Edexcel GCSE Geography B Scheme of Work

Component 3, People and environmental issues – making geographical decisions

Introduction

Edexcel GCSE Geography B Investigating Geographical Issues offers an issues-based approach to the content and assessment, and the content is split by Global and UK scale. As with all GCSEs, the guided learning hours total 120 hours over two years. This document provides a sample scheme of work for teaching Component 3 Topics 7, 8 and 9 that can be adapted by centres to fit their timetabling and staffing arrangements. It is meant as an example approach only and is not intended to be prescriptive. This scheme of work follows the order of the content in the Geography B specification. This document can be edited and updated over time to develop a resource bank.

The scheme of work contains suggestions for resources that you can use to support your teaching. These are suggestions only of material you may find useful and you are encouraged to use a wide range of resources that suit the needs of your students.

Overview of Component 3

* Component 3 is worth 25% of the GCSE
* All students are required to study three topics
* Topic 7: People and the biosphere
* Topic 8: Forests under threat
* Topic 9: Consuming energy resources
* You need to allow 28 hours to teach Component 3: 4 hours for topic 7, 12 hours for topic 8, and 12 hours for topic 9.

Component 3 will be assessed in Paper 3 which is worth 25% of the GCSE assessment and is 1 hour 30 minutes in duration. The paper is marked out of 64, of which up to four marks are available for spelling, punctuation, grammar and use of specialist terminology. The sample assessment materials can be used for question practice to enable students to build up the confidence and skills as part of their revision and exam practice.

Health and safety

The practical work and fieldwork suggested within the scheme of work are those which we believe are not banned or restricted in any way and are still currently used in most schools and colleges. We advise teachers and technicians to discuss the merits of the suggested practical work and fieldwork when deciding which to carry out and how they will be carried out. You may have ideas for practical work and fieldwork which we have not suggested but would work just as well. As with all practical work and fieldwork, a risk assessment is expected as part of good health and safety practice in all centres. Reference to health and safety in the field is made in the specification.

Scheme of Work for Component 3, People and environmental issues – making geographical decisions

| Lesson | Learning objectives | Content (vocabulary, concepts, processes, ideas) | Place exemplification | Integrated skills | Teaching activities and resources |
| --- | --- | --- | --- | --- | --- |
| **Topic 7: People and the biosphere** |
| 1 lesson(1 hour) | Key idea 7.1:The Earth is home to a number of very large ecosystems (biomes) the distribution of which is affected by climate and other factors.Suggested learning objectives:To know the global distribution of the world’s major biomes.To recognise the different characteristics and reasons why the world’s major biomes are different. | 7.1aHow the global distribution and characteristics of major biomes (tropical, temperate and boreal forests, tropical and temperate grasslands, deserts and tundra) are influenced by climate (temperature, precipitation, sunshine hours).7.1b Local factors (altitude, rock and soil type, drainage) can alter the biome distribution locally and how the biotic (flora, fauna) and abiotic (soils, rock, water, atmosphere) components of biomes interact.Key wordsBiome/ EcosystemPressure beltsAltitudeBiotic/ AbioticFlora/ Fauna |  | Comparing climate graphs for different biomes **(homework task)**.Use of world maps to show the location of global biomes. | Starter *Interpreting images -* Show students a number of photographs of the world’s major biomes. Ask students to consider the following: * What makes them different?
* What is the vegetation like?
* What animals live there?

Possible photos can be sourced from the following website - [The Nature Conservancy](http://www.nature.org/ourinitiatives/habitats/rainforests/index.htm)Main activityProvide students with a copy of a world map showing the world’s major biomes. Students describe the distribution of the major biomes. Provide students with clues for the three key factors that influence the distribution through the use of cartoons – temperature, precipitation and sunshine hours. In pairs, students work out how the factors influence the distribution. Teacher brings group together and reviews ideas. Students then draw an annotated diagram to explain the different factors.Plenary*Hot seat -* Students (or the teacher) take on a role in the ‘hot-seat’ and answer questions posed by the rest of the class. |
| 1 lesson(1 hour) | **Key idea 7.2:**The biosphere is a vital life-support system for people as it provides both goods and services.Suggested learning objectives:To understand how the biosphere provides resources for indigenous and local people.To have an awareness of how the biosphere is increasingly being exploited.  | 7.2aHow the biosphere provides resources for indigenous and local people (food, medicine, building materials and fuel resources) but is also increasingly exploited commercially for energy, water and mineral resources.Key wordsBiosphereExploitationIndigenous people |  | Use and interpretation of line graphs showing the range of future global population projections, and population in relation to likely available resources. | Starter*Question pose/pair-discuss –* Provide a series of suitable pictures (around four) and ask the question – *What does biosphere mean?*Review student response as a whole-class discussion.Main activityProvide students with a blank copy of the ‘Biosphere Goods’ mind map – a copy of this can be obtained from Edexcel/ Pearson Geography B Evolving Planet student book. Students use the blank mind map and the separate information cards to write them in the correct place.Using the completed diagram, students provide an answer to the following two key questions:1. Why is the biosphere important for indigenous and local people?
2. Why is the biosphere being exploited for wider global use?

