Geography Summer work 2024

Hello and Welcome to A Level Geography – Well done on picking what we consider to be one of the best A' Levels to do.

Can we thank you for all your hard work over the last year and wish you all the best for your results in the summer.

In Year 12 one of the topics you will be studying is Cold Environments and Glaciers – Including a great trip to the Lake District in March.

You have 4 tasks to complete over the summer

Task 1

Locate these top 10 glaciers onto a world map

1 Kennicott Glacier Alaska

2 Wothington Glacier Alaska

3 Trapridge Glacier Canada

4 Greenland Ice sheet

5 Palisade Glacier, Sierra Nevada

6 Glacier d'Argentiere, Savoie Alps

7 Rhone Glacier, Bernese Alps

8 Bogdanovich Glacier E Russia

9 Khumbu Glacier, Himalayas

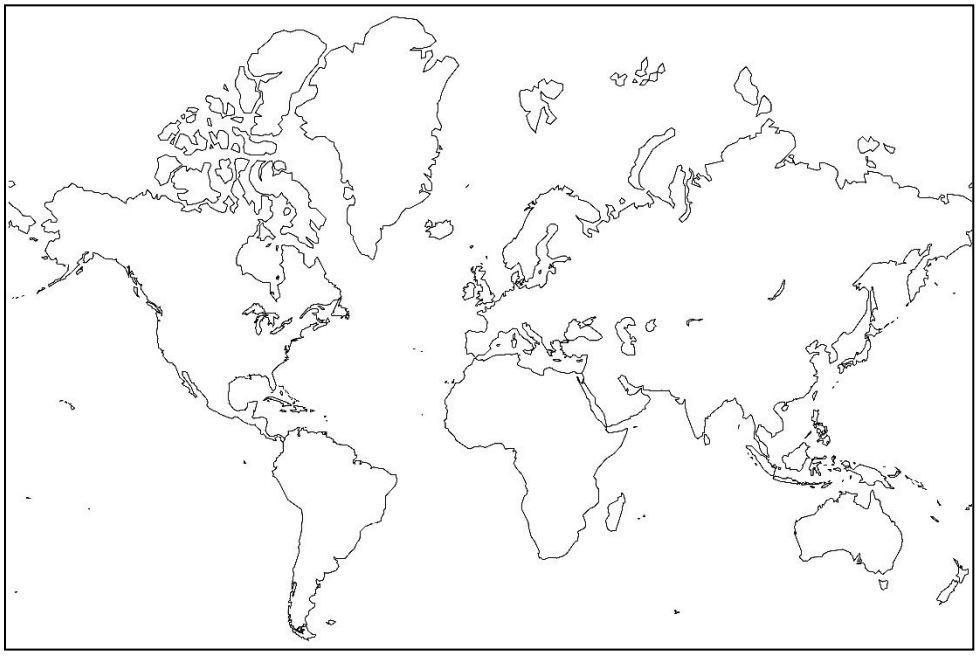
TASK 2 - Climate Regions – The Tundra

The first climate region we are looking at is the Tundra. The Tundra is located near the top of the world and covers around 1/7th of the Earths surface. It is one of the coldest and harshest places in the world and is the most fragile climate region on Earth.

We already know that the Tundra is cold because the suns rays are scattered over a larger surface area than at the Equator. Also the heat from the sun has to pass through a larger area of atmosphere and so a lot of this heat is either absorbed or reflected back out to space.

1. What is another reason why the Tundra is so cold?

Shade in the map below showing the distribution of the Tundra in BLUE. Use the internet to help you with this.



Q1. Describe the distribution of the Tundra from your map using named locations of continents (and countries if you can).

