

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 Earth's 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 sun's 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.

What is another reason why the Tundra is so cold?

Task 1

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



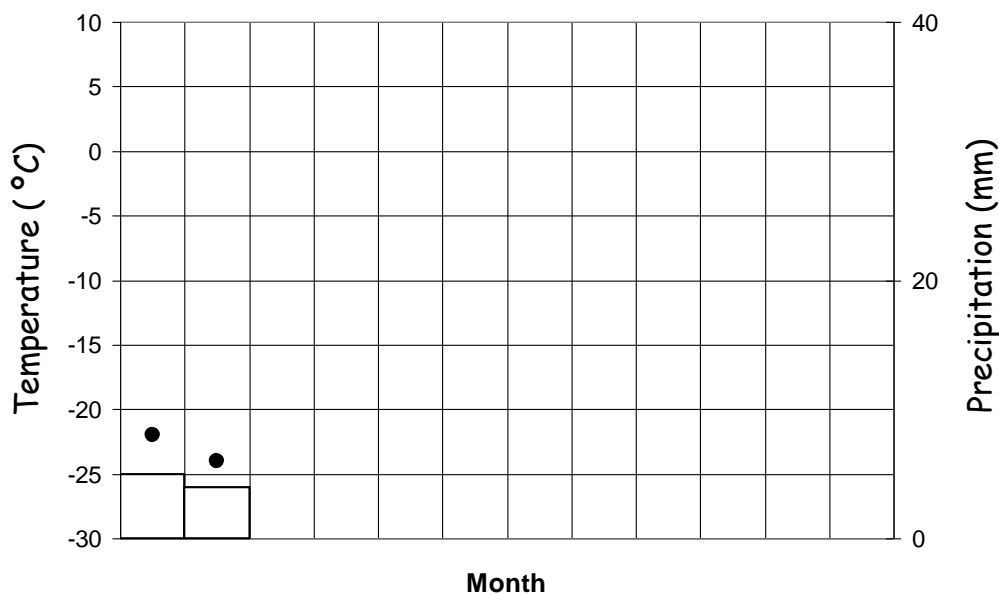
Q1. Describe the distribution of the Tundra from your map using named locations of continents (and countries if you can).

Task 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?

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.

Task 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?