

# YEAR 9 GEOGRAPHY – CYCLE 2 – COLD ENVIRONMENTS

BOX 1: KEYWORDS PART 1	
cold environments	areas with very <b>low temperatures</b> distributed at <b>high latitudes</b> e.g. <b>tundra</b> and <b>polar</b> biomes
global ecosystem	very <b>large ecosystems</b> e.g. <b>desert</b> , <b>tropical rainforest</b> and <b>polar</b> biomes
interdependence	when the <b>components</b> of an <b>ecosystem</b> <b>rely on each other</b> to <b>survive</b>
climate	the <b>average temperature</b> and <b>precipitation</b> in a <b>place over many years</b>
permafrost	<b>layer of permanently frozen ground</b> → found in <b>polar</b> and <b>tundra</b> regions
biodiversity	<b>variety of living things</b> in the <b>world</b> or in a particular <b>habitat</b>

BOX 2: THE TUNDRA BIOME → PHYSICAL CHARACTERISTICS	
distribution	<b>located Arctic</b> areas of <b>Northern Europe</b> , <b>Northern Asia</b> , <b>North America</b>
temperature	long freezing <b>winters -50° C</b> → short cold <b>summers 10° C</b>
precipitation	<b>low</b> → less than <b>300 mm</b> annually (per year)
soil	<ul style="list-style-type: none"> <li><b>thin soil layer</b> → <b>plants decompose slowly</b> due to <b>cold</b> → <b>less nutrients</b> enters soil → <b>soil not very fertile</b></li> <li><b>permafrost</b> → permanently <b>frozen</b> ground (underneath soil layer)</li> <li><b>plant growth limited to 60 days</b> in <b>summer</b> when <b>soil thaws</b></li> </ul>
animal adaptation	<b>musk ox</b> → two <b>fur coats</b> → keeps them <b>warm</b> → helps <b>survival</b>
plant adaptation	<b>arctic poppy</b> → <b>turns head to follow sun</b> → maximises <b>photosynthesis</b> → also has <b>small hairs</b> on stem to <b>trap heat</b> and <b>grows close to ground</b>
biodiversity	<b>biodiversity limited</b> by <b>low temperatures</b> → plants and animals find it <b>difficult to survive</b> (but biodiversity is <b>higher in tundra</b> than polar biome)
people	<b>indigenous people</b> and <b>workers employed</b> in <b>mineral extraction</b>

BOX 3: THE POLAR BIOME → PHYSICAL CHARACTERISTICS	
distribution	<b>located around North and South Poles</b> e.g. the <b>Arctic</b> and <b>Antarctica</b>
temperature	long freezing <b>winters -90° C</b> → short cold <b>summers maximum 10° C</b>
precipitation	<b>low</b> → less than <b>100 mm</b> annually (per year) → usually falls as <b>snow</b>
soil	large thick <b>ice sheets cover the area</b>
animal adaptation	<b>polar bears</b> → <b>insulated with thick fur</b> → <b>survive freezing temperatures</b>
plant adaptation	<b>lichen</b> grows <b>without soil</b> → <b>adapted to grow on rocks</b>
biodiversity	<b>very low biodiversity</b> due to <b>extreme conditions</b>
people	small number of <b>indigenous people</b> and some <b>scientists</b>

BOX 4: KEYWORDS PART 2	
development	to <b>improve</b> an <b>area</b> e.g. improve <b>amenities</b> , <b>jobs</b> and <b>quality of life</b>
opportunities	a <b>chance</b> to <b>improve something</b>
challenges	a <b>problem</b> or <b>difficulty</b> → makes improving something <b>difficult</b>
mineral extraction	<b>mining</b> ( <b>digging</b> ) <b>raw materials</b> from the <b>ground</b> → e.g. <b>coal</b> , <b>iron ore</b>
infrastructure	places and their <b>connections</b> e.g. <b>roads</b> , <b>water supply</b> and <b>sewage pipes</b> → needed for places to <b>function properly</b>
inaccessibility	when a <b>place</b> is <b>difficult to travel to/from</b> → e.g. not many roads

