Geography 11–12

Human-environment interactions resource booklet

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# Rationale

This resource booklet is not a standalone resource. It has been designed for use alongside the geography 11–12 – human-environment interactions sample program. The material is a sample and is intended to support teachers as they develop contextually appropriate teaching and learning resources for their students’ needs. It is not intended to be taught exactly as is presented in its current format. There are instructions for the teacher and instructions for the student throughout the resources and activities. Teachers using this resource should edit and refine these to suit their students’ needs, interests, abilities and the texts selected.

The content in this resource booklet has been prepared by the HSIE curriculum team, unless otherwise credited. The HSIE curriculum team have created a series of other support resources for geography 11–12, including sample assessment schedules, scope and sequences and assessment tasks. [Planning, programming and assessing geography 11–12](https://education.nsw.gov.au/teaching-and-learning/curriculum/hsie/planning-programming-and-assessing-hsie-11-12/planning-programming-assessing-geography-11-12) contains key information to complement this resource.

Some of the information in this resource is collated from relevant NESA and department documentation. It is important that all users re-read and cross-reference the relevant syllabus, assessment and reporting information hyperlinked throughout. This ensures the content is an accurate reflection of the most up to date syllabus content. Links contained within this resource were correct as of 1 November 2023.

# Purpose, audience and suggested timeframes

The purpose of the program is to encourage and foster students’ curiosity and wonder about human diversity across the Earth’s surface, by analysing the spatial patterns and characteristics of the human impact. They examine the ways in which human actions have shaped these patterns and processes. The program involves an in-depth exploration of geopolitical characteristics, political tension and conflict, and contested spaces, with a focus on understanding the impacts of human actions. Students develop critical thinking skills and gain a deeper understanding of the interconnectedness of political, economic, social, cultural and environmental factors in shaping our world. The timeframe is suggested as a 6-week program of approximately 3 to 4 lessons per week. Human environment interaction focus area is 20 indicative hours.

# Using this resource booklet

The program has been designed for delivery in Term 3 of Year 11. It provides opportunities for the teacher to develop a rapport with their class while getting to know their needs, interests and abilities. Short, engaging materials have been selected to examine the spatial patterns and extent of the human footprint, and the human transformations shaping those patterns. This approach enables students to develop a strong foundation in geography 11–12 while helping the teacher assess their comprehension and skills. The following is an outline of some of the ways this resource booklet can be used:

* use the resources and/or activities as samples and models, tailoring them to address contextual needs and specific learning objectives
* review the resources and activities during faculty meetings and/or planning days, refining them collaboratively to align with faculty or school goals
* discuss the resources and activities during faculty meetings or planning days, jointly planning opportunities for team teaching, mentoring, lesson observation and sharing of student samples
* use the resources and/or activities as samples with students, fostering a deeper understanding of people, patterns and processes
* employ the examples of resources and/or activities as a blueprint for designing student-specific tasks that cater to individual learning styles and needs
* assign resources/activities independently or as flipped learning, preparing students for class collaboration and/or revision activities
* leverage the strategies, texts, assessment practices, pedagogical practices and/or syllabus planning as an opportunity to backward map Years 7–10, ensuring a cohesive and comprehensive learning experience in geography.

# Activity 1 – Is it natural or human-induced change?

Conduct research to complete Table 1. The following websites provide a starting point for the research:

* [Australian Bureau of Meteorology](http://www.bom.gov.au)
* [Australian Government Department of Agriculture, Fisheries and Forestry](http://www.awe.gov.au)
* [US Geological Survey](http://USGS.gov) (USGS).

