Sets (s): All Y13 classes.

YEAR 13 **LP 2b**

SUBJECT Geography

Knowledge Focus: Global Systems and Governance – Water and Carbon Cycles (Unit 3).

Ysgol Uwchradd Prestatyn High School

This half term : Skills, Knowledge and understanding to be developed:

3.1.6 The global carbon cycle
3.1.7 Carbon stores in different biomes
3.1.8 Changing carbon stores in peatlands over time
3.1.9 Links between the water and carbon cycles
3.1.10 Feedback within and between the carbon and water cycles.

Key Terms to be learned this half term:

Mass balance. Carbon cycle. Carbon stores. Carbon Pathways. Fossil fuel combustion. Carbon sequestration. Photosynthesis. Respiration. Decomposition. Absorption. Biota. Diffusion. Tropical rainforest biome. Temperate grassland biome. Deforestation. Afforestation. Agriculture. Peatlands. Peat restoration. Anthropogenic greenhouse gas emissions. Feedback. Thresholds. Equilibrium. Methane feedback. Cryosphere (ice) feedback. Permafrost. Albedo. Terrestrial carbon feedback. Marine carbon feedback.

Week 1 and 2 Learning Objectives etc: • Understand the distribution and size of carbon stores in oceans, Inputs, outputs, stores and flows in the carbon cycle, including the concept of 'mass balance'. • Understand 'Carbon pathways' and processes and how they operate between: (i) land and atmosphere at the local (plant), short-term scale, including fossil fuel combustion, carbon sequestration and the processes of photosynthesis, respiration, decomposition. (ii) Ocean and atmosphere through the processes of absorption by biota, diffusion into and out of oceans (iii) land and oceans at the continental scale through the processes of weathering, river transport, indirect movement (water cycle) and carbon sequestration in sediments.	Objective assessments: What are the main elements of the carbon cycle? How is carbon exchanged between (i) the land and atmosphere (ii) ocean and atmosphere and (iii) land and oceans?	Homework: 1. Essay - water deficit 2. Aquifers
Week 3 and 4 Learning Objectives etc: • Understand the differing size of carbon stores in the tropical rainforest and temperate grassland and factors influencing the size of these stores. • Outline changes in the size of carbon stores due to human activity including landuse change (deforestation, afforestation, agricultural activity). • Understand the accumulation of the carbon stores through the process of peat formation and the reduction of the carbon store through peat extraction and drainage.	Objective assessments: What are the main characteristics of rainforest and temperate grassland carbon stores and cycles? How can human activity result in changes to carbon stored in biomes and ecosystems?	Homework: Carbon storage essay
Week 5 and 6 Learning Objectives etc: • Recognise the importance of restoration of the carbon store through management of peatlands. • Understand the causes of recent increases in the atmospheric carbon store and discuss the relationship between recent increases in the atmospheric carbon store and the energy budget. • Examine the impacts of recent increases in the atmospheric carbon store on the water cycle and oceans: amount, type and patterns of precipitation, extreme weather, river discharge, sea level rise, ocean acidification. • Outline links between the water & carbon cycles at the local scale.	Objective assessments: How does peat extraction and land drainage lead to a reduction in carbon storage? What strategies are there for the restoration of peatlands? What does an increase in the greenhouse gas emissions result in energy budget changes and a warming climate?	Homework: 1. Peat and carbon storage 2. Revise for SA and January Mock exam (unit 3).
Week 7: Learning Objectives etc: • Explain positive / negative feedback loops, thresholds and equilibrium • Identify consequences of change within and between the water and carbon cycles including cryosphere feedbacks, marine carbon feedbacks, terrestrial carbon feedbacks and methane feedbacks • Discuss the implications of feedback within and between the two systems for life on Earth, including Arctic permafrost thawing. SA: long answer question on the carbon cycle.	Objective assessments: What is meant by feedback, thresholds and equilibrium? What feedback effects are there within and between the water and carbon cycles, in relation to a warming climate? What are the implications of these feedback effects? SA.	Homework: Essay - links between water and carbon cycles