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Geography Scheme of Learning

Year 11 – Term 4 Consolidation of Living with the physical world/The Living World – Ecosystems, Tropical Rainforests and Hot Deserts

Intent – Rationale

Living with the physical environment is about physical processes and systems, how they change, and how people interact with them at a range of scales and in a range of places. Ecosystems focuses on the interaction of living and non-living components at a variety of scales. We then focus on tropical rainforests: their distinctive characteristics, the impacts of deforestation and how they can be managed sustainably. Finally, we study the distinctive characteristics of hot deserts, the opportunities and challenges of development and the issue of

Sequencing – what prior learning does this topic build upon?	**Sequencing – what subsequent learning does this topic feed into?**
• **Year 8 – Palm oil, plants and people** • **Year 10 – global atmospheric circulation model**	• Year 13 – Water cycle and water insecurity • Year 13 – Carbon cycle and energy insecurity
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• Science – ecosystems	• SMSC: SP2; M2&3; • BV – • Careers: GB4 – a), b), d), e), g)
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**

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• Geography Review magazine • Wideworld Magazine • GeoActive articles • The Week **FROM THE LIBRARY** *People and Places*-333.75 *Rainforest People*-304.2 *The Amazon*-918.11 *Brazil*-918 *Conserving The Jungles*-573 *Geography Matters*-910 Green Alert: Vanishing Forests-574.5 *Horrible Geography*: Bloomin Rainforests- *Sustainability and Environmen*t-363	• Climate graphs – analysis – for rainforests and deserts • Calculation of mean and range for temperatures/precipitation • Graph and located graph analysis – patterns and rates of deforestation

Ecosystems Scheme of Learning
Year 11 – Term 4

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

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Know

- The key characteristics of ecosystems at a global and local scale (biotic and abiotic)
- The distinctive characteristics of rainforest and desert ecosystems
- The causes and impacts of deforestation
- How rainforests can be managed sustainably
- The opportunities and challenges of developing hot deserts – the Sahara Desert or Thar desert
- The causes and effects of desertification, and how it can be managed

Apply

- The impacts of altering the food chain or other aspects of ecosystems
- The global atmospheric circulation system – impact on biome distribution
- How have plants, animals and people adapted to the distinctive environmental characteristics in rainforests and deserts?
- The causes and effects of deforestation in the Amazon, Brazil
- The concept of sustainable development to the rainforest and hot desert environments
- How much is climate change responsible for desertification?

Extend

- How might climate change affect both local and global ecosystems?
- How can the need for economic development be balanced with the need to protect rainforests? Do HICs have the moral right to tell LICs what to do?
- To what extent is ecotourism truly sustainable?
- What will the future water security issues be in deserts if groundwater is extracted?

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?

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3.1.2.1 Ecosystems **Abiotic** Relating to non-living things. **Biotic** Relating to living things. **Consumer** Creature that eats animals and/or plant matter. **Decomposer** An organism such as a bacterium or fungus, that breaks down dead tissue, which is then recycled to the environment. **Ecosystem** A community of plants and animals that interact with each other and their physical environment. **Food chain** The connections between different organisms (plants and animals) that rely on one another as their source of food. **Food web** A complex hierarchy of plants and animals relying on each other for food. **Nutrient cycling** A set of processes whereby organisms extract minerals necessary for growth from soil or water, before passing them on through the food chain - and ultimately back to the soil and water. **Global ecosystem** Very large ecological areas on the earth's surface (or biomes), with fauna and flora (animals and plants) adapting to their environment. Examples include tropical rainforest and hot desert. **Producer**	Assessment will take 3 main forms: 1. In starters, plenaries and during the lessons – formative assessment to reinforce prior knowledge e.g. word searches, bingo, memory recall, definition matches etc. 2. For homeworks -tasks that require students to research new knowledge (e.g. characteristics of hot deserts) or apply existing knowledge to exam-style Qs (e.g. Qs from CGP book) 3. Summative assessments – past exam paper Qs in test or exam conditions, either as end-of-unit tests or in Y10 or Y11 formal exams.

