

KNOWLEDGE ORGANISER

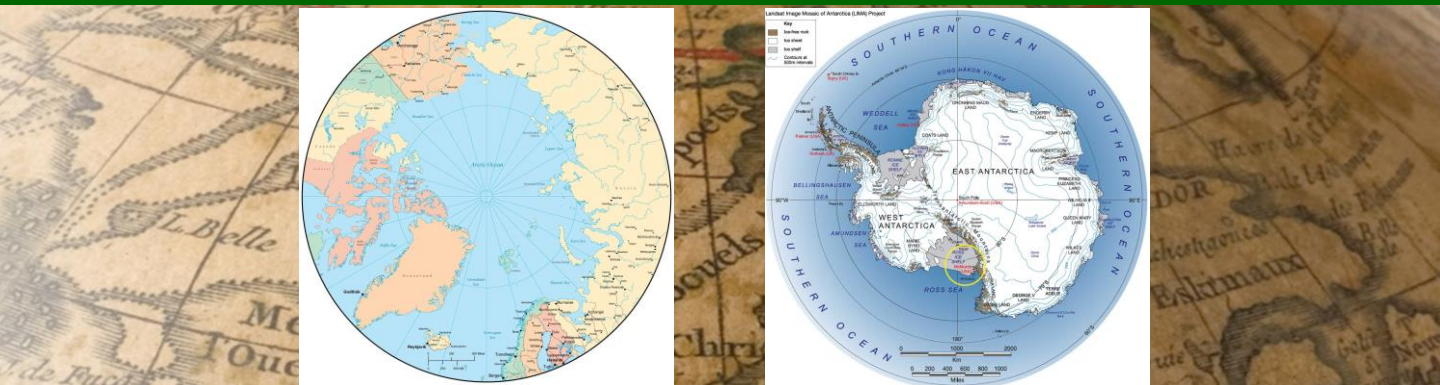
WORLD STUDIES

Year 9 Geography

Polar Regions

Name:

Class Teacher:



HOMework












Big Question	Task	Due Date
4	Complete recall quiz on page 9	
6	Complete recall quiz on page 13	
9	Revise for the Mid Unit test	

Key terms found in the glossary on pages 4 and 5 will be tested throughout the unit


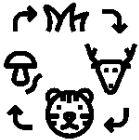






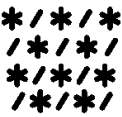


ENQUIRY QUESTIONS

1. Who discovered the Antarctic?
2. What are Antarctica's icy features?
3. Why is Antarctica's climate considered extreme?
4. How are animals adapted to life in Antarctica?
5. What role does tourism play in Antarctica? (*Career focus – Polar Conservationist*)
6. How is climate changing in Antarctica?
7. How is Antarctica managed?

GLOSSARY

Key term	Icon	Definition
Ablation		the loss of ice or snow from a glacier or iceberg, or the loss of rock or similar material, caused by a process such as melting or erosion
Abrasion		Blocks of rock in the base and sides of the glacier are scraped over the rock surface, just like sandpaper.
Biodiversity		The number and types of plants and animals that exist in a particular area or in the world generally
Biome		Large area characterised by its vegetation, soil, climate and wildlife.
Climate		The weather conditions in an area over a long period of time.
Climate change		changes in the world's weather, in particular the fact that it is believed to be getting warmer as a result of human activity increasing the level of carbon dioxide in the atmosphere
Condensation		Vapour being converted to a liquid
Crevasse		a very deep crack in the thick ice of a glacier (= moving mass of ice)
Deposition		The geological process in which sediments, soil and rocks are added to a landform or land mass
Erosion		The wearing away and transport of materials
Evaporation		Liquid being converted to water vapour

