

## IB ESS YEAR 2 - Unit 4 Natural Resources

<b>Teacher(s)</b>	IB ESS PLC	<b>Subject Group and Course</b>	Group 4 - ESS		
<b>Course Part and Topic</b>	Topic 7: Natural resources	<b>SL or HL / Year 1 or 2</b>	SL Year 2	<b>Dates</b>	5 weeks
<b>Unit Description and Texts</b>		<b>DP Assessment(s) for Unit</b>			
<ul style="list-style-type: none"> <li>● Oxford Textbook Topic 7</li> <li>● Topic 7.1 Natural resources - uses and management</li> <li>● Topic 7.2 Energy sources- uses and management</li> <li>● Topic 7.3 Solid Waste</li> </ul>		<ul style="list-style-type: none"> <li>● Formative/Summative assessment quizzes and activities/reports to check for understanding - Based in IB exam questions and format</li> </ul>			

### ***INQUIRY: establishing the purpose of the unit***

<p><b>Transfer Goals</b></p> <p><i>List here one to three big, overarching, long-term goals for this unit. Transfer goals are the major goals that ask students to “transfer” or apply their knowledge, skills, and concepts at the end of the unit under new/different circumstances, and on their own without scaffolding from the teacher.</i></p>
<p><b>Statement of Inquiry</b></p> <p>Natural resources are the raw materials and sources of energy used and consumed by society.</p> <ul style="list-style-type: none"> <li>❖ <i>How does the renewability of natural capital have implications for its sustainable use?</i></li> <li>❖ <i>How might societies reconcile competing perspectives on natural resource use?</i></li> <li>❖ <i>To what extent can human societies use natural resources sustainably?</i></li> </ul> <p><b>Phenomenon:</b> Declining oil fields in the North Sea</p> <p><b>Review Significant Ideas</b></p> <ul style="list-style-type: none"> <li>● There is a range of different energy sources available to societies that vary in their sustainability, availability, cost and sociopolitical implications.</li> <li>● The choice of energy sources is controversial and complex. Energy security is an important factor in making energy choices and has a significant impact on resource sustainability.</li> </ul>

- Scientists use a variety of techniques to study past, present, and possible futures of the Earth's climate.

***ACTION: teaching and learning through inquiry***

Content / Skills / Concepts - Essential Understandings	Learning Process
<p><u>Students will know the following content:</u></p> <ul style="list-style-type: none"> <li>• Fossil fuels contribute to the majority of humankind's energy supply, and they vary widely in the impacts of their production and their emissions; their use is expected to increase to meet global energy demand.</li> <li>• Sources of energy with lower carbon dioxide emissions than fossil fuels include renewable energy (solar, biomass, hydropower, wind, wave, tidal and geothermal) and their use is expected to increase.</li> <li>• Renewable energy prices and natural gas prices have fallen dramatically since 2015 due to recent technological innovations.</li> <li>• Nuclear power is a low carbon low-emission non-renewable resource but is controversial due to the radioactive waste it produces and the potential scale of any accident.</li> <li>• Energy security depends on adequate, reliable and affordable supply of energy that provides a degree of independence. An inequitable availability and uneven distributions of energy sources may lead to conflict.</li> <li>• The energy choices adopted by a society may be influenced by availability; sustainability; scientific and technological developments; cultural attitudes; and political, economic and environmental factors. These in turn affect energy security and independence.</li> <li>• Improvements in energy efficiencies and energy conservation can limit growth in energy demand and contribute to energy security.</li> <li>• <u>Students will develop the following skills:</u></li> <li>• Evaluate the advantages and disadvantages of different energy sources.</li> <li>• Discuss the factors that affect the choice of energy sources adopted by different societies.</li> </ul>	<p><i>Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.</i></p> <p>Learning experiences and strategies/planning for self-supporting learning:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Lecture</li> <li><input type="checkbox"/> Socratic seminar</li> <li><input checked="" type="checkbox"/> Small group/pair work</li> <li><input checked="" type="checkbox"/> PowerPoint lecture/notes</li> <li><input checked="" type="checkbox"/> Individual presentations</li> <li><input checked="" type="checkbox"/> Group presentations</li> <li><input checked="" type="checkbox"/> Student lecture/leading</li> <li><input type="checkbox"/> Interdisciplinary learning</li> </ul> <p>Details:</p> <p><i>Students will learn through a combination of presentations, team/small group work, activities surrounding threats to and conservation of biodiversity.</i></p> <p>Other(s): Use of social media - Instagram/Twitter for</p>

