GCSE (9-1) Geography B

Knowledge Organiser

Paper 3: Making Geographical Decisions

Issue 2

This guide is designed to support students on the key content of the GCSE Geography B specification for Paper 3 Global Geographical Issues. It covers:

- Topic 7: People and the biosphere
- Topic 8: Forests under threat
- Topic 9: Consuming energy resources

It can be used to identify gaps in learning, as a personalised checklist to aid revision or as a knowledge organiser.

Paper 3: Global Geographical Issues

This is assessed by Paper 3 (90 minutes). You answer all questions in the paper. Section A contains questions on Topic 7, Section B on Topic 8, and Section C on Topic 9. Section D is a decision-making question which draws together all three topics.

<table>
<tr><th colspan="2">Topic 7: People and the biosphere</th></tr>
<tr><th>Specification key ideas</th><th>Key content</th></tr>
<tr><td rowspan="2">7.1 The Earth is home to a number of very large ecosystems (biomes), the distribution of which is affected by climate and other factors.</td><td>The biosphere contains all living organisms and is the layer of the Earth's surface between the lithosphere and the atmosphere. The biosphere is divided into nine major biomes such as tropical rainforest and taiga. Biomes are large-scale ecosystems.

The location and characteristics of these biomes are influenced by temperature, precipitation and sunshine, all are controlled by latitude.</td></tr>
<tr><td>Local factors can alter the biome distribution.
Rock and soil type – acidity and nutrients affect plant growth.
Water availability and drainage – some pants prefer wet soil, others dry soil.
Altitude – temperature decreases with height, rainfall increases.
Biomes consist of:
the biotic (living) part – plant and animal life
the abiotic (non-living) part – the atmosphere, water, rock and soil.</td></tr>
<tr><td>7.2 The biosphere is a vital life support system for people as it provides both goods and services.</td><td>Biomes provide humans with different goods and services. The importance of ecosystem services varies – they can be important locally and globally.
Provisioning services (goods) – food, fuelwood, timber, and chemical materials
Supporting services – nutrient cycling, photosynthesis, and soil formation
Regulating services – carbon storage and the hydrological cycle</td></tr>
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	• Cultural services – tourism, education, science, and well-being Ecosystem services are being exploited commercially. Large areas of biomes are cleared for: • commercial farming • mining metal ores • timber • construction of dams for HEP and water supply.
	Biomes are usually carbon sinks. A carbon sink is where carbon is stored. They maintain healthy air, soils and the **hydrological cycle**. • Healthy air – Biomes remove carbon dioxide from the atmosphere through **carbon sequestration** and **photosynthesis**. Destruction of biomes releases additional carbon dioxide into the atmosphere, contributing to global warming. • Healthy soils – Soil health is maintained by the **nutrient cycle**. Removing biomass takes away nutrient stores. • Water supply and flood risk – Destroying forest biomes reduces interception and infiltration affecting groundwater supplies. Surface run-off and erosion increases, and flooding becomes more frequent. • Burning forests turns them into carbon sources.
	Population growth, **industrialisation**, **urbanisation** and rising wealth has led to an increase in demand for **natural resources**. As a result, biomes are destroyed for farming, species are threatened, and rivers and the atmosphere are polluted. However, population growth has been slowing down (not declining) since 1962. It is now approximately 1.1% per annum. Pessimistic view (**Malthus**) – The population will grow, and the planet will run out of resources, leading to '**positive** checks' (war, famine) or **preventative** checks (fewer children). Optimistic view (**Boserup**) – Humans will invent new ways to allow more resources to be supplied (for example, technology such as farm machinery, GM crops and irrigation).

Topic 8: Forests under threat	
Specification key ideas	**Key content**
8.1 The Earth is home to a number of very large ecosystems (biomes), the	Biodiversity in tropical rainforests is high because: • of the **equatorial climate** (hot and wet all year around) • species have evolved over millions of years • multiple layers of vegetation.

