

INTERNATIONAL AS GEOGRAPHY (9635) Schemes of work

Human geography 1: Resource security

Human geography

Resource security

Specification content Week number	Subject specific skills development	Learning outcomes	Suggested learning activities (including ref to differentiation and extension activities)	Resources
Week 1 Concept of a resource and classifications to include stock and flow resources. Stock resource evaluation: measured reserves, indicated reserves, inferred resources, possible resources. Natural resource development over time: exploration, exploitation, development. Concept of the resource frontier. Concept of resource peak. Sustainable resource development. Environmental impact assessment (EIA) in	Use of key subject specific and technical terminology. To identify connections and interrelationships between different aspects of geography. Analyse issues with resources and sustainability. Research using the internet. Develop an awareness of stakeholders.	 Students can define the key basic resources vocabulary. Identify and explain the physical factors that affect the occurrence and availability of natural resources, including: geological structures geomorphological features climatic factors. Identify, describe and explain the human factors that influence whether and to what extent resources are developed including: factors that affect demand local, regional, national and/or global factors affecting the supply of the resources development of technologies affecting the demand for and the supply 	 View video to look at basics of resources such as journeyman economics to set the scene. Give pupils mixed up definitions of: stock resources flow resources flow resources measured reserves indicated reserves inferred resources possible resources Pupils work in groups to research these/match these up and note them down. Use articles from the internet to support students work in small groups to research the concepts of: resource frontier 	Journey man – global economics and resources: youtube.com/watch?v=sPHuvUAx7 G4 Project earth – resource based economy explained: youtube.com/watch?v=XDhSgCsD_ x8 Wikipedia definitions: en.wikipedia.org/wiki/Mineral_resou rce_classification PowerPoint presentation: unece.org/fileadmin/DAM/energy/se/ pp/unfc_egrc/egrc4_april2013/25_ap ril/UNFC_cube_animation.v5.mp4 Illustration of Arctic resource frontier: visual.ly/resource-frontier Article on deep sea mining: english.alarabiya.net/en/views/news /world/2014/11/12/Deep-sea-mining- the-new-resource-frontierhtml AQA GCE 2030 Geography 2016 June Geo4B resource on fracking: aqa.org.uk/subjects/geography/as-

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relation to resource development projects.		of resources • the effect of sources and flows of capital on the development of resources. Understand how the above factors combine to affect the levels of exploration, development, exploitation and decline of resources over time. Understand that the development of resources has to take into account both the present levels of demand and the possible long-term demands for that resource. Understand that the development of any resource has implications for the environment – both the physical and the human – and that responsible developers will take those implications into consideration when planning the resources exploitation.	occurrence of natural resources and their availability. Students could study guidance for carrying out an EIA and consider how this might be applied in a development scheme that has been suggested in the local area or widely publicised in the press.	and-a-level/geography-2030/past- papers-and-mark-schemes Wikipedia page has useful ideas for A-level geographers: en.wikipedia.org/wiki/Peak_minerals Discussion of the concept of 'Peak Oil', compare these two sites: fool.com and truthmove.org: fool.com/investing/general/2014/08/ 06/is-the-peak-oil-myth-dead.aspx truthmove.org/content/peak-oil/ Read Sustainable use of natural resources and then go to FAQs for further development of ideas: europa.eu/rapid/press- release_MEMO-05- 497_en.htm?locale=en Advice on carrying out an EIA (directed at real commercial or government organisations) can be found on the flow chart: gov.uk/government/uploads/system/ uploads/attachment_data/file/21869 9/env-impact-flowchart.pdf
Week 2 Natural resource issues	Use base maps. Develop the use of	Pupils will be able to describe patterns of water availability and demand.	Share maps of water availability, demand, scarcity, security etc with pupils to engage in	UN water security: unwater.org/topics/water- security/en/