Review student answers through a whole-class discussion.Plenary*Summary tweet –* Students write a summary of what they have learnt in the form of a tweet. |
| 1 lesson(1 hour) | **Key idea 7.2:**The biosphere is a vital life-support system for people as it provides both goods and services.**Suggested learning objectives:**To know how the biosphere plays a wider important role for our planet. | **7.2b**How the biosphere regulates the composition of the atmosphere, maintains soil health and regulates water within the hydrological cycle, providing globally important services.**Key words**BiosphereHydrological cycle |  |  | Starter*Key word challenge –* Students work out the key words from the definitions provided:Biome - A plant and animal community covering a large area of the Earth’s surface.Exploitation - Making full use of something (often implying that the use is unfair and has a negative impact).Ecosystem - A community of plants and animals that interact with each other and their physical environment.Review responses.Main activityStudents create their own copy of the biosphere life-support system diagram - a copy of this can be obtained from Edexcel/ Pearson Geography B Evolving Planet student book.Teacher provides students with a series of fact cards on the goods provided by the biosphere – vitamins, medicines, fish, meat, timber, etc.Using the information provided students produce an awareness poster on the importance of the biosphere.Plenary*Question pose –* Students answer the following question:*Summarise in no more than 50 words how the biosphere plays an important role for our planet.* |
| 1 lesson(1 hour) | Key idea 7.2:The biosphere is a vital life-support system for people as it provides both goods and services.**Suggested learning objectives:**To know the reasons why the global demands for food, energy and water resources are increasing.To understand how theories can help explain the relationship between population and resources. | 7.2c The global and regional trends increasing demand for food, energy and water resources (population growth, rising affluence, urbanisation and industrialisation) and theories on the relationships between population and resources (Malthus and Boserup).Key wordsAffluenceUrbanisationIndustrialisationRising affluence Malthus theoryBoserup theory |  |  | Starter*Cartoon clues –* Provide cartoons that represent the reasons for the changing global and regional trends in demands for food, energy and water resources.In pairs, students try to work out which reason the cartoon represents.Main activityTeacher introduces the two different theories related to the relationships between population and resources – Malthus and Boserup. This could be presented in a summary table.Students use the summary table to write an answer to the following question.*How can theories be used to explain the relationships between population and resources?*Students review their answers through a peer assessment activity.Plenary*Tell me three –* Students describe their top three learning points from the lesson. |
| **Topic 8: Forests under threat** |
| 1 lesson(1 hour) | **Key idea 8.1:** The structure, functioning and adaptations of the tropical rainforest reflect the equatorial climate.**Suggested learning objectives:**To know how plants and animals have adapted to living in the tropical rainforest biome. | **8.1a**How biotic and abiotic characteristics are interdependent (climate, soil, water, plants, animals and humans), how plants (stratified layers, buttress roots, drip tips) and animals are adapted to the climate.Key wordsDrip tipsButtress rootsStratified layersLianasEpiphytes |  |  | Starter*Describing climate graphs –* Provide a climate graph for the Amazon rainforest and ask students a series of closed questions interpreting the data.Main activityUsing a world location map of the tropical rainforest biome and the climate graph (from the starter), students consider the reasons for specific tropical rainforest characteristics.Review response as a whole-class with students annotating their location maps of the tropical rainforest biome (from homework 1: topic 7).Show the following video clip on the different layers of the tropical rainforest - [Rainforest Layers](http://www.bbc.co.uk/education/clips/zkdnvcw).Provide students with a blank A3 diagram of the tropical rainforest structure and the key words. Students annotate their diagram with the key words.Teacher provides information on the ways in which plants and animals have adapted to the rainforest. Students add further detail to their diagram to explain the different ways plants and animals have adapted.Plenary*True or false –* Provide a series of true or false statements on the key learning points from the lesson. Students make a decision using two different coloured cards. |
