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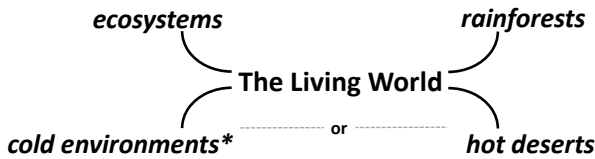
THE LIVING WORLD

Cold Environments

quiz



The Big Picture



Key Terms



Biodiversity – The variety of life in the world or a particular habitat.



Fragile environment – An environment that is both easily disturbed and difficult to restore if disturbed.



Infrastructure – Basic equipment and structures for a location to function.



Mineral extraction – The removal of solid mineral resources from the earth.



Permafrost – Permanently frozen ground.



Polar – Most extreme cold environment inc. Antarctica and much of Greenland.



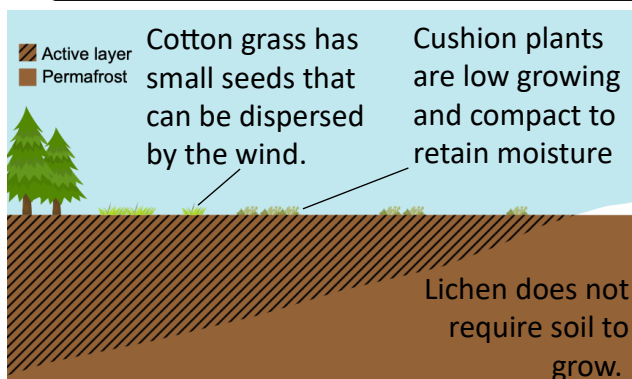
Tundra – The flat, treeless Arctic regions where the ground is permanently frozen.



Wilderness area – A natural environment that has not been significantly modified by human activity.



Adaptations

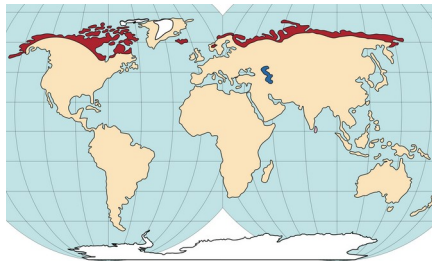


Arctic Foxes and Arctic Hares

- have thick fur on their bodies and feet to keep them warm
- in winter their fur becomes white providing camouflage from predators



Location



Polar – Antarctica and much of Greenland.

Tundra – Includes parts of Canada, Alaska, Northern Europe and Russia.



Characteristics



Climate – P = Temp below freezing all year and precipitation low. T = High temp range. Snowy winter, rain in summer. Dark winter.



Permafrost – T = active layer freezes in winter and thaws in summer. Permafrost below.



Soil – P = mainly bare rock. T = Thin and lack fertility. Waterlogged in summer. Depth and fertility increase from Poles.



Biotic – Low level of biodiversity. Food chain and webs are very basic. Adaptations required.



People – No permanent settlements in polar. Indigenous people live in tundra esp. near coast.



Interdependence

Interdependence includes:

- simple food webs
- sustainable coexistence of people, plants and animals in cold environments
- adaptations of plants and animals to soil and climate characteristics
- potential damage to the ecosystem inflicted by resource exploitation.



Biodiversity

Thousands of species of lichens, plants and insects.

Climate

change threat

Species

dependent on short, mild summers



biodiversity

Considerable

biodiversity

Exploitation threat by humans



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THE LIVING WORLD

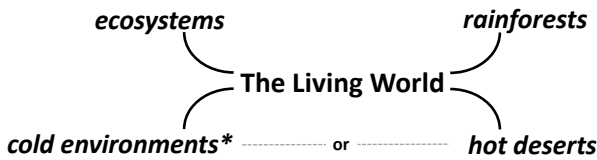
Alaska, USA



quiz



The Big Picture



Location



About

Alaska is the most northern state in the USA, covering 2million km². The southern half experiences relatively mild conditions, whereas a tundra environment overlaying permafrost is found to the north. Alaska is one of the most sparsely populated places on Earth. Nearly half its 750,000 residents live in the city of Anchorage.