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Global patterns of water availability and demand. The geopolitics of energy and water resource distributions, trade and management. Linked to Water security Water conflicts at a variety of scales – local, national, international.	internet research. Use of key subject specific technical terminology.	Pupils use research to analyse patterns of water availability and demand. Pupils use examples to link patterns of water availability and demand with geopolitics.	discussion. Use mid tariff questions to support description of pattern. Select a range of example places to look at analysing patterns – eg why is water security low in? (can do this in small groups to present). Look at videos to examine the importance of water and ask pupils to suggest why conflicts arise about water and if they can come up with any examples. Use an example to look at the geopolitics of water – reasons for this.	Smart water: smartwater.com/ University of East Anglia – water security: uea.ac.uk/watersecurity UN water for life: un.org/waterforlifedecade/scarcity.s html Global water fund: globalwaterfund.com/business- services/ Water politics looks at the issues surrounding water sharing, scarcity and demand: waterpolitics.com/blog/ Video – water our most precious resource: youtube.com/watch?v=Vlaw5mCjHP I TEDtalk – water think again: youtube.com/watch?v=NSL_xx2Qny c Waternet discusses water politics in the Middle East: waternet.be/ Stratford video introducing geopolitics of water: youtube.com/watch?v=FXSdxkV1XR A
Weeks 3–4	Use of key subject specific and technical	Develop from understanding of the distribution of water on	Revise/refresh key ideas on water cycle from work	Water stress map: wrsc.org/attach_image/world-water-

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Water security Sources of water; components of demand, water stress. Relationship of water supply (volume and quality) to key aspects of physical geography – climate, geology and drainage. Strategies to increase water supply to include catchment, diversion, storage and water transfers and desalination. Strategies to manage water consumption (including reducing demand). Linked to Resource futures Alternative energy and water futures and their relationship with a range of technological, economic, environmental and political developments.	terminology. Development of annotated diagrams. Online research. Construct and interpret distribution maps at a variety of scales. Comparison of maps to show how the distributions of phenomena are interrelated. Develop an awareness of the interrelationships between different aspects of the specification – most notably between the water and carbon cycles and water security. Develop knowledge and understanding of the various sources of water available for human use.	earth developed in the water and carbon cycles unit to understand how water is available for human use from: • direct precipitation • rivers • reservoirs and other stores • soil water • ground water • recycled water • desalination. Build on understanding of water balance developed during the water and carbon cycle unit to show an understanding of how this affects the water supply for people. Understand the relationship between: • precipitation • evaporation • infiltration	on water and carbon cycles – pupils develop diagrams to show how water is available for human consumption. Use maps to describe and explain world patterns of water stress. Go on to consider how the patterns of water stress are likely to develop over the next 20 years. Get pupils make map overlays from the base map. Use these to create an answer mid tariff examination style questions (probably six marks). Consider the relationships between physical and human factors in water needs and stresses. Use a local example of a climate graph to support work on water balance – give pupils factors and 'clues' to explain reasons for the balance seen (eg a climate graph, map of geology, urban and rural areas etc). Compare this with an	stress-map Article on present day water stress: wri.org/publication/aqueduct- country-river-basin-rankings Article on increased stress by 2040: wri.org/blog/2015/08/ranking- world%E2%80%99s-most-water- stressed-countries-2040 BBC News article on world water stress: bbc.co.uk/news/science- environment-18353963 Series of maps of world water supply and water stress: http://staging.unep.org/dewa/vitalwa ter/article69.html Explanation of the water balance equation and graphs: s-cool.co.uk/a- level/geography/river- profiles/revise-it/the-water-balance Human influence on the water balance: ramp- alberta.org/river/hydrology/human+i nfluences.aspx