| 1 lesson(1 hour) | **Key idea 8.1:** The structure, functioning and adaptations of the tropical rainforest reflect the equatorial climate.**Suggested learning objectives:**To understand the reasons why tropical rainforests have high levels of biodiversity. | **8.1b**Why tropical rainforests have a very high rate of nutrient cycling which, in turn, supports high levels of biodiversity and complex food webs.**Key words**BiodiversityFood websNutrient cycleTrophic levels |  |  | Starter*Review –* Students write the main layers of the tropical rainforest on a post-it note.Main activityTeacher introduces the three key words related to the cycle – inputs, recycling and outputs.Using a blank nutrient cycle and a series of key words, students decide which are inputs, recycling, and outputs of the cycle.Review student responses as a whole-class. Discuss the reasons why the tropical rainforest have very high nutrient recycling and biodiversity.Introduce the concept of trophic levels, food chains and food webs. Discuss the different trophic levels – level 1(producers), level 2 (primary consumers), level 3 (secondary consumers) and level 4 (tertiary consumers).Provide students with examples of the different trophic levels and get them to create a food web.Plenary*Picture quiz –* Show 10 pictures of different animals with students deciding the trophic level. |
| 1 lesson(1 hour) | **Key idea 8.2:** The taiga shows different characteristics, reflecting the more extreme and highly seasonal climate.**Suggested learning objectives:**To understand how plants and animals have adapted to living in the taiga biome. | **8.2a**.How biotic and abiotic characteristics are interdependent (climate, soil, water, plants, animals and humans), how taiga plants (cone-shaped, needles, simple structure) and animals (migratory) are adapted to the climate.8.2bWhy the taiga has lower productivity, with less active nutrient cycling and much lower levels of biodiversity. Key wordsNutrient cyclingBiodiversity |  |  | Starter*Interpreting images-* Show an image of the cone-shaped plants and ask students to decide how this helps them survive in the climatic conditions of the taiga (dominated by cold arctic air - long, severe winters and short summers).Main activityUsing a world location map of the taiga biome and a climate graph, students consider the reasons for the characteristics and lower levels of productivity compared to the tropical rainforest biome.Review response as a whole-class with students using their location map of the taiga biome (from homework 1: topic 7) to annotate the reasons for the characteristics.Provide students with a series of photographs and information cards on how plants and animals have adapted to living in the taiga. Students use the resources to create a mind map showing how plants and animals have adapted to the climate.Plenary*Question pose –* Students answer the following question to reflect on their learning from the lesson:*Explain one way in which plants, and one way in which animals have adapted to the taiga biome.* |
| 1 lesson(1 hour) | **Key idea 8.3:**Tropical rainforests are threatened directly by deforestation and indirectly by climate change.**Suggested learning objectives:**To know the cause of deforestation in tropical rainforests.To understand the social, environmental and economic impacts of deforestation in tropical rainforests. | 8.3aCauses of deforestation: commercial hardwood logging, subsistence and commercial agriculture, local demand for fuel wood and how demand for biofuels, mineral resources and electricity (HEP) contribute to deforestation.Key wordsDeforestationBiofuelsLoggingSubsistence and commercial agriculture |  |  | Starter*Contrasting images –* Provide one image of a forest cleared, and one of a forest not cleared through deforestation. Ask the following question – *Why does this happen?*Students discuss their ideas in pairs and write a response on a post-it note.Main ActivityShow the WWF photo ‘Deforestation for cattle ranching in the Amazon’ as an introduction for one of the causes of the clearing of tropical rainforests for cattle ranching - [Photos & Videos | WWF](http://www.worldwildlife.org/media?place_id=amazon).Provide students with cards on the key causes of deforestation in rainforests – logging, farming, HEP, biofuels, settlement growth, and road construction.Students rank the causes in order of importance, justifying their decisions.Teacher then provides a series of information sheets on the impact of deforestation in the Amazon rainforest. Students use this information to summarise the impacts in a table.