distribution of which is affected by climate and other factors.	Adaptations to the climate include: • **Hardwood trees**, such as mahogany which have large buttress roots to support the weight of trees and leaves and branches are only found at the top • **Lianas** that use the tree to climb up to the sunlight in the canopy • **Birds** such as macaws that have strong beaks to break open nuts • **Primates** such as monkeys that use their tails for balance and live in the canopy where most food is found.
	In the tropical rainforest, nutrient cycling is rapid because it has: • a **large biomass store** (dense vegetation) • a **small litter store** (rapid **decay**) • a **large take-up of nutrients** (rapid plant growth) • a **larger supply of nutrients** (**weathering**) • a **larger loss of nutrient** (**throughflow**). The nutrient cycle can be easily disrupted by deforestation which also changes the climate with rising temperatures and more rainfall reaching the ground. Litter and soil can easily be eroded. Farming often fails as the rainforest soil contains few nutrients.
8.2 The biosphere is a vital life support system for people as it provides both goods and services.	The taiga climate is harsh, and biodiversity is low. Plants and animals have adapted to the cold conditions in order to survive. • Mammals have **thick, oily** fur to retain heat. • Some animals **hibernate** in the winter. • Some birds and animals **migrate**. • Trees are **coniferous** (evergreen). The trees are cone shape to allow snow to slip off and the waxy needles reduce water loss.
	The nutrient cycle in the taiga occurs more slowly than in rainforests. The stores are smaller, with smaller flows of nutrients between. Most nutrients are found in the litter because decay happens much slower in cold temperatures. The biomass store is small because trees can only grow for a few months of the year. Precipitation is also lower.
8.3 Tropical rainforests are threatened directly by deforestation and indirectly by climate change.	Deforestation is the main direct threat to the tropical rainforest. • **Cattle ranching** – There is an increasing global demand for beef (and the need to grow soya to feed cattle). • **Poverty** – Local people cut down trees for subsistence farming and fuelwood. • **Debt** – Countries export timber and grow cash crops to pay off debts. • **Development** – urbanisation, HEP stations and palm oil plantations • **Demand** – The need for timber, oil, gas, iron ore and gold.

	Climate change is the main indirect threat to tropical rainforests. Droughts in the Amazon rainforest are becoming more common. Dry leaf litter reduces decomposition and dying leaves in the canopy reduces food supply, affecting food webs. During droughts, the Amazon can switch from absorbing CO_2 to emitting it.
8.4 The taiga is Increasingly threatened by commercial Development.	Deforestation is greatest in countries with taiga forests. Causes of taiga deforestation include: • paper – comes from softwood trees (for example, fir and pine) • construction – softwood is used for construction (for roofs) • mining – clearing forest for minerals (for example, gold and iron ore) • fossil fuels – extraction of oil and gas (and tar sands) • HEP – building dams also destroys taiga.
	The taiga is under threat from the increase in wildfires (as Arctic temperature rise), pests and diseases, and acid rain. These all contribute to a loss of biodiversity. • **Forest fires** – hot and dry summers make the forest prone to fires from lightning strikes. • **Pests and diseases** – warmer temperatures increase insect infection and diseases in coniferous trees. • **Acid rain** – burning of fossils releases sulphur dioxide into the air – the acid rain weakens trees by reducing photosynthesis and damaging the soil.
8.5 Conservation and sustainable management of tropical rainforests is vital if goods and services are not to be lost for future generations.	Two of the main global actions to protect rainforests are **CITES** (The Convention on International Trade in Endangered Species) and **REDD** (Reducing Emissions from Deforestation and forest Degradation). • **CITES** is an international treaty adopted by 180 countries that protects species (for example, African elephants and the banning of the ivory trade). However, protecting species does not prevent deforestation and global warming. • **REDD** is a UN project that aims to stop deforestation with governments and TNCs funding projects to conserve forests in development countries. However, it is difficult to police so illegal logging often takes place.
	Sustainable management of tropical rainforests has economic, social and environmental benefits. **Ecotourism** provides jobs for local people and educates tourists, whilst **agroforestry** maintains biodiversity allowing crops to grow between trees. However, population growth will increase urbanisation and deforestation.
8.6 The taiga	There are pressures to develop the taiga for oil, gas and mineral extraction, and HEP. **Wilderness** areas and **national parks** are ways of protecting the taiga such as those in the USA. **RAMSAR**

wilderness areas need to be protected from overexploitation.	is an example of conservation that adds an additional level of protection for wetlands
	Some people believe that the taiga should be conserved; others believe it should be exploited. National governments must try and balance these views which can lead to conflict (for example, indigenous people versus oil and gas companies). The economy versus the environment debate is common in all biomes but is especially notable in the Taiga and TRF. A sustainable alternative is **selective logging** which only removes the large valuable trees and leaves some of the forest intact.