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Sustainability issues associated with water management: virtual water trade, conservation, recycling,	Develop extended writing skills.	 drainage and the seasonal balance between them. Develop knowledge of water 	unfamiliar area to make a mind map of how and why factors affect water balance. Ask pupils to suggest how	Clear diagram of different types of aquifer: room6science.pbworks.com/f/Aquif er%2520Diagram.jpg More complex aquifer diagram:
'greywater' and groundwater management. Linked to Resource futures		conservation techniques, both in the home and in the wider world. Through a case study, develop knowledge and	to reduce demand and increase supply of water. Pupils research, note down and evaluate the use of catchment diversion; water	cattco.org/files/aquifer_diagram.jpg At a personal level: environment.nationalgeographic.co m/environment/freshwater/water- conservation-tips/
Alternative energy and water futures and their relationship with a range of technological,		 understanding of: water sources distribution networks 	transfers schemes, grey water, ground water management desalinisation, aquifers along with water reduction schemes. Some ability to	At an architectural level: wbdg.org/resources/water_conserv ation.php Desalination in Israel:
economic, environmental and political developments. Environmental impacts of a major water supply		 sustainability issues conservation recycling geopolities 	look at sustainability and suitability of the measures for various places. Ask pupils to view virtual	mcclatchydc.com/news/nation- world/national/article24765472.html Water transfers in Israel: stratfor.com/analysis/israels-water-
scheme incorporating a major dam and/or barrage and associated distribution networks.		 geopolitics conflict and its resolution. Students will analyse the sustainability of schemes to 	water trade maps globally and more regionally. Analyse what these show and suggest reasons for the balance.	challenge UN inventory of water use in Jordan basin: waterinventory.org/surface_water/jo rdan-river-basin
		reduce demand and conserve water, alongside looking at more national and international schemes.	Note that one of these could be developed later as a case study in more detail (end of SOL).	BBC Bitesize – Advantages and Disadvantages of dams: bbc.co.uk/education/clips/zwr2tfr
		Students will analyse the impacts of a major dam or		Lesotho highlands water project:

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		barrage and its distribution.	Use images of dams to spark/ ask questions (5Ws and 1H etc).	water- technology.net/projects/lesotho- highlands/
			Look at a video/read an article explaining how dams or barrages work and their impact on distributing and conserving water. Research a dam scheme and produce an essay on the nature of the scheme and its benefits and drawbacks. References to the Lesotho highlands water project are provided as an example.	Dam-affected people in Lesotho: web.archive.org/web/2007081907165 7/http:/www.irn.org/programs/lesoth o/pdf/pipedreams.pdf Hydrodependency in Africa: internationalrivers.org/resources/hy drodependency-in-africa-risky- business-3447 Dams and reservoirs: 12.000.scripts.mit.edu/mission2017/ dams-and-reservoirs/ International rivers – how dams affect water supply: internationalrivers.org/resources/ho w-dams-affect-water-supply-1727 Mekong dam issues – transboundary dam: transboundarywaters.orst.edu/resea rch/case_studies/Mekong_New.htm International rivers – why Africa should shun big dam projects: internationalrivers.org/resources/th e-wrong-climate-for-big-dams-1730

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Week 5 Natural resource issues Global patterns of production, consumption and trade/movements of energy. Link to: Energy security Sources of energy, both primary and secondary. Components of demand and energy mixes in contrasting settings. Natural resource issues The geopolitics of energy and water resource distributions, trade and management.	Use base maps. Develop the use of internet research. Use of key subject specific technical terminology.	 Pupils will be able to describe patterns of energy production, consumption and trade movements. Pupils use research to analyse patterns of energy production, consumption and trade. Pupils use examples to link patterns of energy distribution, trade and management. Pupils use examples to discuss the geopolitics of energy and the trade relationships based around energy. 	Share maps and graphs of energy production and consumption with pupils to engage in discussion. Link to sources of energy before analysing reasons for the pattern. Look at sources both primary and secondary. Use articles to support the concept and allow pupils to research around sources of energy. Find a graph of the local energy mix and ask pupils to link this to maps/ graphs of production and consumption – look at trends and change over time (examples of this in the UK can be found in the June 2016 Geo 4b examination resource). Use mid tariff questions to support description of patterns and connections. Select a range of example places to look at analysing patterns and trade relationships of energy – link to geopolitics – ie is	Year book world energy consumption: yearbook.enerdata.net/ BP statistical review of world energy: bp.com/en/global/corporate/energy- economics/statistical-review-of- world-energy.html International energy agency have lots of good resources: iea.org/publications/freepublication s/ Telegraph article on energy production: telegraph.co.uk/finance/newsbysect or/energy/oilandgas/11664366/BP- sees-tectonic-shift-in-world-energy- production.html Statistics Norway UN powerpoint on primary and secondary energy: unstats.un.org/oslogroup/meetings/ og-04/docs/oslo-group-meeting-04 presentation-definition-of-primary- and-secondary-energy.ppt China's energy consumption and peak: econmatters.com/2016/06/will-peak- oil-meet-peak-coal.html Forbes – geopolitics of energy article: forbes.com/sites/stratfor/2014/04/04/ the-geopolitics-of-