|  |  |  |  |
| --- | --- | --- | --- |
| Cause | Economic impacts | Social impacts | Environmental impacts |
|  |  |  |  |

Using the information gathered students answer the following question: *Explain one economic and one social impact of deforestation.*Plenary*Peer assessment* – Students peer assess answers using a marking grid, providing a WWW (what went well) and an EBI (even better if) comment. |
| 1 lesson(1 hour) | **Key idea 8.3:**Tropical rainforests are threatened directly by deforestation and indirectly by climate change.**Suggested learning objectives:**To understand the reasons why climate change is having an indirect impact on tropical rainforests. | **8.3b**Why climate change is an indirect threat to the health of tropical rainforests (ecosystem stress, drought).**Key words**DroughtEcosystem stress |  |  | Starter*Direct vs indirect* – Students are asked the following question at the start of the lesson – what is the difference between direct and indirect threats?Review student responses as a whole-class discussion.Main activityProvide differentiated versions of two articles on the Amazon rainforest:Drought – The Guardian provides a suitable article on the issue of drought in the rainforest.Students actively read the two articles on the indirect threats highlighting the key points.Then using the information provided students produce their own newspaper article on the indirect threats to the health of the rainforest. This could be used an additional homework activity should students not finish during the lesson.Plenary*Charades* - Teacher or students act out a key word, concept or idea from the lesson, and others guess the answer. |
| 1 lesson(1 hour) | **Key idea 8.4:**The taiga is increasingly threatened by commercial development.**Suggested learning objectives:**To know the direct and indirect threats to the commercial development of the taiga. | **8.4a**Direct threats from logging for softwood, pulp and paper production and indirect threats resulting from the exploitation of minerals, fossil fuels and HEP potential.**Key words**HEPFossil fuelsIndirect threatsDirect threatsExploitation |  |  | Starter*Question pose –* A review activity from the previous lesson on indirect threats, students answer the following question – *Explain how one indirect threat is impacting on the health of the Amazon rainforest.*Review responses by students sharing their answers.Main activityProvide resources on the following examples of direct threats on the taiga:1. Illegal logging in Russia Far East, known as ‘Ussuri Taiga’ to supply Chinese furniture – WWF article would be a useful resource - [Illegal logging in Russia](http://www.worldwildlife.org/publications/illegal-logging-in-the-russian-far-east-global-demand-and-taiga-destruction).
2. Canada’s tar sands – RAMP (Regional Aquatics Monitoring Program) is a useful resource - [Oil Sands development](http://www.ramp-alberta.org/resources/development.aspx)
3. HEP development in Canada’s boreal forests.

Students use the resources to summarise the key points on an A3 Y-chart - [Create a Y-chart](http://www.worksheetworks.com/miscellanea/graphic-organizers/ychart.html).Plenary*Tell me three –* Students describe their top three learning points from the lesson. |
| 1 lesson(1 hour) | **Key idea 8.4:**The taiga is increasingly threatened by commercial development.**Suggested learning objectives:**To understand how different factors can contribute towards the loss of biodiversity the taiga. | **8.4b**How acid precipitation, forest fires, pests and diseases contribute to a loss of biodiversity.**Key words**BiodiversityAcid precipitation |  |  | Starter*Interpreting images –* Show an image of a forest fire in the taiga biome. Students create a series of questions using the five W’s – Who? What? When? Where? Why?Main activityStudents to conduct a research-based activity on the threats to the taiga from acid precipitation, forest fires, as well as pests and diseases. Students could be allocated to work in pairs on one of the increasing threats. Research can be guided towards the Russian and Canadian boreal forests.Students present their threat as a PowerPoint presentation.Plenary*Newspaper headlines –* Students create a newspaper headline to sum up the learning from the lesson. |
| 1 lesson (1 hour) | Key idea 8.5Conservation and sustainable management of tropical rain forests is vital if goods and services are not to be lost for future generations.**Suggested learning objectives:**To know the advantages and disadvantages of global actions towards protecting tropical rainforests. | **8.5a**Advantages and disadvantages of global actions (the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Reducing emissions from deforestation and forest degradation (REDD)) designed to protect tropical rainforest species and areas and why deforestation rates are rising in some areas but falling in others.**Key words**CITESREDDDeforestation |  |  | Starter*Different views –* Provide six different views of the conservation and sustainable management of tropical rainforests. Students have to pick at least two of the views and decide on a scale of 1 to 5 whether they agree with the view. Students share their thoughts, justifying the decision made.Main activityIntroduce the two global actions of CITES and REDD by showing students their mission statements. Students complete a research activity looking at how the two types of global action projects work to protect the tropical rainforests.The research collected could be summarised in two tables one for CITES and one for REDD.