Topic 9: Consuming energy resources	
Specification key ideas	**Key content**
9.1 Energy resources can be classified in different ways and their extraction and use has environmental consequences.	Energy resources are classified into three main categories. 1. **Non-renewable** – finite resources (fossil fuels), once used up, they cannot be replaced (for example, coal, oil and gas). 2. **Renewable** – infinite resources, they will never run out (for example, wind power, solar power and hydroelectric power). 3. **Recyclable** – energy sources that can be reused (for example, nuclear and biofuel energy).
	Energy production (both renewable and non-renewable) have impacts on the environment and landscape. Wind turbines and solar panels can look out of place whilst HEP often requires large areas of forest to be cleared. Oil drilling can result in oil spills and open cast mining uses huge amounts of water.
9.2 Access to energy resources is not evenly distributed, which has implications for people.	Access to energy resources depends on **technology** and **accessibility**. Coal was an important energy source to the UK but has since declined owing to the high cost of mining. Although technology makes mining possible, coal is often more expensive than other energy sources. The present UK energy mix includes natural gas, renewable energy and recyclable energy (nuclear).
	Global energy use has increased since 2000, mostly driven by the rapid development of emerging economies such as China, India and Brazil. As well as using more energy, the types of energy used changes as countries develop. • Developing countries such as Malawi, have mainly primary economies, using only a small amount of energy, mostly in the home. Many developing countries suffer from **energy poverty**, lacking electricity, or money to pay for it, collecting fuelwood or dung as an alternative.

	• Newly industrialising or emerging economies (for example, India) use large amounts of energy for manufacturing (coal). • People in developed countries consume more products increasing the demand for energy (gas and oil). However, with these products made elsewhere, carbon footprints have sometimes declined.
9.3 The global demand for oil is increasing, but supplies are unevenly available.	Oil reserves and production are unevenly distributed. Exactly how much oil lies underground is unknown. Oil is finite and will run out one day, but it's not known when. Some believe that **peak oil** (where half of known reserves have been used) has already passed. Oil consumption continues to rise as emerging countries develop.
	Oil prices can vary owing to **economic** (OPEC members restricting supplies to keep prices high) and **political** (conflict) reasons. The Iraq war was closely linked to global oil supplies. The conflict led to shortages of oil and increased prices. The global oil price us based on several factors, listed below. • Demand – high demand causes prices to rise. • Supply – too much oil and the price falls. • Political decisions – countries can increase supply to increase income and gain control of markets. • New supplies – fracking in the USA has caused oversupply and prices have fallen.
9.4 The world's continuing reliance of fossil fuels increases pressure to exploit new areas.	High profits and new technology (drilling, seismic imaging and liquefaction) have enabled oil and gas companies to drill in regions previously too expensive or difficult to access. The Arctic has up 25% of the world's remaining oil and gas and is therefore at risk from exploitation.
	Using tar sands to produce oil and gas is **unconventional** – i.e. it is different from how they are usually produced. **Shale gas** and **tar sands** oil extraction is only possible because of technological improvements, and high energy prices. As well as being expensive, there are also environmental issues with all unconventional sources such as tar sands oil extraction, including the use of large quantities of energy and water. Canada is a key player in the process.
9.5 Reducing reliance on fossil fuels presents major technical challenges.	Fossil fuel use contributes to world's **carbon footprint**. Energy efficiency and conservation measures can cut the amount of energy used at home (for example, solar water heating and energy efficient lights). Transport technology and initiatives in large cities like London (hybrid buses) can play a part in reducing the amount of energy used.
	Energy diversification including the use of HEP, biofuels (wood chipping, solar energy and hydrogen technology (cars) are ways to meet global energy demands.

9.6 Attitudes to energy and environmental issues are changing.	There are two possibilities for the future of global energy use: 1. **Business as usual** – assumes that the world will continue to rely on fossil fuels. 2. **A sustainable future** – renewables are adopted to reduce CO_2 emissions. Different groups have different views about energy futures. Energy companies want to provide energy whilst climatologists believe that the current energy mix is not sustainable enough and is leading to rapid climate change. Governments will want to tackle climate change but keep bills low for customers. Consumers will want low bills, but most are concerned about climate change.
	Affluence (rising wealth) places greater pressure on the planet. **Food miles** increase as people demand more exotic foods but people in developed countries also 'care more' about the environment and resources with rising affluence. Developed countries have started to reduce energy consumption per capita by using technology (for example, LED bulbs). Education and action are essential to the future of the planet. Schools can: • teach more about sustainability, focussing on local actions people can take • change attitudes to climate change (for example, promote recycling).