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			this relationship stable and sustainable? (can do this in small groups to present). Use an example to look at the geopolitics and trade of energy and reasons for this.	energy/#4909287d3b39 Europe, Russia and the geopolitics of energy article: journal- neo.org/2014/02/25/russia-europe- and-the-geopolitics-of-energy/
Weeks 6–7 Energy security Relationship of energy supply (volume and quality) to key aspects of physical geography – climate, geology and drainage. Energy supplies in a globalising world: competing national interests and the role of transnational corporations in energy production, processing and distribution. Environmental impacts of a major energy resource development such as an oil, coal or gas field and associated distribution networks.	Comparative graphing techniques. Extended writing to levels descriptors. Collect, analyse and interpret information from a range of secondary sources – including factual, numerical and spatial data. Critical questioning of information, and sources of information. Evaluating and presenting findings from research.	 Pupils analyse the relationships between energy to physical geography. Pupils analyse the role of TNCs in providing global energy. Pupils develop an understanding of the competition between national interests and TNCs in energy production, processing and distribution. Pupils can evaluate a major energy resource development and its distribution networks. Pupils can name, describe and explain various strategies used to increase energy supply. Pupils can name, describe and explain various strategies 	Select a source of primary energy to use an example eg gas reserves. Show a graph or map of its use/production of secondary energy from this primary source. Initiate discussion on why these places use more gas/make electricity from gas etc. Pupils use textbooks and internet research to identify how geology, climate, drainage etc impact on energy supply – can be natural supply of this or impacts on trading this resource. Watch video clip about the role of TNCs such as Talisman in Peru. Watch a clip about self- sufficient energy production	Geology on shale gas in the UK: bgs.ac.uk/shalegas/ 40 facts about solar energy: conserve- energy-future.com/various-solar- energy-facts.php http://www.conserve-energy- future.com/various-solar-energy- facts.php Greenpeace on mining and drainage: greenpeace.org/international/en/ca mpaigns/climate-change/coal/Coal- mining-impacts/ UGS world petroleum assessment: energy.usgs.gov/OilGas/Assessmen tsData/WorldPetroleumAssessment/ WorldGeologicMaps.aspx Talisman (TNC) drill for oil in Peru: youtube.com/watch?v=JLuJtsmTjn0 Denmark Salmo island: youtube.com/watch?v=FmJxUsXWa

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Strategies to increase energy supply (oil and gas exploration, nuclear power and development of renewable sources). Linked to: Resource futures Alternative energy and water futures and their relationship with a range of technological, economic, environmental and political developments. Strategies to manage energy consumption (including reducing demand). Linked to: Resource futures Alternative energy and water futures and their relationship with a range of technological, economic, environmental and political developments.		used to reduce energy demand. Pupils analyse the sustainability of the energy trade and production. Pupils link energy issues to current climatic issues such as acid rain and the enhanced greenhouse effect.	 – eg Norway or Salmo island in Denmark. Ask pupils to use research, resources in textbooks etc to produce a debate about whether TNCs should be involved in energy production etc. Use maps, graphs and a range of articles to select a specific development – may help to be localised. Ask pupils to produce a SWOT analysis on it and then use the EIA to evaluate this. If possible, use fieldwork/virtual fieldwork to complete this work. Card matching of various ways – pictures, maps of locations, examples etc. Pupils make notes from these and develop research. Ask pupils to look at the suitability and sustainability of these in your locality. 	jo Globalisation of shell: coolgeography.co.uk/A- level/AQA/Year%2013/Development %20%26%20Globalisation/TNCs/TN Cs_Shell.htm Video clip – BP defends multinational corporations: youtube.com/watch?v=- b8TFweBfcA Article on globalised energy markets: thenational.ae/business/energy/robin n-mills-why-globalised-energy- markets-are-worth-defending NYU video on reducing energy consumption: youtube.com/watch?v=tVZzMD1y5n s Top ten future energy sources: youtube.com/watch?v=uStFvcz9Or4 Video – addressing Asia's increasing demand for energy: youtube.com/watch?v=yH7LLWpuiktoo Chevron exploration and production: chevron.com/operations/exploration- -production