An organism or plant that is able to absorb energy from the sun through photosynthesis. 3.1.2.2 Tropical rainforests Biodiversity The variety of life in the world or a particular habitat. Commercial farming Farming to sell produce for a profit to retailers or food processing companies. Debt reduction Countries are relieved of some of their debt in return for protecting their rainforests. Deforestation The chopping down and removal of trees to clear an area of forest. Ecotourism Responsible travel to natural areas that conserves the environment, sustains the wellbeing of the local people, and may involve education. It is usually carried out in small groups and has minimal impact on the local ecosystem. Logging The business of cutting down trees and transporting the logs to sawmills. Mineral extraction The removal of solid mineral resources from the earth. These resources include ores, which contain commercially valuable amounts of metals, such as iron and aluminium; precious stones, such as diamonds; building stones, such as granite; and solid fuels, such as coal and oil shale. Selective logging The cutting out of trees which are mature or inferior, to encourage the growth of the remaining trees in a forest or wood.	

Soil erosion Removal of topsoil faster than it can be replaced, due to natural (water and wind action), animal, and human activity. Topsoil is the top layer of soil and is the most fertile because it contains the most organic, nutrient-rich materials. **Subsistence farming** A type of agriculture producing food and materials for the benefit only of the farmer and his family. **Sustainability** Actions and forms of progress that meet the needs of the present without reducing the ability of future generations to meet their needs. **3.1.2.3 Hot deserts** **Appropriate technology** (Also called Intermediate technology) Technology that is suited to the needs, skills, knowledge and wealth of local people in the environment in which they live. It usually combines simple ideas with cheap and readily available materials, especially for use in poorer countries, and is environmentally friendly. **Biodiversity** The variety of life in the world or a particular habitat. **Desertification** The process by which land becomes drier and degraded, as a result of climate change or human activities, or both. **Hot desert** Parts of the world that have high average temperatures and very low precipitation. **Mineral extraction**	

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The removal of solid mineral resources from the earth. These resources include ores, which contain commercially valuable amounts of metals, such as iron and aluminium; precious stones, such as diamonds; building stones, such as granite; and solid fuels, such as coal and oil shale. Over-cultivation Exhausting the soil by over-cropping the land. Overgrazing • Grazing too many livestock for too long on the land, so it is unable to recover its vegetation.	

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
1. Introduction to Ecosystems	What is an ecosystem? What are the key components of an ecosystem?	Can I use all the complex terminology e.g. producer instead of plant; abiotic instead of non-living.	Starter: true or false? Define key terms: ecosystem, abiotic, biotic. Explain how ecosystems work: producers, consumers & decomposers. Food chains and food webs – who eats who? Nutrient cycling – how does it work? Explanation. Re-order the statements and apply ideas to an exam Q. Small-scale pond ecosystems – Qs on Oxford p53. Plenary: match the key terms to the definition.
2. Changes in ecosystems	How can ecosystems change?	Can ecosystems be restored after change?	Starter: how are these images linked? Categorise physical and human causes of change and explain 1 of each. Food web jenga – impacts of change on wood webs. Direct and indirect changes; slow and rapid changes. Pond ecosystem changes – activities 1&2 p55 Oxford; then practice exam Q. Q3 – extension.

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			Eutrophication clip: https://www.youtube.com/watch?v=UGqZsSuG7ao Plenary: should humans try to restore damaged ecosystems? Pros and cons?
3. Global biomes	What are the major global ecosystems? How does climate affect their distribution?	What other factors affect the distribution of global biomes? How will climate change affect biome distribution in the future?	Starter: listen to the song and identify any global biomes: https://www.youtube.com/watch?v=0A5eeE93uEA Distribution of biomes and explanation – link to global climate and atmospheric circulation model. Other factors affecting distribution. Either research a biome or complete a summary sheet for 3 biomes (excluding tropical rainforests and hot deserts). Plenary: name that biome from its description.
4. Tropical rainforests: distinctive characteristics	What are the distinctive characteristics of tropical rainforests? (TRFs)	Why are the rainforests like this?	Starter: what do you already know about TRFs? Recap from Y8. Distribution – describe where they are found. Climate – interpret climate graph to describe temperature and rainfall; explain the patterns; the rainforest water cycle. Soils – description and explanation of the nutrient cycle. Plenary: watch this overview clip: https://www.youtube.com/watch?v=UIbplCn8-zs
5. Tropical rainforests: adaptations and interdependence	How are plants and animals adapted to the TRF? How do different species rely on each other in TRFs?	What would happen if there were changes to the ecosystem?	Starter: true or false? TRF characteristics. Plants – species and vegetation structure; adaptations to the climate. Animals – species and adaptations. People – how they rely on the rainforest. Interdependence – how are the different components of the ecosystem interdependent? Plenary: what would happen if…..