GLOSSARY

Key term	Icon	Definition
Extinction		a situation in which something no longer exists
Food chain		a series of living things that are connected because each group of things eats the group below it in the chain
Fossil fuels		fuels, such as gas, coal, and oil, that were formed underground from plant and animal remains millions of years ago
Geology		The science which deals with the physical structure and substance of the earth, their history, and the processes which act on them.
Greenhouse effect		an increase in the amount of carbon dioxide and other gases in the atmosphere (= mixture of gases around the earth), that is believed to be the cause of a gradual warming of the surface of the earth
Greenhouse gases		a gas that causes the greenhouse effect, especially carbon dioxide
Infiltration		(of water) to flow slowly down into the earth from the earth's surface, for example, through cracks in rocks
Pangea		the name given the one large area of land that began to break apart about 200 million years ago to create the present continents
Permafrost		an area of land that is permanently frozen below the surface
Plankton		very small plants and animals that float on the surface of the sea and on which other sea animals feed
Precipitation		Moisture that falls from the sky in the form of rain, hail, sleet and snow

BQ1. WHO DISCOVERED THE ANTARCTIC?

- Antarctica is the world's last great wilderness.
- It is a continent almost entirely buried by snow and ice.
- It is the fifth largest continent.



1773

Captain **James Cook** and his crew were the first people to cross the Antarctic Circle, although they never saw Antarctica itself.



1823:

British seal hunter, **James Weddell** sailed further south than anyone had ever gone before ($74^{\circ} 15'S$) – 345 kilometres further south than Cook's expedition fifty years before. The waters that he reached are now called the Weddell Sea.



1841:

Following orders to discover the South Magnetic Pole, British Royal Navy commander, **Sir James Clark Ross**, reached the sea now named after him. He also discovered Ross Island, Mount Erebus (named after Ross's ship) and the Ross Ice Shelf.



1911 (December):

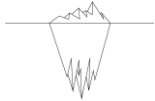
Norwegian **Roald Amundsen** and four other men were the first to reach the South Pole thanks to a new route that only took them 57 days. Amundsen planted a Norwegian flag and wrote two letters – one for the king of Norway, and one for the British Antarctic Expedition team led by Robert F. Scott.



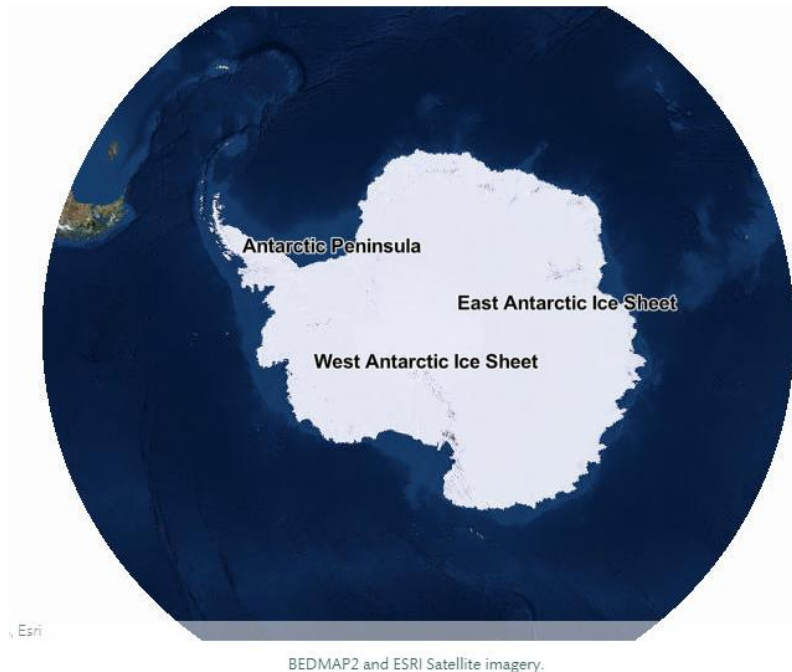
1912 (January):

Robert F. Scott, Edward Wilson, Edgar Evans and Lawrence Oates finally reached the South Pole only to discover that the Norwegian, Amundsen had got there 33 days earlier. Scott and his companions all died on their return journey.

BQ2. WHAT ARE ANTARCTICA'S ICY FEATURES?



Antarctica is a continent with bedrock under the thick ice sheet.