|  |  |
| --- | --- |
| Advantages of CITES | Disadvantages of CITES |
|  |  |

Plenary*Five-five-one –* Students complete the following review activity:* Summarise today’s topic in five sentences.
* Reduce to five words.
* Now to one word.
 |
| 2 lessons(2 hours) | Key idea 8.5:Conservation and sustainable management of tropical rain forests is vital if goods and services are not to be lost for future generations.Suggested learning objectives:To recognise the ways to achieve sustainable forest management of tropical rainforests. | 8.5bThe challenge of achieving sustainable forest management and why alternative livelihoods (ecotourism, sustainable farming) might better protect the remaining tropical rainforest.**Key words**EcotourismSustainable farming |  |  | Starter*What is? –* Students define what they understand by the terms ecotourism and sustainable farming.Main activity (two lessons)Provide a series of case study examples of how sustainable forest management can be achieved. These can be drawn from a number of tropical rainforest examples and could include:* Nature Conservancy – working with indigenous people in the Amazon rainforest
* The ‘Selective Management System’ in Malaysia
* Ecotourism in Costa Rica

Split the class into groups of four and allocate them each a different example of rainforest management. Students use the resources to produce a presentation on their management type.During the second lesson students present their findings to the rest of the group. The class should summarise the main points about each example in a table.The Plenary *Decisions –* Students summarise the three management techniques and decide which one they believe is the most effective in achieving long term sustainability (Stand in one of three areas of the room to indicate their choice). |
| 1 lesson(1 hour) | Key idea 8.6:The taiga wilderness areas need to be protected from over-exploitation.Suggested learning objectives:To have an awareness of the challenge of achieving sustainable forest management of the taiga. | 8.6aChallenges of creating and maintaining protected wilderness areas, national parks and sustainable forestry in the taiga.8.6bReasons for conflicting views on protecting or exploiting forest and natural resources in the taiga.**Key words**Sustainable forestryNational ParksExploitation |  |  | Starter*Exploring images –* Show a series of images to represent the Zabaikalsky National Park. Students then consider the following question – *Why would this place be important to protect?*Review responses through a whole-class discussion.Main activityProvide information packs on the following two examples of managing the taiga biome:1. Boreal Forest Platform (BFP)
2. Zabaikalsky National Park

In pairs, students work together to produce a speech on their management scheme. Provide the following guidance to structure their speech:* Overview of who is involved and how it aims to promote sustainability
* Different views on the use of the scheme.