BOX 5: CHALLENGES OF DEVELOPING COLD ENVIRONMENTS ☹️ → ALASKA	
case study	<b>Alaska</b> → <b>tundra</b> biome
location	largest and most <b>north-westerly</b> state in <b>USA</b> → <b>Northern Hemisphere</b> → <b>high latitude</b> → <b>bordered by Canada</b> → surrounded by <b>Arctic Ocean</b>
1. temperature	extreme → <b>-30° C</b> → <b>60 days of non-stop night</b> (darkness) during <b>winter</b> → <b>difficult work conditions</b> → <b>limits development</b>
2. inaccessibility	<b>sparsely populated</b> → <b>ice covers roads</b> → <b>towns hard to travel to and from</b> → <b>employment difficult</b> → <b>isolated communities</b>
3. infrastructure	<b>buildings heat permafrost layer</b> → <b>melts</b> → <b>buildings sink</b> into ground

BOX 6: DEVELOPMENT OPPORTUNITIES IN COLD ENVIRONMENTS 😊 → ALASKA	
case study	<b>Alaska</b> → <b>tundra</b> biome
1. mineral extraction	<ul style="list-style-type: none"> <li>over <b>half of income</b> from <b>oil and gas extraction</b> → <b>Trans-Alaskan Pipeline</b> transports oil across Alaska</li> <li>in <b>2015 Alaska</b> exported <b>\$154 million</b> of <b>gold</b></li> </ul>
2. energy	<b>hydroelectric power</b> provides <b>over 21%</b> of <b>electricity</b> to <b>Alaska</b>
3. fishing	e.g. <b>salmon</b> → <b>employs 30,000 people</b> → <b>boosts economy by \$1.7 billion</b>
4. tourism	<b>2 million tourists</b> a year → mostly arrive on <b>cruise ships</b> → tourism <b>employs 39,000 local people</b> → <b>\$2.5 billion for economy</b>

BOX 7: KEYWORDS PART 3	
value	<b>importance/usefulness</b> of something → <b>does not</b> always mean the <b>price</b>
wilderness area	<b>natural environment</b> has <b>not</b> been <b>developed</b> or <b>disturbed</b> by <b>humans</b>
fragile environment	<b>environment</b> that is both <b>easily damaged</b> and <b>difficult to restore</b>
strategy	a <b>plan</b> or <b>project</b> (sometimes called a <b>scheme</b> )
economic	<b>economic development</b> → <b>improving money</b> and <b>jobs</b>
conservation	to <b>protect</b> and <b>look after</b> something → e.g. <b>stop habitat destruction</b>
international	across <b>more than one country</b>
agreements	a <b>promise</b> to carry out a plan (often a promise between <b>countries</b> )

BOX 8: WHY SHOULD FRAGILE WILDERNESS AREAS BE PROTECTED?	
wilderness areas → fragile and valuable → need to protect	<b>wilderness areas</b> are <b>fragile</b> and <b>valuable</b> → provide <b>habitats</b> for species that cannot survive anywhere else → allows <b>scientists</b> unique <b>opportunity</b> to <b>study</b> rare areas that are <b>undisturbed</b> by <b>human activity</b>

BOX 9: STRATEGIES TO BALANCE ECONOMIC DEVELOPMENT AND CONSERVATION	
1. technology	<b>Trans-Alaskan Pipeline</b> raised on <b>stilts</b> → <b>stops permafrost melting</b>
2. governments	<b>governments protect fragile wilderness areas</b> e.g. <b>Arctic National Wildlife Refuge (ANWR)</b>
3. international agreements	<ul style="list-style-type: none"> <li><b>1959 Antarctic Treaty</b> → <b>bans nuclear activities</b> in <b>Antarctica</b></li> <li><b>1986 Whaling Ban</b> → <b>increased numbers of whales</b> 3% each year</li> </ul>
4. conservation	conservation groups → <b>Greenpeace campaigns</b> to <b>protect fragile environments</b> → e.g. to <b>stop oil drilling</b>

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