<ul style="list-style-type: none"> <li>● Discuss the factors that affect energy security.</li> <li>● Discuss strategies to manage natural resources.</li> <li>● Evaluate management strategies for sustainability.</li> <li>● Evaluate the energy strategy of a given society.</li> <li>● Discuss the feedback mechanisms that would be associated with a change in mean global temperature.</li> <li>● Evaluate contrasting viewpoints on the issue of climate change.</li> <li>● Discuss mitigation and adaptation strategies to deal with impacts of climate change.</li> <li>● Evaluate the effectiveness of international climate change talks.</li> </ul>	<p>increased awareness - creation of a children's book, game, etc to inform the younger generation of issues surrounding biodiversity</p> <p><b>Formative assessment(s):</b>          Quizzes          In class activities          Case studies          Research assignments          Role-playing study (EN-Roads from MIT Sloan Business School)</p> <p><b>Guidance:</b></p> <ul style="list-style-type: none"> <li>❖ <b>Strengths and weaknesses of the use of fossil fuels, of a renewable source of energy, and of nuclear power should be considered.</b></li> <li>❖ <b>Use case studies to highlight the energy choices of different countries.</b></li> <li>❖ <b>GHGs are those atmospheric gases that absorb infrared radiation, causing global temperatures to be higher than they would otherwise be.</b></li> <li>❖ <b>Students should be able to distinguish between the natural and the enhanced greenhouse effect and to identify a variety of human activities that contribute to GHG emissions.</b></li> <li>❖ <b>Students must understand the concept of tipping points and how it might be applied to climate change.</b></li> <li>❖ <b>A minimum of two different viewpoints should be considered</b></li> <li>❖ <b>CCS is carried out by carbon dioxide being compressed, transported and stored permanently underground (geological sites used as repositories) or chemically fixed to form a carbonate.</b></li> <li>❖ <b>Mitigation is the use of technology and substitution to reduce resource inputs and emissions per unit of output.</b></li> <li>❖ <b>Adaptation is the adjustment of natural or human</b></li> </ul>
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	<p><b>systems in response to actual or expected climatic stimuli or their effects, which either moderates harm or exploits beneficial opportunities.</b></p> <p><b>Two mitigation and two adaptation strategies should be considered</b></p>
<p><b>International Mindedness:</b></p> <ul style="list-style-type: none"> <li>• <b>Choice of energy sources can have impacts at both local and global level as emissions of greenhouse gasses can contribute to global climatic change.</b></li> <li>• <b>Political and economic situations around the world can affect energy security and choice of options.</b></li> <li>• <b>The impacts of climate change are global and require coordinated international action.</b></li> <li>• <b>The impacts of climate change are global and require global mitigation.</b></li> </ul>	<p><b>Summative assessments:</b> Group project Summative assessment over each subtopic and over Topic 7 all</p> <p><b>Differentiation:</b></p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Affirm identity - build self-esteem</li> <li><input checked="" type="checkbox"/> Value prior knowledge</li> <li><input checked="" type="checkbox"/> Scaffold learning</li> <li><input checked="" type="checkbox"/> Extend learning</li> </ul> <p><b>Details:</b></p> <ul style="list-style-type: none"> <li>• <i>SWD/504 – Accommodations Provided</i></li> <li>• <i>ELL – Reading &amp; Vocabulary Support</i></li> <li>• <i>Intervention Support</i></li> <li>• <i>Extensions – Enrichment Tasks and Project</i></li> </ul>
<p><b>Approaches to Learning (ATL)</b></p> <p><i>Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see <a href="#">the guide</a>.</i></p>	
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Thinking</li> <li><input checked="" type="checkbox"/> Social</li> <li><input checked="" type="checkbox"/> Communication</li> <li><input checked="" type="checkbox"/> Self-management</li> </ul>	