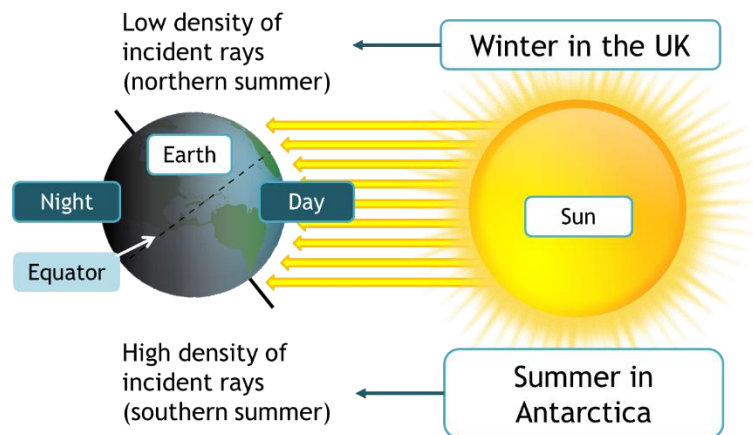
- **Ice sheets** - Antarctica is sub-divided into three different ice sheets, each with different characteristics: the giant East Antarctic Ice Sheet, the West Antarctic Ice Sheet, and the Antarctic Peninsula Ice Sheet.
- **Ice shelves** - Form when the ice from the land extends beyond the coast and floats on the water. Ice shelves surround 75% of the coastline of Antarctica.
- **Icebergs** - Icebergs are large chunks of ice which have broken off from marine-terminating glaciers or ice shelves, in a process called *calving*. They are made from freshwater.
- **Sea Ice** - **Sea ice** is frozen sea water. It floats on the surface of the ocean and is not permanently connected to the land.

BQ3. WHY IS ANTARCTICA'S CLIMATE CONSIDERED EXTREME?



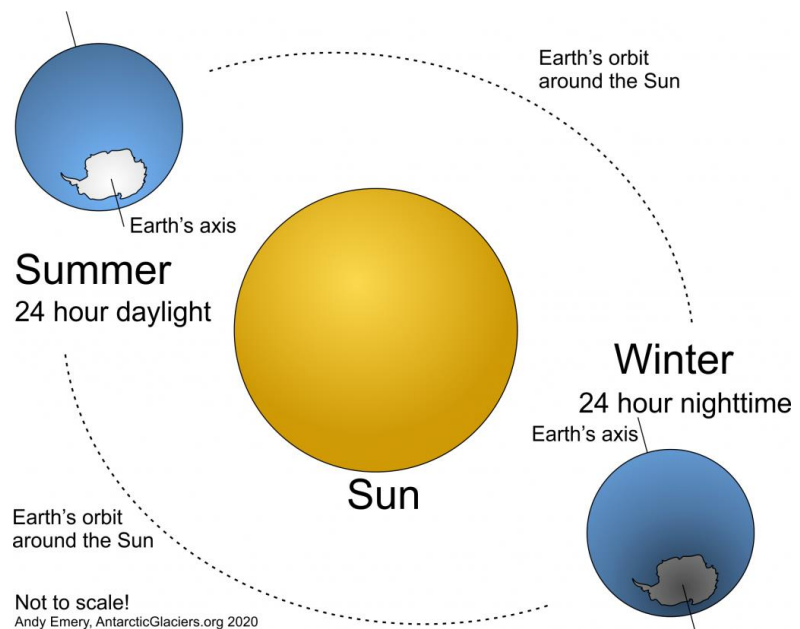
What is the climate like in Antarctica?

Summer occurs when you are tilted towards the sun. In Antarctica, because of the tilt the earth – this means that during the summer days can consist of 24 hours of sunshine.



Seasons in Antarctica

On the continent of Antarctica, there are only **two seasons**, winter and summer. Summer in Antarctica starts in October⁸ and ends in March, and winter starts in March and lasts until October.



