Belfairs Academy

GEOGRAPHY Fundamentals Map

YEAR 12 - PHYSICAL

Fundamentals	Skills
Unit 1 **The Water Cycle:** • Global distribution and size of major stores of water – lithosphere, hydrosphere, cryosphere and atmosphere. • 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. • Drainage basins as open systems – inputs and outputs, to include precipitation, evapo-transpiration 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. • Runoff variation and the flood hydrograph. • 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. The Carbon cycle: • Global distribution, and size of major stores of carbon – lithosphere, hydrosphere, cryosphere biosphere, atmosphere. • Factors driving change in the magnitude of these stores over time and space, including flows and transfers at plant, sere and continental scales. Photosynthesis, respiration, decomposition, combustion, carbon sequestration in oceans and sediments, weathering. • 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).	**Qualitative skills and quantitative skills** Students should develop the following with respect to qualitative data: use and understanding of a mixture of methodological approaches, including interviews interpretation and evaluation of a range of source material including textual and visual sources understanding of the opportunities and limitations of qualitative techniques such as coding and sampling, and appreciation of how they actively create particular geographical representations understanding of the ethical and socio-political implications of collecting, studying and representing geographical data about human communities. **Students should develop the following with respect to quantitative data:** understanding of what makes data geographical and the geospatial technologies (eg GIS) that are used to collect, analyse and present geographical data an ability to collect and use digital and geo-located data, and understand a range of approaches to use and analyse such data understanding of the purposes and difference between the following and to use them in appropriate contexts:descriptive statistics of central tendency and dispersion descriptive measures of difference and association, inferential statistics and the foundations of relational statistics measurement, measurement errors, and sampling understanding of the ethical and socio-political implications of collecting, studying and representing geographical data about human communities. **Specific skills** The following sections identify specific qualitative and quantitative skills to be developed. **Core skills** Use and annotation of illustrative and visual material: base maps, sketch maps, OS maps (at a variety of scales), diagrams, graphs, field

- The carbon budget and the impact of the carbon cycle upon land, ocean and atmosphere, including global climate.

Water, carbon, climate and life on Earth:

- The key role of the carbon and water stores and cycles in supporting life on Earth with 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.
- Human interventions in the carbon cycle designed to influence carbon transfers and mitigate the impacts of climate change.

Case studies:

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.

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.

Unit 2
Coastal Systems and Landscapes
Coasts as natural systems:

- Systems in physical geography: systems concepts and their application to the development of coastal landscapes – inputs, outputs, energy, stores/components, flows/transfers, positive/negative feedback, dynamic equilibrium. The concepts of landform and landscape and how related landforms combine to form characteristic landscapes.

Systems and processes:

sketches, photographs, geospatial, geo-located and digital imagery.
Use of overlays, both physical and electronic.
Literacy – use of factual text and discursive/creative material and coding techniques when analysing text.
Numeracy – use of number, measure and measurement.
Questionnaire and interview techniques.

Cartographic skills
Atlas maps.
Weather maps – including synoptic charts (if applicable).
Maps with located proportional symbols.
Maps showing movement – flow lines, desire lines and trip lines.
Maps showing spatial patterns – choropleth, isoline and dot maps.

Graphical skills
Line graphs – simple, comparative, compound and divergent.
Bar graphs – simple, comparative, compound and divergent.
Scatter graphs, and the use of best fit line.
Pie charts and proportional divided circles.
Triangular graphs.
Graphs with logarithmic scales.
Dispersion diagrams.

Statistical skills
Measures of central tendency – mean, mode, median.
Measures of dispersion – range, inter-quartile range and standard deviation.
Inferential and relational statistical techniques to include Spearman's rank correlation and Chi-square test and the application of significance tests.

ICT skills
Use of remotely sensed data (as described above in Core skills).
Use of electronic databases.
Use of innovative sources of data such as crowd sourcing and 'big data'.
Use of ICT to generate evidence of many of the skills provided above such as producing maps, graphs and statistical calculations.

• Sources of energy in coastal environments: winds, waves (constructive and destructive), currents and tides. Low energy and high energy coasts. • Sediment sources, cells and budgets. • Geomorphological processes: weathering, mass movement, erosion, transportation and deposition. • Distinctively coastal processes: marine: erosion – hydraulic action, wave quarrying, corrasion/abrasion, cavitation, solution, attrition; transportation: traction, suspension (longshore/littoral drift) and deposition; sub-aerial weathering, mass movement and runoff. **Coastal Landscape development:** • This content must include study of a variety of landscapes from beyond the United Kingdom (UK) but may also include UK examples. • Origin and development of landforms and landscapes of coastal erosion: cliffs and wave cut platforms, cliff profile features including caves, arches and stacks; factors and processes in their development. • Origin and development of landforms and landscapes of coastal deposition. Beaches, simple and compound spits, tombolos, offshore bars, barrier beaches and islands and sand dunes; factors and processes in their development. • Estuarine mudflat/saltmarsh environments and associated landscapes; factors and processes in their development. • Eustatic, isostatic and tectonic sea level change: major changes in sea level in the last 10,000 years. • Coastlines of emergence and submergence. Origin and development of associated landforms: raised beaches, marine platforms; rias, fjords, Dalmatian coasts. • Recent and predicted climatic change and potential impact on coasts.	

• The relationship between process, time, landforms and landscapes in coastal settings. **Coastal Management:** • Human intervention in coastal landscapes. Traditional approaches to coastal flood and erosion risk: hard and soft engineering. Sustainable approaches to coastal flood risk and coastal erosion management: shoreline management/integrated coastal zone management. **Case studies:** **Case study(ies)** of coastal environment(s) at a local scale to illustrate and analyse fundamental coastal processes, their landscape outcomes as set out above and engage with field data and challenges represented in their sustainable management. **Case study** of a contrasting coastal landscape beyond the UK to illustrate and analyse how it presents risks and opportunities for human occupation and development and evaluate human responses of resilience, mitigation and adaptation.	