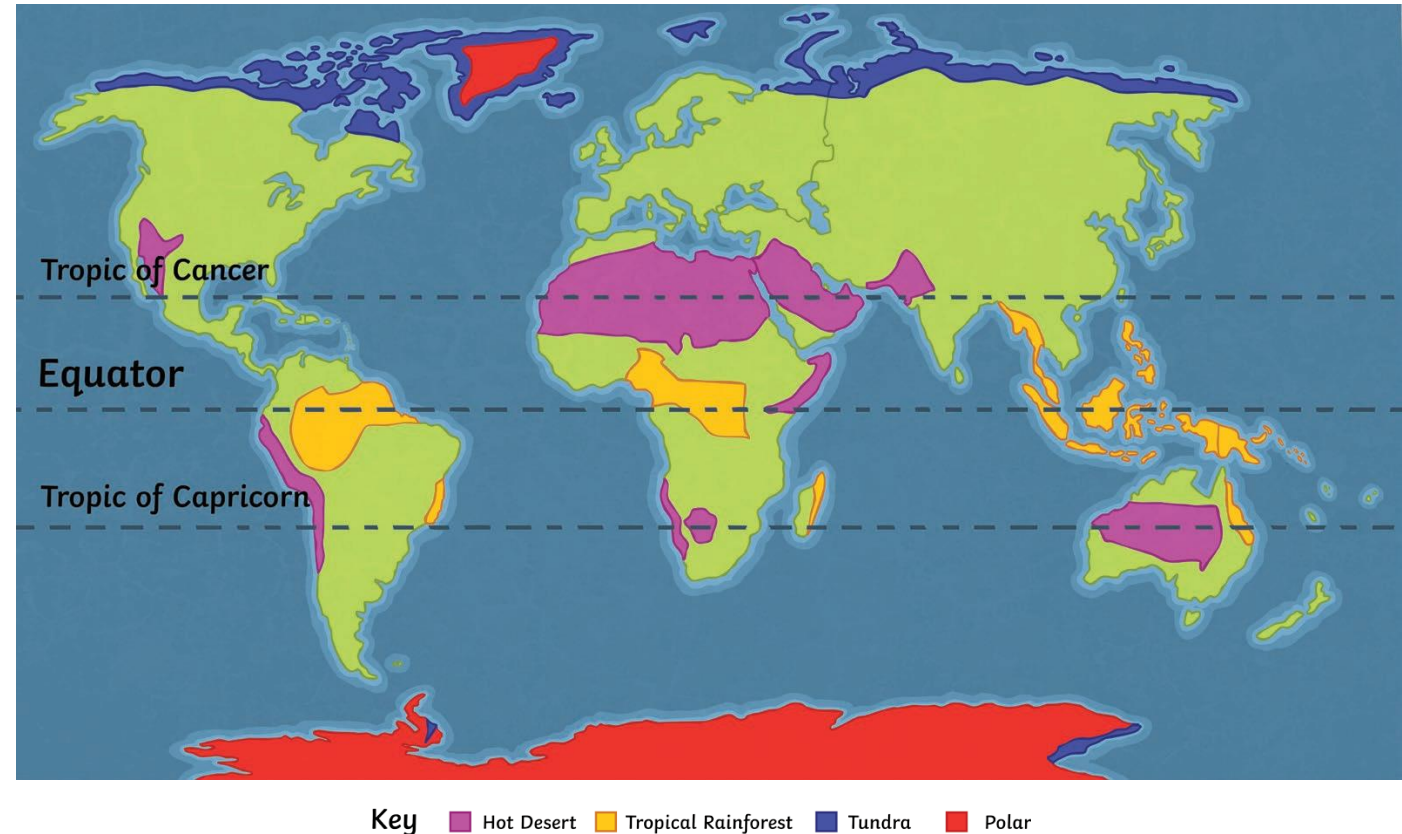


## The Value of Cold Environments and Why They Should Be Protected

- Tundra is very fragile; small changes will destroy plant and animal life. Plant growth is very slow; it takes a long time for Tundra to recover from any changes.
- Polar ice is melting. This provides hunting ground for predators (e.g. polar bears) which is being lost and these species face extinction.
- Melting polar ice causes sea levels to rise and can change the temperature of the oceans.
- Oil spills can destroy habitats and kill animals e.g. the Exxon Valdez oil tanker spilt between 257,000 to 750,000 barrels of oil when it ran aground in Alaska's Prince William Sound. Up to 250,000 seabirds, 2,800 sea otters, 300 seals and over 200 bald eagles were killed. The spill damaged over 1000 miles of Alaska's coastline.
- Tundra traps CO<sup>2</sup> in the permafrost. This is because the cold temperatures do not allow plants and animals to rot when they die, storing CO<sup>2</sup> in the ground. This CO<sup>2</sup> is released if the permafrost thaws, which could cause global warming.
- Tundra is a valuable wilderness area which should be conserved to protect the unique biodiversity found there.

## Global Distribution of Cold Environments

- All of the world's tundra is found in the northern hemisphere (Antarctica is polar ice).
- Tundra is found within the Arctic circle (66° N).
- Polar ice ecosystems are found near the north pole (90° N) and the south pole (90° S).

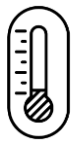


## Year 9 Cold environments KO

### Cold environment characteristics

Cold environments are fragile and easily damaged.

They make up 35% of our planet and are found at the north and south poles.



Average temperature is around 0°C which means the areas are largely covered in snow and ice.

Cold environments are only above freezing for 3 months a year, this is when the vegetation can grow.

Plants and animals have to adapt to cold, dry, windy conditions. These areas also have prolonged dark periods during the winter. Some animals which adapt to these conditions are arctic hare, polar bears and arctic foxes. Plants include bear berry and lichen.

### Challenges for development in cold environments



Extreme temperatures due to lack of insolation for part of the year, and other factors, mean people have to adapt their way of life to survive by wearing suitable clothing and adopting a hunter-gatherer way of life.

Permafrost is permanently frozen ground, when this thaws the soil becomes mobile and any structures or infrastructure attached to it can get damaged. People build structures on stilt so the risk is reduced. Roads are made from gravel so they can move and pipes are above the ground to prevent freezing.

Inaccessibility is a problem as most the roads break in the winter as the ice and permafrost melts. Most places are more accessible in the winter when roads are frozen.

### Exploitation of cold environments - Svalbard

Tourism – over 70 000 people visit Svalbard a year, mainly on cruise ships, the harbour has been enlarged for more ships. 300+ people are employed in tourism



Mineral extraction – more than 300 people are employed in coal mining. A new min opened in Svea in 2014.

Energy – Longyearbyen coal power station creates enough energy for Svalbard. There is research into how geothermal energy and carbon capture can be used in Svalbard.



Fishing – Over 150 species of fish around Svalbard create amazing fishing grounds which have to be protected from over fishing and water pollution.

### Managing of cold environments

Tourism – IAATO tries to limit tourist damage on Antarctica by limiting boat size to 500 passenger, stopping people going into SSSIs, ensuring companies keep to the policies in place.

Use of technology – Trans-Alaskan oil pipeline can move in case there is an earthquake. Its on stilts so animals can migrate. It stops pumping if the pipe cracks so oil doesn't spill.



International agreement – US government have created the Western Alaska reserve area which cannot be developed. NOAA ensures sustainable fishing. Antarctic treaty prevents any economic development on Antarctica. The WWF work with local communities and people in Canada to protect the environment and people.