_____

_____

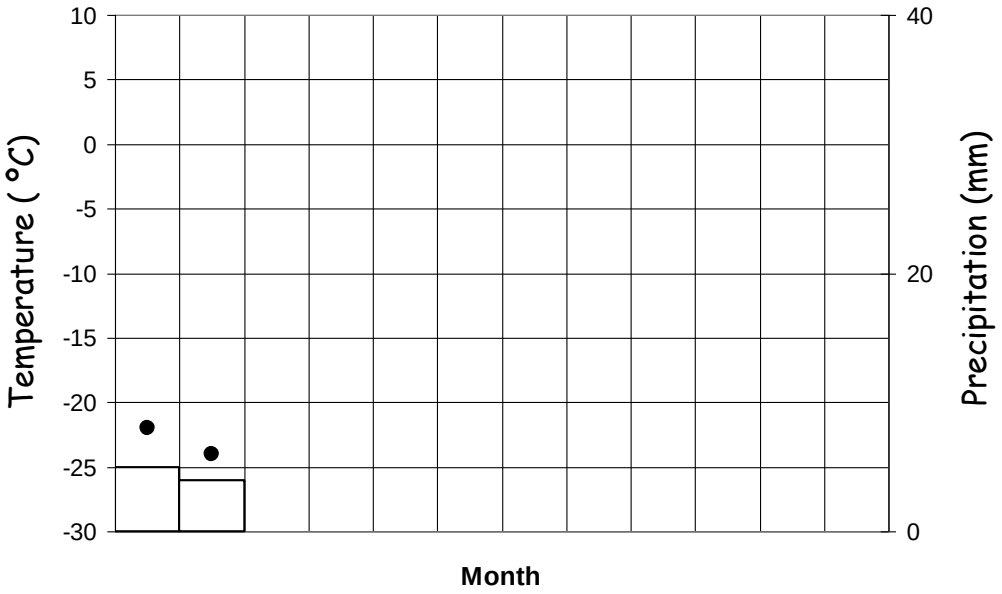
_____

2

Complete the climate graph below for Barrow, Alaska. Plot the temperature as a LINE graph in RED and the rainfall as a Bar Graph in BLUE.

When you have done this, answer the questions below.

	J	F	M	A	M	J	J	A	S	O	N	D
Temperature	-22	-24	-23	-15	-4	4	7	6	1	-8	-16	-21
Rainfall	5	4	4	4	4	8	22	25	16	12	6	4



Q1. What is the highest monthly temperature in Barrow? _____

Q2. What month has the lowest temperature? _____

Q3. What is the wettest month? _____

Q4. What is the total rainfall for the whole year? _____

Q5. Is the annual temperature for Barrow mostly above freezing or below?

_____

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Extra Questions

Q5. In what month is the average rainfall 4mm and the average temperature -21°C?

_____

Q6. In what month is the average rainfall 8mm and the average temperature 4°C?

_____

Q7. What is the average temperature over the whole year? _____

Q8. Why do you think the Tundra is sometimes called a Cold Desert?

_____

_____

Tundra Landscape

Read Resource 1 below about the landscape of the Tundra. Answer the questions below.

Resource 1

The name Tundra comes from the Finnish word *tunturi* which means treeless plain. For most of the year the Tundra is covered in snow, but in summer some of this will melt away. Because of the very harsh climate it is extremely difficult for anything to grow there. Plants and animals have to be well adapted to survive and both are very vulnerable to any slight changes in the environment. The foundation of the whole Tundra ecosystem rests on a layer of ground called the Permafrost. This permafrost is a frozen layer of soil and dead plant material that in some places extends to almost 450 metres under the surface. In much of the Arctic it is frozen all year round. In the southern regions, the surface layer above the permafrost melts during the summer and this forms bogs, marshes and shallow lakes that invite an explosion of animal life. Insects swarm around the bogs, and millions of migrating birds arrive to come and feed on them.

Because of global warming, the autumn freeze comes later in the year and more of the permafrost is melting. Shrubs and spruce that previously couldn't take root on the permafrost now dot the landscape, potentially altering the habitat of the native animals.

Another major concern is that the melting of the permafrost is actually contributing to global warming. It is estimated that about 14 percent of the Earth's carbon is tied up in the permafrost. Until recently, the tundra acted as a carbon sink and captured huge amounts of carbon dioxide from the atmosphere as part of photosynthesis. This process helped keep the amount of this greenhouse gas from accumulating in the atmosphere.

Today, however, as the permafrost melts and dead plant material decomposes it releases Carbon Dioxide (CO^2) into the atmosphere.

3

Q1. Why is there very little plant life in the Tundra? _____

_____

Q2. Why are there no Trees in the Tundra? (Think about how the Permafrost would stop trees growing) _____

_____

_____

Q3. What problems are caused by the melting of the Permafrost?

_____

_____

_____

_____

TASK 3 - Should Antarctica be developed in the future?

SEAL AND PUP IN ANTARCTICA
' We must not lie here too long, mum or we will get sun burnt'
PHOTOGRAPH BY Me mum

Read a letter from someone working in the Antarctic!

Your Task: You are going to be a reporter for a Sunday Supplement Magazine. You have been asked to produce an article posing the question 'Should Development Be Allowed in the Future in Antarctica?' Remember that some people will have very little knowledge of this area of the world and might even have incorrect pictures in their minds of polar bears and igloos, so you need to include plenty of background information and pictures. The article should have the following four sections.

It is important that certain key words (underlined and in bold type) are understood before the project commences.

1. **Introduction** - Where is it? How far away from the UK is it? How long would it take to get there? Size? Describe the climate (include temperature, wind and precipitation) Hours of daylight in winter and summer? Scenery on the coast and inland? Plants and wildlife on land and in the sea?

2. **Ownership or Control?** - Who owns or controls Antarctica? What treaties are in place at the moment over the area? What are their aims?