Plenary*Agree or disagree? –* Following the sharing of selected speeches, students decide whether they agree or disagree with the type of management used and justify their decision. |
| Topic 9: Consuming energy resources |
| 2 lessons(2 hours) | Key idea 9.1:Energy resources can be classified in different ways and their extraction and use has environmental consequences.**Suggested learning objectives:**To recognise how energy resources can be classified as non-renewable, renewable and recyclable.To outline how the extraction of energy resources impacts on the environment.To understand how the use of renewable energy can have impacts on the landscape. | 9.1aHow energy resources can be classified as non-renewable (finite stocks of fossil fuel coal, oil and gas), renewable (flows of solar, wind, HEP) and recyclable (nuclear, biofuels).9.1bHow mining and drilling can have environmental impacts (landscape scarring, oil spills, carbon emissions, removal of forests) and the landscape impacts of renewable energy (HEP flooding, land use for wind turbines and solar panels).**Key words**Fossil fuelsHEPFinite stocksLandscape scarringCarbon emissions |  |  | Starter *Match-up* – Provide students with the key words – abiotic, biotic, renewable and non-renewable. Students match the key word to the correct definition.Review responses and discuss any misconceptions.Main activityDivide students into groups of four and allocate them one of the case study examples on the environmental impacts of mining and drilling, as well as the impacts of renewable energy on the landscape. Provide information packs on the different exploitation types: 1. Oil extraction in Ecuador (landscape scarring, oil spills, carbon emissions) – the WWF website have a range of resources for students to use.2. Deforestation in Cameroon (landscape scarring, carbon emissions, removal of forests) – the SAVE Wildlife Conservation Fund website provides a detailed overview of deforestation in the country.3. HEP flooding – The Three Gorges Dam example could be used here – The China Dialogue website provides a useful article for this example.4. Land use for wind turbines and solar panels – the Energy Collective has some information on this.First lessonUsing the information - either provided by the teacher or from internet research - students produce a two-minute speech. The speech is written as a representative for the prospective country, outlining the ways the environment or the landscape have been impacted by the extraction or generation of the energy resource.Second lessonStudents spend the first part of the second lesson finishing their speeches. Then students present their speeches to the rest of the group. During the speeches the students make notes on each presentation using a summary table.Plenary*Plenary Pyramid* – Provide students with a pyramid shape split into three sections. Students complete the following:*A. One question you are left with**B. Two concepts you understand that you didn’t know before**C. Three new pieces of vocabulary you now understand.* |
| 1 lesson(1 hour) | Key idea 9.2:Access to energy resources is not evenly distributed which has implications for people.**Suggested learning objectives:**To know the global pattern in energy use per capita.To outline the reasons for variations in energy use per capita. To appreciate how access to technology and physical resources affect access to energy resources. | **9.2a**How access to energy resources is affected by access to technology and physical resources (geology, accessibility, climate and landscape influences on renewable potential). 9.2bThe global pattern of energy use per capita and the causes of variations (levels of economic development, reliance of traditional fuel sources, demand from different economic sectors).**Key words**Energy per capitaGeology |  | Use and interpretation of world maps showing the distribution of energy resources. | Starter*Interpretation of maps –* Show a map of global energy use per capita – a suitable copy can be found in the Collins Student World Atlas.Students describe the pattern of energy use per capita. Review responses as a group and model an answer.Main activityProvide students with a copy of the ‘global energy use per capita’ map which students annotate with reasons as to why countries have differences in energy use. Through a whole-class exercise, discuss the countries chosen by each of the students and their reasons for choosing these. Teacher then discusses the three key reasons for variations – level of economic development, traditional fuel sources, and different economic sectors. Students then go back to their map and add further annotations to their chosen countries. Plenary*Tell me three –* Students describe their top three learning points from the lesson. |
| 2 lessons(2 hours) | **Key idea 9.3:**The global demand for oil is increasing, but supplies are unevenly available.**Suggested learning objectives:**To know how oil reserves and production are unevenly distributed.To outline the reasons why oil consumption is growing.To understand how oil supply and prices are affected by changing international relations and economic factors. | 9.3aHow oil reserves and production are unevenly distributed, and why oil consumption is growing (rising per capita GDP, rapid industrialisation in emerging economies).**9.3b**How oil supply and oil prices are affected by changing international relations (conflicts, diplomatic relations) and economic factors (periods of recession versus boom, over or under supply).**Key words**GDPIndustrialisationEmerging economiesInternational relationsRecessionDiplomatic relations |  | Use of oil price and oil production data to graph trends over time. | Starter*Mind map –* With a partner, students bullet point some ideas on the following question: *Why is the consumption of oil increasing?*After a few minutes, share students’ ideas as a whole-class discussion.Main activityFirst lessonTeacher introduces the learning through discussing the production and distribution of oil reserves using a suitable map.Teacher links in the reasons why oil consumption is growing.Students are then provided with a differentiated version of the conflict relating to the East Siberia-Pacific Ocean (ESPO) oil pipeline. Students use the information provided to summarise their understanding in a mind map.Second lessonStudents review their mind maps on the East Siberia-Pacific Ocean (ESPO) oil pipeline.Students then draft an answer to the following question:*Explain how the global production and supply of oil can cause conflict between countries.* Provide time for a peer assessment activity to review answers. Students then re-draft their answer following guidance from the peer-assessed activity.Plenary*KUW –* Students complete the following sentence stems to reflect on their learning from the lesson.*As a result of the lesson:**I know…**I understand…**I will investigate further…* |
| 2 lessons(2 hours) | **Key idea 9.4:**The world’s continuing reliance of fossil fuels increases pressure to exploit new areas.**Suggested learning objectives:**To understand the economic benefits and costs of developing new oil and gas sources in ecologically sensitive and isolated areas.To understand the environmental costs of developing new oil and gas sources in ecologically sensitive and isolated areas. | **9.4a**Economic benefits and costs of developing new conventional oil and gas sources in ecologically sensitive and isolated areas.9.5bEnvironmental costs (negative impacts on water quality and ecosystems) of developing new unconventional oil and gas sources (tar sands, shale gas) in ecologically sensitive and isolated areas.**Key words**Tar sandsShale gasEconomicEnvironmentalEcologically sensitive |  |  | Starter*Annotating images –* Provide an image to show the impact of tar sands in Canada. Students use the Five Ws (who, what, when, why, where) to create a number of questions.Main activity First lessonProvide a number of resources about the use of tar sands and fracking. Students use the information to create two summary fact files on developing the two energy resources. This lesson could also be done as a computer based research activity. Create two A4 fact files on the developing energy resources through the use of tar sands and fracking. For each fact file including the following:1. Where the reserves of each energy resource can be found
2. Images to represent the process of extracting the energy resource
3. A summary of how the resource is extracted
4. Economic costs and benefits of developing the extraction of the resource
5. Environmental costs and benefits of developing the extraction of the resource