POLAR HOMEWORK 1: ANSWER ALL QUESTIONS

What physical feature divides Antarctica? (1)	
What percentage of the world's fresh water is held in Antarctica? (1)	
Who was the first to reach the South Pole? (1)	
Why is Antarctica different to the Arctic? (2)	
Name two of Antarctica's ice sheets (2)	
What is the difference between sea ice and icebergs? (2)	
Describe the summer in Antarctica (2)	
Explain one reason why Antarctica is so cold (2)	
Explain one reason why Antarctica is so dry (2)	
When does summer occur in Antarctica? (1)	
During an El Nino year what direction are ocean currents flowing across the Pacific Ocean? (1)	
Between which lines of latitude do we find tropical rainforests? (1)	
What is the Intertropical Convergence Zone (ITCZ)? (2)	
Total out of 20:	

POLAR HOMEWORK 1: CHECK YOUR ANSWERS

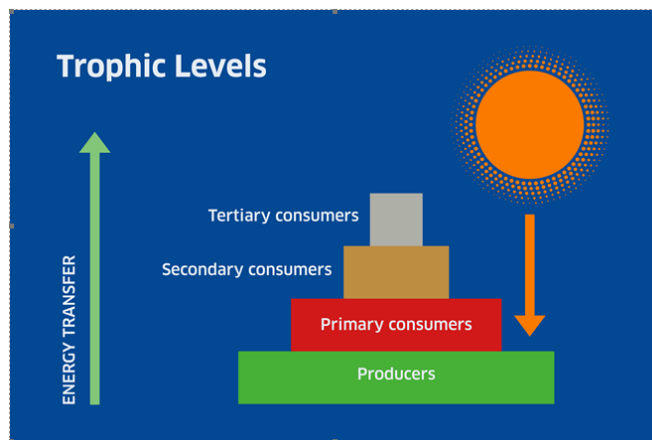
What physical feature divides Antarctica? (1)	Transantarctic mountains
What percentage of the world's fresh water is held in Antarctica? (1)	70%
Who was the first to reach the South Pole? (1)	Norwegian Roald Amundsen
Why is Antarctica different to the Arctic? (2)	The Arctic is ice floating on water (1) Antarctica is a continent (1)
Name two of Antarctica's ice sheets (2)	East Antarctic/ West Antarctic and Antarctic Peninsula Ice sheet
What is the difference between sea ice and icebergs? (2)	Sea ice is frozen sea water (1) icebergs are frozen freshwater (1)
Describe the summer in Antarctica (2)	24 hour sunshine (1) temperature of -27.5 (1)
Explain one reason why Antarctica is so cold (2)	High latitude (1) so the sunlight (insolation) hits the surface at a low angle (1)/ Snow and ice have a high albedo (reflectivity) (1) so 85% of the insolation is reflected back (1)
Explain one reason why Antarctica is so dry (2)	Cold air doesn't hold much water vapour (1) /polar high pressure (1) means cold air is sinking(1) /continentality (1) – it is a large landmass far from the sea (1)
When does summer occur in Antarctica? (1)	October to March
During an El Nino year what direction are ocean currents flowing across the Pacific Ocean? (1)	Moving west to east (from Indonesia/Australia to South America)
Between which lines of latitude do we find tropical rainforests? (1)	Tropic of Cancer and Capricorn
What is the Intertropical Convergence Zone (ITCZ)? (2)	It is a belt of low pressure (1) (rising air) formed by convectional rainfall and warm moist air (1).
Total out of 20:	

BIG Q4. HOW ARE ANIMALS ADAPTED TO LIFE IN ANTARCTICA?



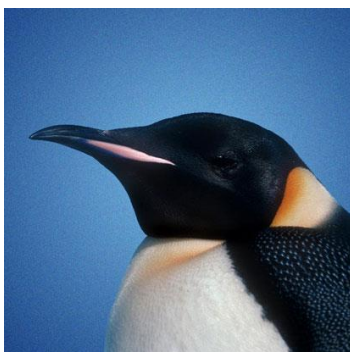
Antarctica's food web

There would be no life in the Southern Ocean around Antarctica without energy from the sun. Through **photosynthesis**, microscopic plants called **phytoplankton** that float near the water's surface trap and use the sun's energy to grow.



B. A layer of fat called blubber stops them from losing too much heat from their bodies. Extra warmth comes from the air that is trapped in their fur.

C. They are born big and fat, and grow very quickly. They can put on as much as 10 kg a day. By being bigger they can conserve heat more efficiently.



D. On land during the long, dark winter, the males huddle together in groups (sometimes in thousands) to keep warm, taking it in turns to stand on the outside of the group.