Table – change and examples

|  |  |  |
| --- | --- | --- |
| Natural and/or human change | Example | Natural or human induced change? Or both? |
| Erosion: research on how natural processes like wind, water and ice wear away soil and rock, changing the landscape over time. | The Grand Canyon’s formation due to erosion by the Colorado River over millions of years. |  |
| ****Floods**: understand the reasons behind flooding and its effects on both the natural environment and human settlements.** | **The 2010 Pakistan floods which changed river courses and landforms.** |  |
| ****Earthquakes**: explore the causes and effects of earthquakes, and how they change the natural landscape.** | **The 2010 Haiti Earthquake and its impact on the landscape and communities.** |  |
| ****Water management:** explore human-induced changes in water systems, including dam construction and water extraction.** | **The construction of the Snowy Mountains Scheme and its impact on river ecosystems.** |  |
| ****Drought**: research the causes and impacts of prolonged dry periods in Australia.** | **The Millennium Drought (1997–2009) and its effects on agriculture and water resources.** |  |
| ****Urbanisation:** research the growth of cities and towns, and how urbanisation alters the natural environment.** | **Urban sprawl in Los Angeles and its impact on local ecosystems.** |  |
| ****Bushfires:** explore the occurrence and consequences of bushfires in Australia.** | **The 2019–2020 Australian bushfire season and its impact on wildlife, communities and the environment.** |  |
| ****Coral bleaching:** investigate the natural and human-induced factors contributing to coral bleaching in the Great Barrier Reef.** | **Mass coral bleaching occurred in 2019–2020 in the Great Barrier Reef.** |  |
| ****Pollution:** investigate different types of pollution (air, water, soil) and how they are caused by human activities.** | **The Great Pacific Garbage Patch as a result of ocean pollution.** |  |
| ****Deforestation:** examine the causes and impacts of deforestation, focusing on regions in Australia where logging is prevalent.** | **Deforestation in Queensland and its impact on local ecosystems and species such as the koala.** |  |
| ****Invasive species:** research how the introduction of non-native species by humans has altered the natural ecosystems in Australia.** | **The introduction of rabbits and their effect on vegetation and soil erosion.** |  |

# Activity 2 – evidence of climate change in the contemporary world and over time

Complete Table 2 about the evidence of climate change in the contemporary world and over time.

Table – climate change in the contemporary world and over time

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Climate change in the contemporary world | ****Climate change over time**** | Evidence | Source | Natural and/or human induced? |
| Temperature data: global temperature data is crucial in understanding the extent of climate change. |  |  |  |  |
| Ice cap sizes: the size of ice caps and glaciers is a direct indicator of the global climate’s state. |  |  |  |  |
| Sea levels: rising sea levels are a result of thermal expansion (as water warms, it expands) and the melting of ice caps and glaciers.  Coastal regions and small island nations are particularly vulnerable to rising sea levels, which lead to erosion, increased flooding and other coastal hazards. |  |  |  |  |
| Historical climate data: records from physical, chemical and biological materials preserved within the geologic record. These materials offer clues to the climate conditions of the past. |  |  |  |  |
| Indirect measurements: data from natural sources like tree rings, ice cores, corals and sediments from oceans and lakes. These materials hold information about climate conditions over varying time scales. |  |  |  |  |

# Activity 3 – land cover change at a global scale

Students complete the following questions about land cover change at a global scale, including deforestation, desertification, melting glaciers and retreating ice sheets.

Deforestation dynamics and drivers:

* How has deforestation impacted biodiversity in the Amazon Rainforest over the past decade?
* What are the primary human activities contributing to desertification in Sub-Saharan Africa?
* Using Geographic Information System (GIS) and remote sensing data, how can you compare the extent of deforestation in the Brazilian Amazon between 2000 and 2020?

Glacier melting and ice sheet retreat:

* How is glacier melting in the Himalayas affecting the availability of freshwater in surrounding regions?
* What are the consequences of the Greenland Ice Sheet retreat on global sea-level rise?

Climate change connection:

* How do global land cover changes contribute to the broader issue of climate change?
* How can local communities be engaged in efforts to prevent or reverse land cover changes such as deforestation?

Technological solutions and future projections:

* How can spatial technologies like GIS and remote sensing aid in monitoring and addressing land cover changes at a global scale?
* Based on current trends, what are the projected impacts of melting glaciers on global freshwater resources by 2050?

# Activity 4 – spatial and temporal characteristics of climate change

The spatial and temporal characteristics of climate change at a global scale refer to how climate change manifests differently across various locations (spatial) and over different time periods (temporal).

Students read the following spatial and temporal characteristics examples. Conduct further research and complete the following tables.

