# Stage 5 Geography: Environmental Change and Management



This resource has been designed to support teachers by providing a range of tasks based on syllabus content. Tasks can be incorporated into context driven teaching and learning programs in full or can be used to supplement existing programs. All content is textbook non-specific.

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## Overview

Students develop an understanding of the functioning of environments and the scale of human-induced environmental change challenging sustainability. They explore worldviews influencing approaches to environmental use and management. Students undertake an investigative study of the causes and consequences of environmental change in an environment in Australia and another country. They compare and evaluate the management responses in both countries and propose ways individuals can contribute to environmental sustainability.

### Key inquiry questions

* How do environments function?
* How do people’s worldviews affect their attitudes to and use of environments?
* What are the causes and consequences of change in environments and how can this change be managed?
* Why is an understanding of environmental processes and interconnections essential for sustainable management of environments?

### Outcomes

A student:

* **GE5-2** explains processes and influences that form and transform places and environments
* **GE5-3** analyses the effect of interactions and connections between people, places and environments
* **GE5-4** accounts for perspectives of people and organisations on a range of geographical issues
* **GE5-5** assesses management strategies for places and environments for their sustainability
* **GE5-7** acquires and processes geographical information by selecting and using appropriate and relevant geographical tools for inquiry
* **GE5-8** communicates geographical information to a range of audiences using a variety of strategies.

Outcomes and key terms referred to in this document are from [Geography K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/hsie/geography-k10/) © 2015 NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales.

## Capacity matrix

**Note**: Explain to the class how to use the [Capacity matrix](#_Appendix:_Capacity_matrix) (Appendix). Ensure students understand and can distinguish between the information, knowledge, know-how, and wisdom categories in the matrix.

The Capacity matrix can be used as a formative assessment tool that clarifies student understanding of course concepts for the duration of the learning sequence. For more information, see Quality Learning Australasia’s [The Capacity Matrix](http://www.qla.com.au/capacity-matrix). Please note that teachers need to register to access the free resources on this site.

Review the [Capacity matrix](#_Appendix:_Capacity_matrix) for geographical concepts and terms relating to the topic ‘Environmental Change and Management’. Using different colours for the matrix criteria, shade or tick where you think you are according to the matrix categories for each geographical concept. The criteria for the matrix include:

* information – at this level, you have heard of the term and/or you can recall basic facts about it
* knowledge – at this level, you can explain and know what the term or concept means
* know-how – at this level, you can draw connections between this geographical term or concept and relate them to other concepts or situations
* wisdom – at this level, you can use the term or concept in new contexts or teach others.

You will revisit this matrix throughout the learning sequence.

## Learning sequence 1: How do environments function?

Students:

* investigate the role and importance of natural environments, for example:
* identification of the function of natural environments in supporting life, for example maintaining biodiversity.

**Note:** The key inquiry question for the first learning activities is ‘How do environments function?’ This is important content for students to understand before studying human induced environmental change as it establishes the importance of the environment in supporting human life and welfare.

For the final activity in this section, students should be divided into 4 groups, each allocated one of the spheres to research.

Use the following resources to complete a [concept map](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/577) illustrating 10 key benefits of the natural environment to humans using:

* [Benefits of nature](https://www.environment.nsw.gov.au/get-involved/sydney-nature/benefits-of-nature)
* Earth Day, [What does nature give us?](https://news.mongabay.com/2011/04/what-does-nature-give-us-a-special-earth-day-article/)

Use [Earth’s Interconnected Cycles (4:11)](https://www.youtube.com/watch?v=6j5iHvYBIcg) and school resources to complete the ‘Spheres’ table below:

Table 1 – Spheres

|  |  |
| --- | --- |
| Sphere | Definition and function of the sphere |
| Atmosphere |  |
| Hydrosphere |  |
| Lithosphere (geosphere) |  |
| Biosphere |  |

In your assigned group, complete a ‘[Step Inside](https://pz.harvard.edu/resources/step-inside)’ thinking routine from the perspective of your assigned sphere. Research:

* the function and importance of the sphere to humans and the planet
* what you believe the ‘sphere’s perception’ of the changes that humans are making to it might be.

Present your sphere’s perspective to the class. Use the following scaffold as a guide: ‘I am (sphere); I serve the planet by (functions and importance); humans are changing me by (human changes).’

Use [environmental functions](https://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/syllabus/humanities-overview/glossary/environmental-functions) or school resources to complete definitions for the following functions of the environment:

* source
* sink
* service
* spiritual.

Use the following resources to write a paragraph explaining the source, sink, service, and spiritual functions of the rainforest environment:

* [A flying river? – How the Amazon Forest produces the largest flying river in the world](https://www.environment.co.za/world-environmental-issues-news/a-flying-river-how-the-amazon-forest-produces-the-largest-flying-river-in-the-world.html)
* [Why are rainforests important?](https://www.rainforestconcern.org/forest-facts/why-are-rainforests-important)
* [What are carbon sinks? (2:00)](https://www.youtube.com/watch?v=OoW2PlvMpZs).

## Learning sequence 2: Environmental change

Students:

* investigate human-induced environmental changes across a range of scales (**ACHGK070**)
* brief examination of types, and extent, of environmental change.

