Your notes

GCSE Geography: revision notes

Cold environments

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Physical characteristics

- **Polar environments**, such as Antarctica and Greenland, are extremely cold (below –50 °C in places), very dry, and mostly covered by ice sheets, with little life on land.
- **Tundra**, such as in northern Canada, Alaska and Siberia, has long, very cold winters and short, cool summers, with little precipitation.
- **Permafrost** (ground frozen all year) lies under an **active layer** that thaws in summer, so the surface becomes boggy.
- Biodiversity is low, the growing season is short, and dead material decomposes slowly, so soils are thin and poor.

Adaptations

- Plants: low-growing, cushion shapes stay out of the wind; small leaves lose less water; shallow roots cope with the **permafrost**; short life cycles let plants flower quickly in the brief summer.
- Animals: thick fur and fat (polar bears and arctic foxes); white winter coats for camouflage (arctic foxes and hares); small ears to reduce heat loss; migration (caribou) and hibernation.

Case study: Alaska

- Opportunities: oil at Prudhoe Bay, carried south by the Trans-Alaska Pipeline, about 1,300 km long; mining for gold and zinc (the Red Dog mine is one of the world's largest zinc mines); fishing for salmon; and tourism, such as cruises, wildlife watching and national parks.
- Challenges: extreme cold; inaccessibility (few roads, so many places can only be reached by air or sea); and building on **permafrost**, because heat from buildings and pipes thaws the ground and causes **subsidence**. The pipeline and many buildings are raised on stilts to prevent this.

A fragile environment

- Cold environments are fragile: plants grow very slowly, so damage such as vehicle tracks across the **tundra** can last for decades.
- Protection: technology (raised pipelines and buildings on gravel pads); government laws, such as protecting wildlife areas; international agreements (the Antarctic Treaty of 1959 keeps Antarctica for peace and science, and a 1991 agreement bans mining there); and conservation groups, such as WWF.

Key terms

Permafrost	Ground that stays frozen all year.
Active layer	The top layer of soil above the permafrost that thaws in summer.
Tundra	A cold, treeless environment with permafrost, found at high latitudes.
Polar environment	An extremely cold area near the poles, mostly covered by ice.
Fragile environment	An environment that is easily damaged and slow to recover.
Subsidence	The ground sinking, for example when permafrost thaws.
Wilderness	A wild area largely untouched by people.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is permafrost?
2. What is the active layer?
3. Why do tundra plants grow low to the ground?
4. Why do tundra plants have shallow roots?
5. How are arctic foxes adapted to the cold?
6. Why is the Trans-Alaska Pipeline raised on stilts?
7. Which of these is an economic opportunity in Alaska?
8. What problem can buildings cause on permafrost?

Answers

1. Ground that stays frozen all year
2. The top layer of soil that thaws in summer
3. To shelter from cold, strong winds
4. The permafrost stops roots growing deep
5. Thick fur, small ears and a white winter coat
6. To stop heat from the oil melting the permafrost
7. Oil extraction
8. Their heat melts the ground, causing subsidence

Your notes

What to do next

Practise 12 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

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