Table – spatial characteristics and examples

|  |  |  |
| --- | --- | --- |
| Spatial characteristics | Examples | Other examples |
| * Involves the geographical distribution and localised impact of climate change. * Vary widely from region to region, including changes in temperature, precipitation patterns, frequency of extreme weather events, sea-level rise, glacial melting and shifts in ecosystems and biodiversity. | **Polar regions**  The Arctic’s rapid warming, resulting in the shrinking and thinning of sea ice. Impact on polar bears, walruses and other species dependent on sea ice.  Antarctica’s ice shelf disintegration and glacier retreat. The melting of the West Antarctic ice sheet contributes significantly to sea-level rise.  **Oceans**  Sea-level rise caused by the melting of polar ice and thermal expansion of seawater. This leads to inundation of low-lying areas and islands, coastal erosion and habitat loss.  **Ocean acidification**  Increased CO2 absorption lowers pH levels, affecting marine life, particularly organisms with calcium carbonate shells or skeletons.  **Forests and terrestrial ecosystems**  Shifts in vegetation zones, altered rainfall patterns and temperature regimes are causing shifts in plant species distribution, potentially leading to forest dieback in some regions.  Increased wildfires due to warmer and drier conditions in many regions, are leading to more frequent and intense wildfires.  **Deserts and arid regions**  Desertification expansion of desert areas due to reduced rainfall and increased evaporation. This affects soil quality, agriculture and water resources.  **Mountain regions**  Glacial retreat: many mountain glaciers are retreating, affecting freshwater supplies for millions of people downstream.  **Altered ecosystems**  Changes in snow cover and melting patterns affect mountain biodiversity and ecosystems.  **Urban areas**  Heatwaves and urban heat islands in cities often experience higher temperatures than surrounding areas, exacerbating the effects of heatwaves on human health and energy demand. |  |

Table – temporal characteristics and examples

|  |  |  |
| --- | --- | --- |
| Temporal characteristics | Examples | Other examples |
| * Involves the timing and duration of climate change impacts over short-, medium- and long-term periods. * Short-term variations might include year-to-year changes in weather patterns or the frequency of extreme weather events like cyclones or droughts. * Medium-term changes could be observed over decades, such as shifts in average temperature or precipitation patterns, affecting agriculture and water resources. * Long-term trends span centuries and even millennia, involving gradual but significant shifts like the alteration of global temperature averages and sea-level rise. | **Seasonal changes**  Altered growing seasons, changes in temperature and precipitation patterns are affecting agricultural practices and crop yields.  Shifts in animal migration and breeding cycles: wildlife is adjusting migration patterns and breeding times in response to climate changes.  **Year-to-year variability**  Increased frequency and intensity of extreme weather events with more intense storms, droughts and flooding events are becoming more common.  **Decadal trends**  Gradual changes in climate norms in areas that are experiencing gradual shifts in average temperatures, precipitation patterns and extreme weather event frequencies.  **Long-term changes (centuries to millennia)**  Ice Age cycles are natural long-term cycles and are overlaid by human-induced climate changes, complicating predictions for future climate conditions. |  |

# Quality assurance alignment

**NSW Syllabus:** [Geography 11–12 Syllabus](https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022?tab=course-overview) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2022.

**Author:** Curriculum Secondary Learners

**Related resources:**

Geography 11–12 resources, including sample assessment schedules, scope and sequences, programs, resource booklets and assessment tasks:

* [Planning, programming and assessing geography 11–12](https://education.nsw.gov.au/teaching-and-learning/curriculum/hsie/planning-programming-and-assessing-hsie-11-12/planning-programming-assessing-geography-11-12)
* [Geography Year 11: sample scope and sequence (DOCX 76.55 KB)](https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/curriculum/hsie/media/documents/geography-Year-11-scope-and-sequence.DOCX)
* [Geography Year 11: sample assessment schedule (DOCX 74.0 KB)](https://education.nsw.gov.au/content/dam/main-education/teaching-and-learning/curriculum/hsie/media/documents/geography-Year-11-assessment-schedule.DOCX)

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# References

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[Geography 11–12 Syllabus](https://curriculum.nsw.edu.au/learning-areas/hsie/geography-11-12-2022/overview) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2022.

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