Opportunities

 **Mineral resources** – Alaska has abundant mineral resources, including coal, copper, silver, gold and zinc. Twenty per cent of Alaska's mineral wealth lies in gold.

 **Energy** – There are vast reserves of oil and gas in the north of Alaska. One-third of the state's income comes from the industry, which employs over 100,000 people.



Tourism – Alaska's amazing environments, with mountains and glaciers, attract over 2 million tourists every year. Cruises are popular, with 60% of summer tourists arriving this way.



Fishing – The fishing industry employs eighty thousand people in Alaska. Alaska's 3,000 rivers, three million lakes and 10,686 kilometres of coastline are rich in fish.



Challenges

 **Buildings and infrastructure** – Permafrost in Alaska creates challenges for building and constructing infrastructure. Roads are built on gravel beds so permafrost not affected.

 **Inaccessibility** – Alaska is very remote, relying on planes and ships for access. In addition, some roads depend on crossing frozen rivers in the winter.



Temperature – Winter temperatures can drop below -30°C in the north of Alaska. This, along with limited sunlight in the winter, makes working outside very challenging. In addition, in the winter the sea freezes and roads become very dangerous.



Key Terms



Ecotourism – Travel that conserves the environment and benefits locals.



Inaccessibility – Very difficult to travel or impossible to travel to or reach.



Infrastructure – Basic equipment and structures for a location to function.



Non-renewable energy – Energy from sources that will run out e.g. oil.



Permafrost – Land that is permanently frozen.



Sparsely populated – Few people live in an area.



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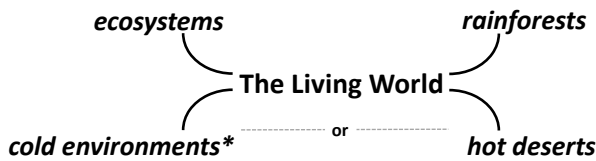
THE LIVING WORLD

Protecting Cold Environments

quiz



The Big Picture



What is a wilderness area?

 **Wilderness areas** are remote, unspoilt parts of the world including deserts, mountains and cold environments. Wilderness areas are typically unspoilt by human development and remain natural. Many of the world's cold environments are considered wilderness areas due to their remoteness and physical conditions.



Protecting wilderness areas

Cold environments need to be protected for a range of reasons, including:



Tundra and polar environments are fragile environments. Recovery from human impact can take significant time.



Indigenous culture depends on the preservation of the natural environment.



Cold environments are home to a range of species, many are unique.



There is a global moral responsibility to protect wilderness areas.



Scientists need to study global processes in unspoilt areas e.g. climate change.



Strategies to maintain cold environments



Stilts raise the insulated Trans-Alaskan oil pipeline above the ground to reduce the risk of thawing permafrost and disrupting animal migration.



Pumping stations enable the oil to flow over mountainous areas in the region.



Only allows the use of Antarctica for peaceful purposes, and military activities are forbidden.



Promotes co-operation among international scientists.



Strict controls on tourism and landing sites to reduce the impact of tourists.

Technology can provide environmentally friendly solutions to some of the challenges faced by developing cold environments.

Technology

Maintaining Cold Environments

International Agreements

Action by Governments

Conservation Groups

Since oil was found in Alaska in the 1960s, the US government has been involved in protecting the environment.

Antarctica is often described as 'the last wilderness on Earth'. It has remained undeveloped since the 1959 Antarctic Treaty.



Alaska's marine habitats and fishing have been monitored by the National Oceanographic and Atmospheric Administration (NOAA).



The Western Arctic Reserve has been set up in the north of Alaska, protecting the area from oil and gas extraction.



The WWF Arctic Programme was launched in 1992 to work with governments on issues such as climate change, polar bears, shipping and oil and gas including project such as:

- Scientific research into endangered species
- Promoting sustainable development
- Monitoring and protecting ecosystems