Second lessonWhen the fact files are finished, students write an answer to the following question: *Assess the environmental costs of developing new oil and gas resources.*Plenary*Fiendishly tricky –* Students come up with three fiendishly tricky questions based on today’s lesson to ask their partner. |
| 1 lesson(1 hour) | **Key idea 9.5:**Reducing reliance on fossil fuels presents major technical challenges.**Suggested learning objectives:**To understand the role of energy efficiency and energy conservation in reducing the use of finite energy resources. | **9.5a**The role of energy efficiency and energy conservation (in transport and the home) in reducing demand, helping finite energy supplies last longer and reducing carbon emissions.**Key words**Energy efficiencyEnergy conservationCarbon emissionFinite energy suppliesSustainable developmentCongestion chargeVelibs |  |  | Starter*Scramble –* Teacher to provide a scrambled version of the definition which students unscramble. Show the following video clip outlining the concept: ‘Sustainability explained’ by GreenCollegeOnline (may be found on YouTube).Main activityTeacher provides a number of articles about the following examples of energy efficiency and conservation in the home, as well as through transport systems:1. Woking Borough Council – Oak Tree House
2. London Congestion Charge
3. Velibs – Paris

Using a carousel based activity, students rotate around the room to three learning stations. Students read the information about each of the schemes and record their understanding in a summary table.Once finished, students share their views from the information gained in the carousel activity.Students then provide an answer to the following question:*Explain how urban transport schemes can contribute towards lowering carbon emissions.*Plenary*Peer assessment –* Using a marking grid, students peer assess their answers and provide each other with a WWW (what went well) and an EBI (even better if) comment. Teacher reviews answers during marking process. |
| 1 lesson(1 hour) | **Key idea 9.5:**Reducing reliance on fossil fuels presents major technical challenges.**Suggested learning objectives:**To know the costs and benefits of alternative energy resources to fossil fuels. | **9.5b**Costs and benefits of alternatives to fossil fuels (biofuels, wind, solar and HEP) and future technologies (hydrogen) aimed at reducing carbon footprints, improving energy security and diversifying the energy mix.**Key words**BiofuelsHEPSolar powerHydrogenEnergy mix |  |  | Starter*Key word challenge –* Students work out the key word from the following definitions as a review activity from the last few lessons.Daily charge for driving a vehicle within a specific zone. [Congestion charge]Mining and processing to extract oil-rich bitumen. [Oil extraction]Natural gas that is trapped in fine-grained sedimentary rocks. [Shale gas]Monetary value of all the finished goods and services produced within a country's borders in a specific time period. [Gross Domestic Product]The use of fast flowing water to turn turbines which produce electricity. [HEP]Combustible sources of energy-like coal, oil or natural gas- that cannot be ‘remade’ because it would take millions of years for them to form again. [Fossil fuels]Main activityProvide students with differentiated packs on each of the alternative energy resources to fossil fuels – biofuels, HEP, solar power and hydrogen. Students actively read the packs to produce a detailed mind map on the costs and benefits of each energy resource.Plenary*Three–two–one RIQ*: Students show their learning by giving three recalls (facts), two insights and asking one question. |
| 1 lesson (1 hour) | **Key idea 9.6:**Attitudes to energy and environmental issues are changing.**Suggested learning objectives:**To appreciate how different groups have contrasting views about energy futures.To understand how attitudes are changing towards unsustainable energy consumption and reducing carbon footprints. | **9.6a**How different groups (consumers, transnational corporations (TNCs), governments, climate scientists and environmental groups) have contrasting views about energy futures (business as usual versus sustainable).9.6bHow, in some developed countries, rising affluence, environmental concerns and education are changing attitudes to unsustainable energy consumption and reducing carbon footprints.Key wordsCarbon footprintEcological footprintEnergy consumptionTNCsConsumersSustainableBusiness as usual |  | Calculation of carbon and ecological footprints. | Starter*What is the difference? –* Teacher displays the two phrases, ‘business as usual’ vs ‘sustainable’. Students work in pairs to decide the difference.Teacher reveals through a whole-class discussion.Main activityTeacher creates a series of characters with their views on energy futures:* Woking resident (1)
* Woking resident (2)
* Google representative
* Climate scientist
* McDonald’s representative
* Government representative