F. Their black and white colouring helps to camouflage them from predators in the water.

BQ5 AND BQ 6. WHAT ROLE DOES TOURISM PLAY IN ANTARCTICA?



Tourism in Antarctica

- Antarctica's first tourists arrived in 1958. In those days, visitor numbers were very small, but that's changed over the last 50 years.
- The number of visitors to Antarctica has shown a steady increase over the past 20 years.
- Between 2020-2021 due to the COVID-19 pandemic, there were only 15 landed visits.

Why has tourism in Antarctica increased?

- The Antarctic tourism industry is growing as people are becoming increasingly interested in extreme environments and want to learn more about them.
- Increased flexible work patterns and the progression to more affordable travel are enabling more and more people to visit.
- The impact of climate change and environmental issues has caused some tourists to want to go to locations before they are gone.
- About 40,000 people visit Antarctica every year.



POLAR HOMEWORK 2: ANSWER THE FOLLOWING

Describe one physical adaptation of an animal in Antarctic (2)	
Describe one behavioural adaptation of an animal in Antarctic (2)	
What percentage of the world's fresh water is held in Antarctica? (1)	
Who was the first to reach the South Pole? (1)	
Explain one reason why Antarctica is so cold (2)	
Explain one reason why Antarctica is so dry (2)	
Name the microscopic plants in the oceans (1)	
Name a predator at the top of the food chain in the Antarctic (1)	
From what country do most tourists to Antarctica come from? (1)	
During what months does the tourist season occur in Antarctica? (1)	
State two rules in place to prevent tourists from damaging Antarctica (2)	
Explain one way in which deforestation contributes to climate change (2)	
Total out of 18:	

POLAR HOMEWORK 2: CHECK YOUR ANSWERS

Describe one physical adaptation of an animal in Antarctic (2)	Antarctica Cod (1) can slow down their heartbeat as low as 10 beats per minute to survive in the cold water (1)/ Elephant seals (1) have a layer of blubber to stop them losing heat (1)
Describe one behavioural adaptation of an animal in Antarctic (2)	Emperor penguin (1) the males huddle together in groups to keep warm in the winter (1)/ Killer whale (1) during the winter they move north to warmer waters (1)
What percentage of the world's fresh water is held in Antarctica? (1)	70%
Who was the first to reach the South Pole? (1)	Norwegian Roald Amundsen
Explain one reason why Antarctica is so cold (2)	High latitude (1) so the sunlight (insolation) hits the surface at a low angle (1)/ Snow and ice have a high albedo (reflectivity) (1) so 85% of the insolation is reflected back (1)
Explain one reason why Antarctica is so dry (2)	Cold air doesn't hold much water vapour (1) /polar high pressure (1) means cold air is sinking(1) /continentalty (1) – it is a large landmass far from the sea (1)
Name the microscopic plants in the oceans (1)	Phytoplankton
Name a predator at the top of the food chain in the Antarctic (1)	Orca/Killer whale
From what country do most tourists to Antarctica come from? (1)	USA
During what months does the tourist season occur in Antarctica? (1)	November and March
State two rules in place to prevent tourists from damaging Antarctica (2)	Group sizes restricted to 20/ keep 5m away from wildlife/give birds the right of way
Explain one way in which deforestation contributes to climate change (2)	When forests are cut down, carbon absorption cease (1) but also the carbon stored in the trees is released into the atmosphere as CO ₂ (1)/ if the wood is burned or even if it is left to rot after the deforestation process(1) / Forests store up to 100 times more carbon than agricultural fields of the same area. (1)
Total out of 18:	

BQ7 AND BQ8. HOW IS CLIMATE CHANGING IN ANTARCTICA?



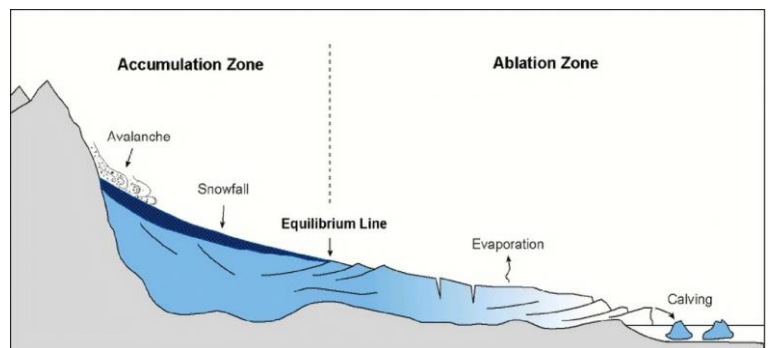
What is Climate Change?

