

Water and Carbon Cycles: Specification Content

	Class Notes	Revision Notes	Exam Question	Confidence Level (R-A-G)
Water and carbon cycles as natural systems				
<ul style="list-style-type: none"> Systems concepts and their applications to the water and carbon cycles inputs-outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
The Water Cycle				
<ul style="list-style-type: none"> Global distribution and size of major stores of water – lithosphere, hydrosphere, cryosphere and atmosphere. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Processes driving change in the magnitude of these stores over time and space, including flows and transfers: evaporation, condensation, cloud formation, causes of precipitation and cryospheric processes at hill slope, drainage basin and global scales with reference to varying timescales involved. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Drainage basins as open systems – inputs and outputs, to include precipitation, evapotranspiration and runoff; stores and flows, to include interception, surface, soil water, groundwater and channel storage; stemflow, infiltration overland flow, and channel flow. Concept of water balance. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Runoff variation and the flood hydrograph. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Changes in the water cycle over time to include natural variation (including storm events, seasonal changes) and human impact (including farming practices, land use change and water abstraction). 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
The Carbon Cycle				
<ul style="list-style-type: none"> Global distribution and size of major stores of carbon – lithosphere, hydrosphere, cryosphere biosphere, atmosphere. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Factors driving change in the magnitude of these stores over time and space, including flows and transfers at plant, sere and continental scales. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Flows and Transfers: Photosynthesis, respiration, decomposition, combustion, burial, compaction, carbon sequestration in oceans and sediments, weathering. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Changes in the carbon cycle over time, to include natural variation (including wild fires, volcanic activity) and human impact (including hydrocarbon fuel extraction and burning, farming practices, deforestation, land use changes). 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.

<ul style="list-style-type: none"> The carbon budget and the impact of the carbon cycle upon land, ocean and atmosphere, including global climate. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
Water, carbon, climate and life on Earth				
<ul style="list-style-type: none"> The key role of the carbon and water stores and cycles in supporting life on Earth and particular reference to climate. The relationship between the water cycle and carbon cycle in the atmosphere. The role of feedbacks within and between cycles and their link to climate change and implications for life on Earth. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Students to understand the positive feedback between CO2 led warming leading to higher evaporation rates and a wetter atmosphere 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Understand the significance of water (water vapour and clouds) and carbon (CO2) as greenhouse gases. Understand the dominance of CO2 in controlling the scale of the greenhouse effect 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Human interventions in the carbon cycle designed to influence carbon transfers and mitigate the impacts of climate change (Carbon Capture and Sequestration (CCS), Changing rural land used, Improved transport practices) 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
Case Studies				
<ul style="list-style-type: none"> Case study of a tropical rainforest setting to illustrate and analyse key themes in water and carbon cycles and their relationship to environmental change and human activity. <p>Describe explain and evaluate a number of themes relating to water and climate in the Amazon tropical rainforest, including: how changes in the water and carbon cycles have changed the tropical rainforest environment, the relationships between hydrology, the carbon cycle and the environment, how human activity affects the tropical rainforest.</p> <p>Describe and evaluate a range of strategies employed in the Amazon tropical rainforest to reduce the effects of climate change.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.
<ul style="list-style-type: none"> Case study of a river catchment(s) at a local scale to illustrate and analyse the key themes above, engage with field data and consider the impact of precipitation upon drainage basin stores and transfers and implications for sustainable water supply and/or flooding. 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Choose an item.

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