

Exploring Oceans PLC

1. What are the main characteristics of oceans?

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| 1. What are the main characteristics of oceans? | The global distribution of the world's oceans, their areas and volumes | | | |
| | The relief of ocean basins, including continental shelf and slope, abyssal plain, ocean ridges and rifts, ocean trenches and guyots. | | | |
| | Horizontal and vertical variations in salinity and temperature. | | | |
| | The global distribution of warm and cold surface currents. | | | |
| | The pattern of circulation in the North Atlantic, including both surface and deep currents. | | | |
| | How and why ocean ecosystems are influenced by changes in light, temperature and nutrient supply, which vary with latitude and depth. | | | |
| | A comparison of food chains, food webs and biodiversity in inter-tidal and deep-water ecosystems. | | | |

2. What are the opportunities and threats arising from the use of ocean resources?

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| 2. What are the opportunities and threats arising from the use of ocean resources? | Case study of the management of one renewable biological resource within oceans, such as krill or whale, including: | | | |
| | • the use and management of this resource | | | |
| | • how the values, attitudes, socio-economic status and political context of the stake holders influence the use and management of the resource | | | |
| | • the resilience of the resource and key thresholds to initiate management. | | | |
| | The use and management of ocean energy resources, including: • oil and gas (non-renewable resources) • wave and tidal energy (flow resources — renewable resources). | | | |
| | The use of sea-bed minerals, including ferrous and non-ferrous minerals, as examples of non-renewable resource use. | | | |
| | Oceans as part of the 'global commons', including the idea of the 'tragedy of the commons' | | | |
| | There are a series of zones extending out from the land that aim to help manage the ocean, including territorial waters, contiguous zone, exclusive economic zone (EEZ), high seas. Resource management through frameworks such as the United Nations Convention on the Law of the Sea (UNCLOS) and marine reserves. | | | |

3. How and in what way do human activities pollute oceans?

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| 3. How and in what way do human activities pollute oceans? | The major sources of pollutants, including combustion of fossil fuels, (such as carbon dioxide), and domestic and industrial pollutants, (such as plastics, heavy metals or nuclear waste). | | | |
| | Case study of one oil spill, including: | | | |
| | • impacts on the physical environment and marine ecosystems | | | |
| | • impacts on human activities such as fishing and tourism | | | |
| | • management of the oil spill and its impacts. | | | |
| | • How pollution, such as plastic, can spread around the globe via oceanic circulation and its impact on marine ecosystems | | | |
| | Case study of the accumulation of plastic in one ocean gyre such as in the North Pacific, including: | | | |
| | • causes of the accumulation | | | |
| | • the impacts on marine ecosystems. | | | |

4. How is climate change impacting the ocean system?

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| 4. How is climate change impacting the ocean system? | How acidification of oceans contributes to depleting fish stocks and has resulting impacts for people. | | | |
| | The rising temperature of the oceans and its threat to coral ecosystems, such as coral bleaching, loss in biodiversity and threats to local communities. | | | |
| | The causes of sea level change due to climate change, the thermal expansion of water and the transfer of water from the land to the oceans. | | | |
| | Case study of one island community in either the Indian Ocean, Pacific Ocean or the Caribbean Sea to illustrate: • the threats to island communities • the impact on communities • the adaptations by governments and communities in both the short- and long-term. | | | |
| | The impact of global warming on the extent of sea ice. The feedback between the extent of ice cover and the degree of warming. The concept of a threshold beyond which change becomes irreversible should be investigated in this context. | | | |
| | Case study of the Arctic region, including: • the geo-political implications of changes in ice-cover in the Arctic region • the impact on indigenous peoples • the threats and opportunities posed by the opening up of ocean route-ways and increasing access to ocean bed minerals • the management of the changing geography of the Arctic through international organisations. | | | |

5. How have socio-economic and political factors influenced the use of the oceans?

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| 5. How have socio-economic and political factors influenced the use of the oceans? | The pattern of principal shipping routes across the oceans, including the influence of changes in the scale of ocean shipping. | | | |
| | The direction and type of trade across the oceans. | | | |
| | The use of oceans by countries to exert their influence, including: | | | |
| | • the distribution of naval strongholds for one country, such as USA, Russia or China, including its home and overseas ports | | | |
| | • a marine conflict zone where countries dispute ocean territory areas. | | | |
| | The distribution of 21st century piracy and its management | | | |
| | The use of oceans as escape routes for migrants such as South East Asia to Australia or North Africa to Europe. | | | |