- Globally, temperatures are rising at an unprecedented rate, not controlled by natural variability, but instead through human activity.
- The burning of fossil fuels, along with cutting down forests and the increase in agriculture, all result in a rise in greenhouse gases emitted to the atmosphere causing the Earth's temperature to rise.



Climate change is already having impacts on Antarctica.

- Antarctica is the world's largest store of freshwater. It is continuously gaining mass (**accumulation**) through snow falling onto the continent.
- At the same time of this accumulation, Antarctica is also losing mass (**ablation**) through ice melt, and the break off (*calving*) of icebergs.



Warming Oceans

- As the oceans are warming, these currents are also getting warmer.

BQ9. HOW IS ANTARCTICA MANAGED?

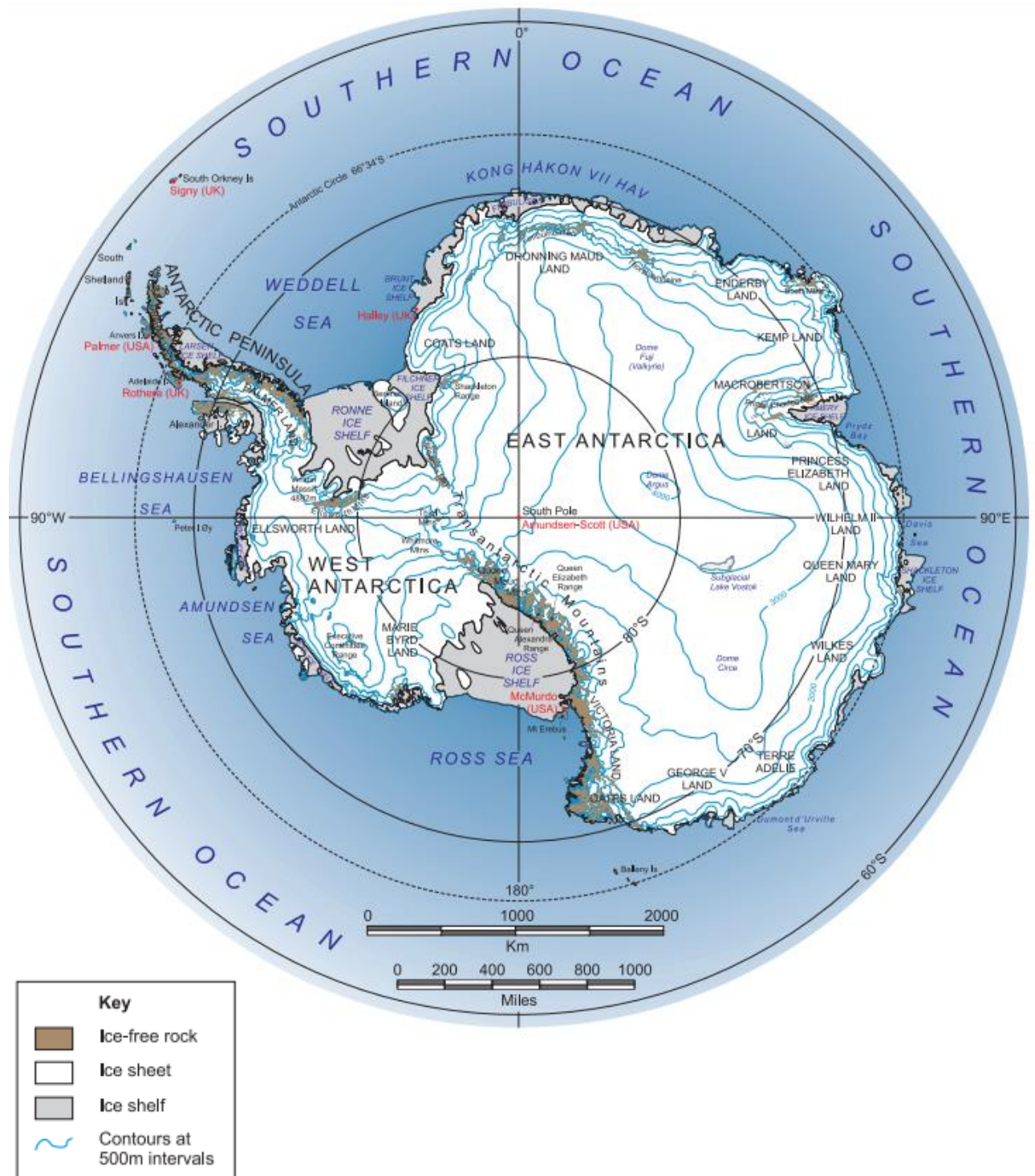


The Antarctic Treaty system ensures that Antarctica is protected as a place for peace and science..

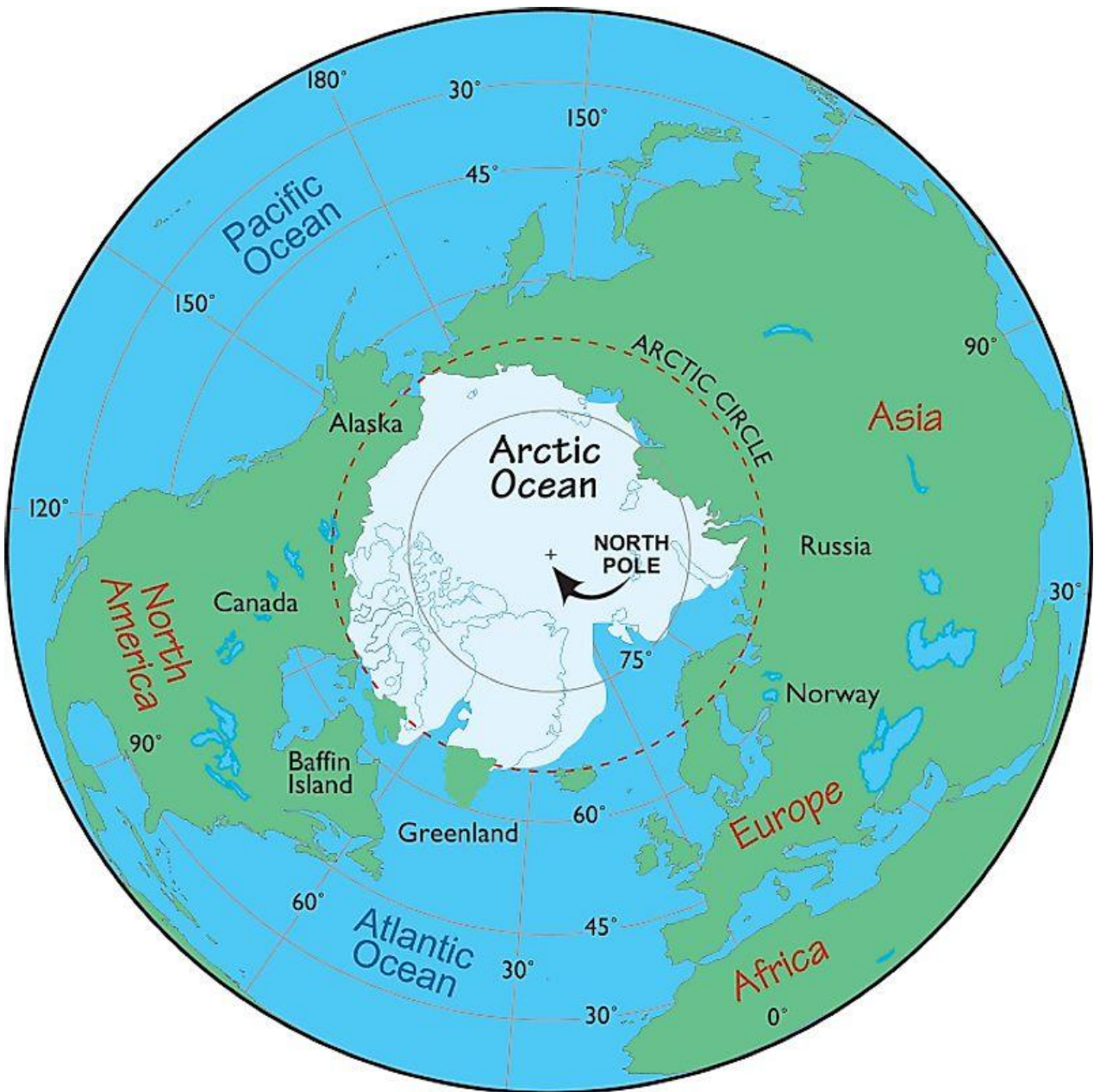
An outline summary of the 14 articles of the Antarctic Treaty:

1. No military use shall be made of Antarctica, though military personnel and equipment may be used for peaceful purposes.
2. There will be complete freedom of scientific investigation.
3. Antarctic Treaty Nations will exchange plans for their scientific programmes, scientific data will be freely available and scientists will be exchanged between expeditions where practical.
4. All territorial claims are put aside for the duration of the Treaty. No activities under the Treaty will affect claims to sovereignty of any part of Antarctica made by any nation.
5. Nuclear explosions and nuclear waste disposal are banned from Antarctica.
6. The Treaty applies to all land and ice shelves south of 60° South, but not to the seas.
7. All Antarctic stations and all ships and aircraft supplying Antarctica shall be open to inspectors from any Treaty nation.
8. Observers and exchange scientists shall be under the jurisdiction of their own country regardless of which national station they may visit. National laws do not apply to stations or areas, but only to the citizens of those countries.
9. Treaty nations will meet to consider ways of furthering the principles and objectives of the Treaty. Attendance at these meetings shall be limited to those countries that are engaged in substantial scientific research activity in Antarctica. Unanimous approval will be necessary for any new measures to become effective (i.e. everyone has to agree).
10. All Treaty Nations will try to ensure that no one carries out any activity in Antarctica that is against the Treaty.
11. Any dispute by Treaty Nations, if not settled by agreement, shall be determined by the International Court of Justice.
12. The Treaty may be modified at any time by unanimous agreement. After 30 years any consultative Party may call for a conference to review the operation of the Treaty. The Treaty may be modified at this conference by a majority decision.
13. The Treaty must be legally ratified (agreed to) by any nation wishing to join. Any member of the United Nations may join as well as any other country invited to do so by the Treaty Nations. All notices and records are deposited with the Archives of the United States of America.
14. The Treaty translated into English, French, Russian and Spanish was signed on 1st December 1959 by 12 states and entered into force on 23rd of June 1961.

MAPS - ANTARCTICA



MAPS - ARCTIC



PREPARING FOR YOUR ASSESSMENT

Locational Knowledge

- ☐ Polar Regions location in the world
- ☐ Countries in the Arctic Ocean
- ☐ Physical features in the Polar Regions

Physical Geography

- ☐ Climatic regions in the Polar Regions
- ☐ Antarctica's physical features such as ice sheets.
- ☐ Know the difference between weather and climate
- ☐ Know that Antarctica has two seasons.
- ☐ Know how animals have adapted to live in Antarctica
- ☐ Understand food webs.
- ☐ Know what climate change is

Skills

- ☐ Use coordinates to locate key locations on a map
- ☐ Use maps to describe physical features – topography.
- ☐ Identify the scale of ice cover on a map.
- ☐ Plot and describe a climate graph for Antarctica.

Human Geography

- ☐ Know who discovered Antarctica
- ☐ Know how human activity is impacting food webs.
- ☐ Understand how tourism plays a part in Antarctica
- ☐ Know the impacts tourism has on local wildlife
- ☐ Know how humans are enhancing climate change
- ☐ Know the global implications of sea level rise.
- ☐ Know what the Antarctic treaty is and how it is used.

WIDER READING



Wider reading is a vital skill in geography in order to extend your knowledge. For each book listed here that you read, write a book report outlining your thoughts and you will **receive 30 house points**.