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Sustainability issues associated with energy production, trade and consumption: acid rain, the enhanced greenhouse effect, nuclear waste and energy conservation. Linked to Resource futures			Pupils do a personal and business review of their energy consumption and identify areas to improve. Look at writing a report to make recommendations to each other on a personal level and to businesses. Extend this to local or	EIA energy projects: eia.gov/todayinenergy/detail.php?id =12251
Alternative energy and water futures and their relationship with a range of technological, economic, environmental and political developments.			national. Use images as cue cards to ask pupils to review the sustainability of our current energy needs – use diagrams and graphs alongside mid tariff questions to support pupils understanding and explanation of the impacts.	
Week 8 Resource futures The connections between energy supply and water supply as exemplified by the geography of attempts to develop the technology to allow desalination of water on a significant scale and at	Use internet research. Develop subject specific vocabulary. Analyse source materials and the views of stakeholders.	Students should be able to explain the relationships between energy and water resources. Students should be able to explain how water desalination works and the costs and benefits of this. Students should develop an understanding of an example where desalination is	Ask probing questions – if the world needs more drinking water why not get it from the sea. Engage discussion. Use diagrams to explain the desalination process – how it works and its connection to energy and economy.	The cost of desalination: adventure.howstuffworks.com/survi val/wilderness/convert-salt- water2.htm Economic assessment of desalination: desline.com/Geneva/Banat.pdf Solar desalination plant in California: sfgate.com/science/article/California -drought-Solar-desalination-plant- 5326024.php Video – desalination in Algeria:

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an economic price.		occurring.	Create an argument for and against desalination using research and examples. Work as a class to look at a specific project and investigate the economic and energy costs.	youtube.com/watch?v=pHP8i4Yuah k Video – solar desalination in Abu Dhabi: youtube.com/watch?v=NgXPooc7K ml
NB When making the choice of energy or water case study – you may wish to 'slot' the case study in rather than leaving until the end of the unit. Week 9 Case study of either water or energy resource issues in a global or specified regional setting to illustrate and analyse theme(s) set out above, their implications for the setting including the relationship between resource security and human welfare and attempts to manage the resource.	Collect, analyse and interpret a range of qualitative and quantitative data from a range of primary and secondary sources – this could include discursive/creative material when looking at the experiences of people in place. Techniques to evaluate the geographical enquiry process.	Describe, explain and evaluate a number of themes relating to aspects of water /energy supply detailed above.	One of the case studies from the water/energy resources section of the scheme of work should be developed in this section.	See previous – Resources for specific case studies will depend on those chosen by the individual student/centre.

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NB When making the choice of energy or water case study– should make links to factors influencing water or energy from earlier in the scheme. Week 10 Case study of a specified place to illustrate and analyse how aspects of its physical environment affects the availability and cost of water or energy and the way in which water or energy is used.		 Pupils should be able to relate a range of detailed physical geography characteristics to energy or water supplies, issues and uses Identify and explain the physical factors (and human) factors that affect the occurrence, availability and demand of water/energy, including: geological structures geomorphological features climatic factors. factors that affect demand local, regional, national and/or global factors affecting the supply of the resources development of technologies affecting the demand for and the supply of resources the effect of sources and flows of capital on the development of resources. 	Give pupils a range of maps of your chosen/ local area – including drainage, geology etc. Provide other resources such as climate data. Ask pupils to make links to the energy/water use. Use research/local field study to look at the availability of water or energy – use base maps to look at choropleth maps. Add flow lines etc to identify transfers and balance of energy/water. Develop clear notes or student presentations on the availability and cost of water or energy and the way in which water or energy is used in the case study area. Engage pupils with higher tariff questions to assess learning.	See previous – Resources for specific case studies will depend on those chosen by the individual student/centre.

Quantitative and qualitative skills

Students must engage with a range of quantitative and relevant qualitative skills, within the theme water and carbon cycles. Students must specifically understand simple mass balance, unit conversions and the analysis and the presentation of field data.

Making connections

Students must consider connections between the subject matter studied and be able to apply their geographical knowledge and understanding in different contexts including within a unit, between units and to novel situations, ie geographical contexts beyond the specification. As water and carbon cycles is a core element of the specification it may be taught early in the teaching programme to allow students to then make links back to the core from their optional units.

GET HELP AND SUPPORT

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