Research

Details: This topic provides students with a vast amount of information that can be studied in many ways. The ATLs used for this subtopic will vary depending on the individual students and groups approach to showing their understanding of the material

<b>Language and Learning</b> <i>Check the boxes for any explicit language and learning connections made during the unit. For more information on the IB's approach to language and learning, please see <a href="#">the guide</a>.</i>	<b>TOK Connections</b> <i>Check the boxes for any explicit TOK connections made during the unit</i>	<b>CAS Connections</b> <i>Check the boxes for any explicit CAS connections. If you check any of the boxes, provide a brief note in the "details" section explaining how students engaged in CAS for this unit.</i>
<p><input checked="" type="checkbox"/> Activating background knowledge  <input checked="" type="checkbox"/> Scaffolding for new learning  <input checked="" type="checkbox"/> Acquisition of new learning through practice  <input type="checkbox"/> Demonstrating proficiency</p> <p>Details:</p> <p><i>Students will acquire new vocabulary dealing with climate change and the impacts humans have on climate</i></p> <p><i>Connections:</i></p> <p><i>ESS: Energy and equilibria (1.3); sustainability (1.4); resource use in society (8.2); human population carrying capacity (8.4).</i></p> <p><i>ESS: Systems and models (1.2); energy and equilibria (1.3); threats to biodiversity (3.3); access to fresh water; human population carrying capacity (8.4)</i></p>	<p><input checked="" type="checkbox"/> Personal and shared knowledge  <input checked="" type="checkbox"/> Ways of knowing  <input checked="" type="checkbox"/> Areas of knowledge  <input checked="" type="checkbox"/> The knowledge framework</p> <p>Details:</p> <p>The choice of energy sources is controversial and complex—how can we distinguish between a scientific claim and a pseudoscience claim when making choices?</p> <p>There has been considerable debate about the causes of climate change— does our interpretation of knowledge from the past allow us to reliably predict the future?</p> <p>There is a degree of uncertainty in the extent and effect of climate change— how can we be confident of the ethical responsibilities that may arise from knowledge when that</p>	<p><input checked="" type="checkbox"/> Creativity  <input checked="" type="checkbox"/> Activity  <input checked="" type="checkbox"/> Service</p> <p>Details:</p> <p>Recycling initiatives</p> <p>Reducing wastes</p> <p>Reusing materials</p>

<i>ESS: Humans and pollution (1.5)</i>	knowledge is often provisional or incomplete?	
<b>Resources</b> <i>List and attach (if applicable) any resources used in this unit</i>		
<ul style="list-style-type: none"> <li>● Oxford Environmental Systems and Societies ISBN 978-0-19-833256-5</li> <li>● Biozone Environmental Science Student Workbook ISBN 978-1-927173-55-8</li> <li>● Hodder Education Environmental Systems and Societies Study and Revision Guide ISBN 978-1-471-89973-7</li> <li>● IB ESS Schoology Group</li> </ul>		

***REFLECTION: considering the planning, process, and impact of the inquiry***

<b>What worked well</b>	<b>What didn't work well</b>	<b>Notes / Changes / Suggestions</b>
<i>List the portions of the unit (content, assessment, planning) that were successful</i>	<i>List the portions of the unit (content, assessment, planning) that were not as successful as hoped</i>	<i>List any notes, suggestions, or considerations for the future teaching of this unit</i>

<p>Mitigations and Adaptations Strategies Assignment Personal Viewpoint Essay Global Warming and Climate Change</p>	<p>Webquest links need to be updated.</p>	<p>Encourage students to be able to answer IB questions and practice test taking strategies more frequently</p>
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