Students use the different views to discuss why there are variations in the approach to energy futures. This could be set up as a whole-class debate with students taking on the roles of the different characters.Students summarise their learning through producing a summary mind map at the end of the class debate.Plenary*Draw your learning -* Students illustrate what they have learned from the lesson and use a maximum of 30 words to describe each image. |

**Independent learning/homework**

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| **Topic 7: people and the biosphere** |
| Task 1 | *Mapping biomes* | Provide students with a blank world map and get them to map the key biomes they will be studying for the topics. Students then describe the distribution of the biomes mapped. |
| Task 2 | *Collage* | Students find images to represent how the Earth’s biosphere provides vital goods and services for people. Using their images, they create an A4 collage and to illustrate their ideas.  |
| **Topic 8: forests under threat** |
| Task 1 | *Comparing climate graphs* | Provide students with two different climate graphs for two different biomes. Students describe the climate graphs separately, and then write a comparative paragraph about the differences. |
| Task 2 | *Comparative writing* | Students write a comparative essay on the differences between the tropical rainforest and taiga biomes. Provide the following guidance for structuring their essay:1. *The location of the two biomes*
2. *The climatic conditions*
3. *The structure and animals present*
4. *Adaptations by plants and animals*
5. *The use and exploitation*
6. *The challenges to managing the biomes.*
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| Task 3 | *Key word glossary* | Students create a glossary of key words for the topic. |
| Task 4 | *Revision mind maps* | Students produce two mind maps (using both sides of a sheet of A3 paper) to summarise the key learning points for the topic to use for revision*.* |
| Task 5 | *A4 fact file* | Students research an example of how the tropical rainforest has been exploited for human benefit. Students present their findings in the form of an A4 fact file. |
| Task 6 | *10 facts* | Students research 10 interesting facts about the Amazon rainforest. |
| **Topic 9: consuming energy resources** |
| Task 1 | *Creating a divided bar chart* | Provide students with the following data to create a divided bar chart on the energy consumption in the US by energy source in 2010.*Petroleum (37%), Coal (21%), Renewable (8%), Nuclear (9%), Natural gas (25%).* |
| Task 2 | *Carbon footprint* | Students use the WWF footprint calculator and bring in their result with an action plan. Students share these during the start of the next lesson. |
| Task 3 | *Extended writing task* | Students complete the following extended writing question – *For one renewable energy resource, explain one cost and one benefit of using this resource for future energy security.* |
| Task 4 | *Key word glossary* | Students create a glossary of key words for the topic. |
| Task 5 | *Revision mind maps* | Students produce two mind maps (using both sides of a sheet of A3 paper) to summarise the key learning points for the topic to use for revision*.* |
| Task 6 | *Energy mix research* | Students research the energy mix for a country. Give students the choice for the format of presenting their country. Provide them with the follow structure:1. *A graph showing the energy mix*
2. *A description of the energy mix for that country*
3. *Suggested reasons for the energy mix of that country*
4. *Comparison with the UK energy mix.*
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