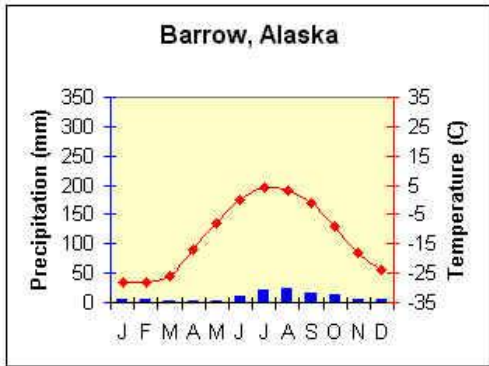


Polar environments – These are found in inland areas, far from the warming influence of the sea. They include Greenland, Northern Canada, Northern Russia and Antarctica. Average monthly temperatures are always below freezing. Snow and ice build up over time. Most polar regions are partly or completely covered with ice caps.

Tundra environments – These are found south of the ice caps in the northern hemisphere. Most of the ground is permanently frozen. The landscape is treeless but has low-lying shrubs and mosses. They do not have snow cover all year round.



Trans-Alaska pipeline
Pumping stations keep the oil moving. It goes under rivers. Raised and insulated. Cost US\$8 billion

Development opportunities in Alaska

Commercial fishing in Prince William Sound– Provides 78,500 jobs. Adds US\$6billion to Alaska’s economy. However, jobs are mostly just seasonal.

Gold mining – One fifth of the mineral wealth in Alaska comes from gold mining.

Tourism – Between 1 and 2 million visitors arrive in the summer. 60% are on cruise ships.

Energy – More than 50 H.E.P plants. Some geothermal energy has been exploited. More than 90% of the taxes raised by the Alaska state government come from the oil industry.



Plant adaptations of Ellesmere Island in the Arctic
Algae grow inside the rocks to escape the dessicating effect of the wind. The Arctic poppy twists to catch the sunshine. The flowering plants all flower at the same time, when the snow melts in the summer. The Arctic Willow grows horizontally not vertically to escape the cold, drying wind. Lichens grow very slowly due to the low amount of sunshine for photosynthesis.

Polar bear adaptations
Low surface area to volume ratio enables them to retain their heat. Translucent hairs with black skin so that the heat from the Sun can be absorbed. Claws help the bear to grip the ice. They have a highly developed sense of smell and they are good swimmers because there is very little food on land.

Oil production in Prudhoe Bay, Alaska

Creates 2,000 jobs – but only 400 local people employed. All the rest is migrant workforce. Helps US energy security

What are the links between people and the environment?

Abiotic – the part of the environment that is not living but affects the organisms e.g. soil, water and sunlight

Development challenges in Alaska

- Snow and ice make some roads unusable for several months of the year.
- The upper layer of soil thaws and starts to slide down over the permafrost. This is called **solifluction**. It can cover roads.
- Permafrost melts in the summer, making routes waterlogged and impossible to use.
- The seasonal melting and re-freezing creates uneven ground called **themokarst**.
- **Frost heave** – where pebbles and stones slowly rise to the surface – makes travel and farming difficult.

THE ARCTIC

Average Yearly Temperature: 0°C

Animals! The Arctic is at the top of the Earth (North!).
Polar Bears live in the Arctic and love to eat Seals!
Penguins do not live in the Arctic!

People & Population: 2 Million native people call The Arctic 'home'!

VS

ANTARCTICA

Average Yearly Temperature: -50°C

The Antarctic is the coldest place on the Earth!
Nope, none of these in Antarctica!
Penguins do however live Antarctica!

Very few people live in Antarctica!

Strategies used to manage cold environments sustainably – The Antarctic Treaty System - Signed by 52 countries.

- It can only be used for peaceful purposes
- guarantees continued freedom to conduct scientific research
- promotes international scientific cooperation
- sets aside the potential for sovereignty disputes - no new or enlarged claims can be made
- nuclear explosions and the disposal of radioactive waste;

It has some of the toughest environmental protection rules in the world. It is viewed as a success. Changes were made to specifically protect plants and animals and to put quotas on fishing.

Drilling for oil is controversial because the tundra and polar environments are very fragile. In 1989 the Exxon Valdez oil tanker spilled 1.2 million barrels of oil and killed 5,000 sea otters.