crabeater seals).
- Some of Antarctica's biodiversity are also important resources (particularly fish and whales).
- As with any biome, the ecosystem is fragile. When the population of one species increases or decreases, this impacts on the entire food chain and wider food web.

### Governance

- Antarctica does not belong to a single country; throughout history, many nations have staked a claim to parts its territory. Currently, 7 countries 'own' a slice of Antarctic land and ocean.
- The Antarctic Treaty is an international agreement signed by 54 countries. It outlines the activities that can and cannot take place in Antarctica.
- Permitted activities include scientific experiments and environmental conservation.
- Prohibited activities include military action and dumping of nuclear waste.
- Antarctica does not have a permanent population; only scientists are allowed to live there year-round in the 48 research stations.



### Resources: a threat to Antarctica?

- Antarctica has a wide range of resources including minerals, marine life and large reserves of fossil fuels.
- The continent's potential has not been fully explored; the majority of known resources exist offshore or in the more accessible coastal zone.
- Antarctica also represents a scientific resource; scientists can study weather patterns, ecosystem adaptations and past climatic and geological changes.
- In the past, lack of governance has led to exploitation of Antarctica's resources. The Southern Ocean is currently protected by international agreements which ban whaling and limit fishing.
- Despite these rules, Japan caught 333 minke whales in 2016.
- Overfishing also remains a concern, and bycatch of bird species is common. Petrels and albatross often get caught up in fishing lines and drown.
- The potential for exploitation of Antarctica's unique resources remains an international concern, particularly for environmental groups.

### Climate Change: a threat to Antarctica?

#### Causes

The threat to Antarctica from climate change is two-fold; rising temperatures caused by the greenhouse effect, and solar radiation through the hole in the ozone layer over the continent.

#### Impacts

- Temperatures are rising more quickly in Antarctica than anywhere else on Earth. The continent has seen increases of 3°C in air temperatures and 1°C in ocean temperatures.
- Sea ice continues to melt, contributing to a rise in sea levels. Ice shelves are retreating and collapsing at a rate of 25,000km<sup>2</sup> since the 1950s.
- There has been a change in the breeding and migration patterns of penguins and other wildlife. Emperor Penguins have seen a decline of 50% in some areas.
- There has been a significant reduction in the number of krill (up to 80% since the 1980s), impacting on the entire food web.

#### Solutions

- Climate change must be tackled at a global, national and individual levels. The key focus must be reduction of greenhouse gas emissions to halt rising temperatures.
- Potential solutions include; increased use of renewable energy, energy-efficient homes and transport, changes in diet and farming and preventing deforestation.