3. **The Reasons for Development of Some Kind** - What types of resources can be found in Antarctica? Look in particular at minerals and fishing. Why would some countries wish to exploit these resources? What about fishing for krill? Why would any of this development be very difficult? Tourism - why do people want to visit Antarctica? Where would they go? How would they get there? Which countries have bases on Antarctica? Where? Why? (Refer to the scientific work and why it is done in this area of the world) Is it necessary? Is this what you would call development? How do the people survive? What is every day life like ?

4. **The Reasons for not Developing** - Describe the types of problems that might occur if minerals were mined and fishing were allowed on a bigger scale. Refer to the effects on the environment (ecosystems, sea, landscape) and bring in the term pollution. Would exploitation be sustainable on a small scale in just some areas? What problem could tourism bring to the area? Think about the needs of tourists and the danger of the environment. Who would rescue them if there were an emergency? Is tourism

sustainable on a small scale? What effect do the present bases have on Antarctica? Are they trying to limit the effect? How?

5. **The Decision** - Should development be allowed in the future? There are a few options.
a. No development at all
b. Limited development
c. Some development in just some areas
d. Development
Please give reasons for your decision. How would you like this to be carried out

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Web Sites

There are a huge range of good sites which include ones set up by the research centres and those set up by people who have worked out in Antarctica. Try just typing in 'Antarctica' in a search engine!

Good sites to follow are:

1. British Antarctic Survey http://www.antarctica.ac.uk/
This is an excellent site that is being revised all of the time. It is possible to read the diaries of people who are out on the bases now. Photographs could be copied and annotated for inclusion in the project or they could be used to draw 'field sketches. There are regular updates of the weather situation and the different types of research that are going on.

2. Virtual Antarctica http://www.terraquest.com/va/index.html
Pretend that you are visiting Antarctica!

3. Australia in the Antarctic http://www.antdiv.gov.au/env

4. New Zealand in the Antarctic http://www.antarcticanz.govt.nz/
This site is good for research on the life of the people working in Antarctica.

5. Gateway to Antarctica http://www.anta.canterbury.ac.nz/

6. The Antarctic Connection http://www.antarcticconnection.com/
This has a lot of good general information, but also includes quite a bit on tourism.

7. Live Camera Links http://bat.phys.unsw.edu.au/~aasto/ mean you really can see it is dark at midday in June. http://www.antdiv.gov.au/stations/casey/video.html

8. An excellent site from the Australian Government - click the Going South button to reveal all sorts of personal stories. http://www-new.aad.gov.au/default.asp?

The Antarctic Treaty

Ask the Expert

Henry Burgess

Deputy Head, Polar Regions Department, Foreign and Commonwealth Office

Henry Burgess is the Deputy Head of the Polar Regions Department at the Foreign and Commonwealth Office. He is responsible for the administration of the British Antarctic Territory, including ensuring its long term security and protection and has a role in advising the UK government on all things Antarctica. He represents the UK in international discussions about the Antarctic environment. We talked to him about the Antarctic Treaty.

What exactly is the Antarctic Treaty?

The Treaty, which dates from 1959, governs all activities in Antarctica. It puts in place a unique and globally important system of international governance and establishes the continent as a region exclusively for peace and science. It also prohibits military activity and sets aside all territorial claims. Subsequent agreements reached under the Treaty system have widened its remit to cover conservation of marine living resources, including highly regulated fishing in Antarctica and nearby areas of the Southern Ocean; implemented practical measures to protect the environment; and prohibited the commercial extraction of the potential mineral wealth of this vast, but vulnerable continent.

Why was it originally needed and what were the most concerning threats at the time it was signed?

Only seven countries have ever formally claimed parts of Antarctica: the United Kingdom, Argentina, Australia, Chile, France, New Zealand and Norway. During the 1940s and 1950s the competing claims between the UK, Chile and Argentina in the Antarctic Peninsula caused international tension. There was also Cold War disagreement between the then USSR and the United States about their potential claims and future use of Antarctica. Possible military and diplomatic conflict was seen as the most pressing threat. However, the International Geophysical Year (IGY) in 1957-58 demonstrated successfully that countries with an interest in Antarctica could work together on scientific research. This collaboration eased tensions and provided a rationale for countries to look for a way to better manage what was increasingly seen as a precious scientific asset. This led directly to the creation of the Treaty, signed in 1959 in Washington DC.

Why do you think it has been so successful?