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6. Rates and causes of deforestation.	How big a problem is deforestation? Why is it happening?	Prediction of future trends – both worldwide and in Brazil.	Starter: complete the picture…. Analysis of data to identify patterns and trends in deforestation worldwide. Case Study: Amazon rainforest. Look at trends of deforestation then explore causes of deforestation. https://www.youtube.com/watch?v=RawJ875KCco https://www.youtube.com/watch?v=K-seAAIsJLQ&fs=1&hl=en%5FUS&rel=0 Create a table of different causes with data. Plenary: which is the most important cause of deforestation? Discuss.
7. Impacts of deforestation and the value of rainforests.	What are the impacts of deforestation? Why are TRFs seen as valuable?	Should TRFs be protected? Who should decide?	Starter: match the type of impact to its meaning (social, economic, environmental). Create a spider diagram of impacts, adding place-specific information from CGP revision guide. Look at images or brainstorm ideas for why rainforests are valuable – locally and globally. Think about different stakeholders: what would their view be? Appreciation of biodiversity: David Attenborough 'jungle': https://www.bbc.co.uk/iplayer/episode/b0074tgb/planet-earth-8-jungles Plenary: discuss this Q: 'The rainforest is more valuable when left intact than when destroyed'. Using a case study, use examples to support or challenge this view. 9 marks.
8. Sustainable management of rainforests.	How can TRFs be managed sustainably?		Starter: classify impacts of deforestation into economic gain or loss OR how are these images linked? Recap what is meant m=by sustainable development. Clip: https://www.youtube.com/watch?v=FbAjxkGvDNs Explain the different strategies for sustainable management (RICE SHED) 1. Selective logging and Replanting 2. Conservation and Education 3. Ecotourism 4. International agreements about using Tropical Hardwoods and reducing Debt. https://www.youtube.com/watch?v=uRbcfTZmLbk Create a summary table of each one to explain how it works, the pros and cons.

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			Plenary: discuss this Q:'International Cooperation is the only way to protect tropical rainforests in the future.' Do you agree with this statement? (6 marks)
9. Hot deserts: characteristics	What are the key environmental characteristics of hot deserts?	How similar or different is the ecosystem to a tropical rainforest?	Starter: what do you already know about hot deserts? Whiteboards. Define deserts and describe & explain their distribution (link to atmospheric circulation model). Watch clip for overview of key characteristics: https://www.youtube.com/watch?v=2QdlF6Ld1oc Either: research in IT room or use A3 summary sheet to complete factfile of climate, soils, vegetation, animals, people and all their adaptations. Describe the biodiversity and ways in which the ecosystem components are interdependent. Plenary: sum up the ecosystem in 5 words
10. Opportunities and challenges for development in hot deserts.	For either the Sahara Desert or the Thar Desert: what are the opportunities for development? What are the challenges for development?	Do you think desert development is sustainable?	Starter: suggest ideas why development is deserts would be challenging, but how these challenges could be overcome. Create a case study of the different development opportunities and challenges in the desert. Pumpkin DVD 'Hot deserts: Opportunities and Challenges' and activities. Plenary: discuss this statement: there are more development opportunities than challenges in a hot desert environment. Homework Q: To what extent does a hot desert environment you have studied provide both opportunities and challenges for development? (9)
11. Desertification	What are the causes and effects of desertification ?	To what extent is desertificatio n caused by physical and human factors?	Starter: what do we think desertification is? Causes? Describe areas at risk from desertification and guess the % of land at risk – use map p74 Oxford. Read the resources on p75 Oxford and answer Qs about the likely causes of desertification, then complete gap-fill summary. Could also complete cut and stick flow diagram. Plenary: suggest the impacts of desertification on the environment and people.

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12. Reducing desertification	How can desertification be reduced?	How will climate change and population growth affect desertification in future?	Starter: suggest ideas for managing the problem. Read Oxford p76-77 and watch the first few minutes of the first 2 clips on this website: http://www.coolgeography.co.uk/gcsen/GCSE_LW_Desertification_Strategies.php This website also a quiz at the bottom. Answer Qs to explain how the different strategies can work: tree planting; water and soil management; appropriate technology. Combining strategies: the Great Green Wall - https://www.youtube.com/watch?v=4xls7K_xFBQ Plenary: discuss this Q: 'Desertification is largely caused by poor land management'. Use evidence to discuss this statement. (9 marks)