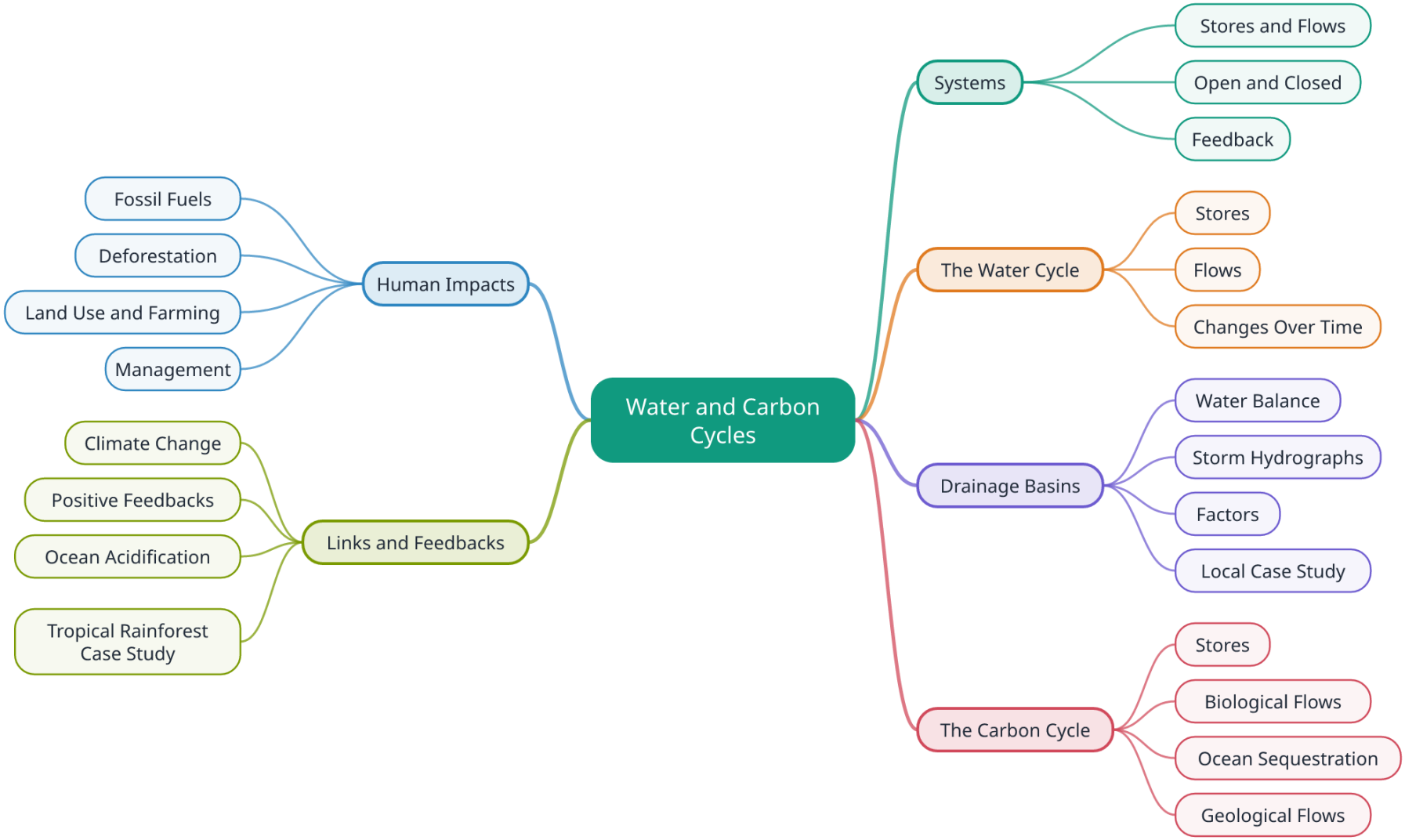
Water and Carbon Cycles Mind Map (A Level Geography)

A level · Geography · mindmapi.ai/mind-maps/water-carbon-cycles-a-level



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Water and Carbon Cycles mind map explained

Systems

Both cycles are studied as systems of stores and flows.

Stores and Flows

Stores hold water or carbon; flows (transfers) move it between stores.

Open and Closed

At the global scale both cycles are closed systems: the amount stays the same. A drainage basin is an open system, with inputs and outputs.

Feedback

Positive feedback amplifies a change; negative feedback reduces it, helping keep the system in dynamic equilibrium.

The Water Cycle

How water moves between the oceans, ice, land and atmosphere.

Stores

The oceans hold about 97% of the Earth's water. Most fresh water is locked in ice (the cryosphere) or underground. Rivers, lakes and the atmosphere hold only a tiny fraction.

Flows

Evaporation, condensation, precipitation, transpiration, interception, infiltration, percolation, throughflow, overland flow and groundwater flow.

Changes Over Time

Seasonal changes, such as snowmelt, and long-term changes, such as the growth and melting of ice sheets.

Drainage Basins

The area of land drained by a river and its tributaries.

Water Balance

Precipitation = runoff + evapotranspiration ± change in storage.

Storm Hydrographs

Show how a river's discharge responds to a storm. Key features are lag time, peak discharge, and the rising and falling limbs.

Factors

Drainage basin size and shape, rock and soil type, vegetation, antecedent rainfall and land use. Urban surfaces shorten lag time and raise peak discharge.

Local Case Study

AQA requires a case study of a river catchment at the local scale, showing how the water cycle works and changes there.

The Carbon Cycle

How carbon moves between rocks, oceans, living things and the atmosphere.

Stores

Rocks (the lithosphere) hold by far the most carbon, then the oceans. Smaller stores are soils, vegetation and the atmosphere.

Biological Flows

Photosynthesis takes carbon out of the atmosphere; respiration and decomposition return it.

Ocean Sequestration

Oceans absorb carbon dioxide. The biological pump moves carbon to the deep ocean in sinking organisms; the physical pump moves it in sinking cold water.

Geological Flows

Weathering and the slow formation of sedimentary rocks store carbon; volcanic eruptions release it.

Human Impacts

Human activity is changing both cycles.

Fossil Fuels

Burning coal, oil and gas moves carbon from long-term geological stores into the atmosphere.

Deforestation

Removing forests cuts photosynthesis and transpiration and releases stored carbon, as in the Amazon.

Land Use and Farming

Urbanisation, ploughing and drainage change infiltration, runoff and soil carbon.

Management

Afforestation, wetland restoration, and reducing emissions protect both cycles.

Links and Feedbacks

The two cycles affect each other and the climate.

Climate Change

More carbon dioxide warms the atmosphere, which increases evaporation and changes rainfall patterns.

Positive Feedbacks

Melting permafrost releases methane and carbon dioxide, causing more warming. Melting ice exposes darker surfaces that absorb more heat.

Ocean Acidification

Oceans absorbing more carbon dioxide become more acidic, harming corals and shell-forming organisms.

Tropical Rainforest Case Study

AQA requires a tropical rainforest case study showing how the two cycles interact, and how human activity affects them.

How to revise with this mind map

1. Use systems language throughout: stores, flows, inputs, outputs and feedback. It is what examiners look for in this topic.

2. Practise drawing and annotating storm hydrographs, and explain how each factor changes the lag time and peak discharge.

3. Learn the stores and flows of each cycle as a diagram, then add arrows to show how human activity changes them.

4. Link the two cycles in every long answer. Explaining how a change in one affects the other is what lifts answers to the top bands.

5. Make it yours. Build your own cycles map in Mindmapi from your notes, and ask the AI for up-to-date figures or examples. Its answers can search the web and are saved into that branch's notes.