There are probably four main reasons why many people think Treaty has been so successful and why countries continue to join: there are now fifty one Parties, representing over eighty percent of the world. Firstly, it is short: the central Treaty document has only fourteen separate Articles, but it has proved itself to be relatively adaptable in terms of keeping pace with developing environmental concerns. Secondly, it is easily understandable. The prohibitions on commercial mining, nuclear testing, military forces and the focus on sharing scientific research are clear. Also, the annual decision-making body is a consensus organisation so in effect every one of the twenty nine Consultative (voting) members has a veto over any changes they do not support. Finally it sets aside territorial issues so the seven original claimants' territorial aims are neither denied nor resolved – essentially Parties have agreed to disagree.

(Source: Henry Burgess)

As time goes on, how might the threats to Antarctica change?

The threats to Antarctica as perceived in 1959 were clear. Armed conflict, nuclear testing and radioactive waste disposal, diplomatic wrangling over land and assets and a general concern that countries could not be trusted to do the right thing were all big issues. In the 1990s the threats became more environmental. The possibility of commercial mining, unfettered building and other construction and the absence of any specially protected areas became priorities. Some people believe that those concerns have now, to some extent, been addressed through the Treaty and related agreements. However as we learn more about Antarctica we know that the twin-track threats of human activity – particularly the cumulative impact in certain locations and any big increases in visitor numbers – and the rapidly accelerating effects climate change, especially in the Peninsula and in the West Antarctic Ice Sheet, may emerge as significant threats.

Research, by its very nature, can sometimes be intrusive on an environment. What compromises on environmental protection have had to be made in order to continue geographical research in Antarctica?

The Environmental Protocol (part of the Treaty System) commits the Treaty nations to '*comprehensive protection of the Antarctic environment'* through a variety of means. One of the most important of these is that all activities, including research, require an Environmental Impact Assessment before they go ahead. This essentially means that each country needs to balance whether the expected positive results of the activity will outweigh the damage that might be caused to the natural environment. In theory, the more significant the damage – such as the building of a runway, the establishment of a new research facility or research involving large numbers of animals – the greater the benefit to the wider scientific community will have to be. But it remains a concern of some Parties that these assessments may not always be as rigorous or as joined-up internationally as they could be. In the end there is no mechanism within the Treaty System of blocking such proposals.

(Source: Henry Burgess)

Can the management structure of the Antarctic Treaty be successfully mirrored in other large scale treaties (such as those on climate change)?

At the heart of the Treaty is the fact that the seven original claimants have agreed to set aside their territorial claims and not enforce their claims against others. All Parties have promised not to make new claims. For all intents and purposes Antarctica is a shared space. Whilst it is possible to think of other global spaces as sharing elements of this sense of shared space it is hard to imagine countries setting aside their territorial claims where there are existing industries, populations and strategic interests. Part of the initial attraction of the Treaty in Antarctica was that there was relatively little that countries had to sacrifice and a great deal to be gained in avoiding future conflict.
But it may be that the focus within the Treaty on the central role of the region as one for peaceful activity and science is something that could be mirrored in other areas.

(Source: Henry Burgess)

The Treaty covers everything that happens south of the 60°S latitude line. Given that Antarctica is influenced by physical processes that could happen anywhere, is there an argument for making the Treaty more global in its scope?

It is true that the Antarctic is affected by – and in turn affects – global issues, not least in terms of climate. Research stations in the Antarctic Peninsula have recorded an increase in the average annual temperature of 3°C in the last sixty years; one of the fastest incidents of warming anywhere in the world. This already seems to be having an effect on the local environment – particularly glacier size, snowfall and penguin breeding patterns. The Antarctic Treaty System already looks beyond the 60°S latitude line though; the fisheries use and conservation regime covers the sub-Antarctic islands and extends in places up to 45°S: roughly equivalent to the south of New Zealand. But it is hard to see any extension of the Treaty's provisions into the global setting being agreed, for all the reasons why many people think the current Treaty has been successful.

Why is there not a matching treaty that covers the Arctic Circle?

The main reason why there is no Arctic Treaty is because, unlike Antarctica, the Arctic is an ocean surrounded by land. This means that there is already an extensive legal framework that applies to it. Firstly, all the land in the Arctic falls within the territory of one of the eight Arctic States (Canada, the Kingdom of Denmark, Finland, Iceland, Norway, Russia, Sweden and the United States). Their national laws apply to this Arctic land. Secondly, the Arctic Ocean, as with all seas of the world, is covered by internationally agreed laws of the sea, such as the United Nations Convention on the Law of the Sea (UNCLOS). Although there is occasionally talk about the value of such an Arctic Treaty, the countries of the Arctic, and many others around the world, therefore see no need to create an additional legal framework enshrined in a Treaty.

Task 4 – The Antarctic Treaty

1. Read the sheets on 'ask the expert' and make some notes on the following:
2. What is the Antartic Treaty?
3. Why was it needed and what was its greatest threat?
4. Why has it been successful?
5. How are threats to Antarctica changing?
6. What compromises on the environment have had to be given?
7. Should the treaty be made more global?