**Note:** For this activity, split students into small groups and assign a human-induced environmental change to each group. Examples of such changes include: land or soil degradation, acid rain, ocean acidification, use of insecticides, and light pollution at night. It is important to select issues that have not been studied previously. Human-induced changes from coal seam gas extraction and introduced plants should also be avoided as they are covered in later activities in this sequence. Students will need an explanation of what is required by the directive term ‘assess’ before completing this task. Whilst there are some resources provided in the learning sequence to get students started on their issue, more may need to be provided for depth and to suit issues relevant in the student context.

In your group, create a short presentation using [Canva](https://app.education.nsw.gov.au/digital-learning-selector/LearningTool/Card/653) to present to an environmental panel. This panel is offering funding to combat the ‘greatest threat’ to the planet. Your task is to convince the panel to give your group the funding. Your presentation should:

* describe which human actions have caused the issue
* explain the type and scale of environmental damage
* analyse why the environmental issue is the ‘greatest threat to the planet.’ This should include reference to the functions of this environment and the impact of changes to natural processes
* assess how well one strategy, used to combat this problem, has worked.

Resources for this task:

* [Soil degradation](https://www.environment.nsw.gov.au/topics/land-and-soil/soil-degradation)
* [What is Ocean Acidification? (2:05)](https://www.youtube.com/watch?v=ogZkV-Yj7Hc)
* [Insecticides: Killing the Good and the Bad](https://www.britannica.com/explore/savingearth/insecticide)
* [Light pollution is bad for us and for wildlife. So what can we do to solve the problem?](https://www.abc.net.au/news/science/2020-06-20/light-pollution-is-bad-for-us-and-for-wildlife/12373776)

As each group presents, observing groups will collaboratively complete [Two stars and a wish](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/549) feedback and summarise this into the ‘feedback table’ below:

Table 2 – Feedback

|  |  |  |
| --- | --- | --- |
| Group | 2 stars | Wish |
| Group 1 |  |  |
| Group 2 |  |  |
| Group 3 |  |  |
| Group 4 |  |  |
| Group 5 |  |  |
| Group 6 |  |  |

At the end of the presentations, each group will use the information in the table to select the ‘greatest threat’ and submit one class vote.

### HPGE task

**Note:** Because this site contains a lot of data from different countries, an example should be reviewed with students before starting the activity.

Go to the 2022 [Environmental Performance Index](https://epi.yale.edu/epi-results/2020/component/epi) and click on ‘Australia.’ Complete a [PMI](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/551) chart on our environmental management. Include information on:

* areas where Australia has performed well, as indicated by a high number or a positive 10-year change
* areas where Australia has performed poorly as indicated by a low number and a negative 10-year change.

Compare the performance of Australia with one country that has a higher EPI score and one country that has a lower EPI score. Outline your observations for each and explain why you think this is the case.

## Learning sequence 3: Environmental management

Students:

* investigate environmental management, including various worldviews and the management approaches of Aboriginal and Torres Strait Islander Peoples, for example: (**ACHGK071, ACHGK072**)
* discussion of varying environmental management approaches and perspectives.

**Note:** For this activity students will need to be provided with a visual continuum, for example, a line stretching across the white board. On the left-hand side should be ‘earth-centred worldview’ and on the right should be ‘human-centred worldview’.

Use [environmental worldview](https://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/humanities-and-social-sciences/humanities-overview/glossary/environmental-world-view) and school resources to explain the difference between an earth-centred and a human-centred worldview in one paragraph.

Use a marker or sticky note to physically mark where you see your worldview on the visual continuum on the whiteboard. For example, if you see the planet as a resource that humans rule over, the continuum would be marked near the human-centred end.

Use the [ecological footprint calculator](https://www.footprintcalculator.org/home/en) to estimate how many planets we would need if everyone lived in the same way as you do.

Compare your results with at least 2 classmates. Explain in 1-2 sentences, the reasons for the results of the comparison.

Conduct a class discussion on the degree to which student worldviews are reflected in daily lives, as indicated by the results from the ecological footprint calculator.

### Coal seam gas

**Note:** Because this is potentially a controversial issue, it is important that the content is approached in an objective manner. Students should access materials that consider a variety of viewpoints and form their own opinions.

For the first activity, images of gas bubbling up in Charley’s creek, Queensland or fire on the Condamine River, Queensland could be shown to the class. Useful images can be viewed from the ABC news article, [Gas, groundwater bubbles up on farmland near Chinchilla, sparking contamination fears](https://www.abc.net.au/news/2020-08-31/coal-seam-gas-water-bubbles-up-through-farming-land-and-creek/12612922). Please note, the additional video embedded in this article should not be shown to students because of the language used and political bias.

View the images of the Condamine River and Charley’s creek. Use these to complete a [See, Think, Wonder](https://pz.harvard.edu/resources/see-think-wonder) visible thinking routine as a basis for a class discussion on what you see, what you think is happening and what it makes you wonder.

Use [How important is mining to Australia?](https://www.abc.net.au/radionational/programs/archived/bushtelegraph/mining-value/5543658) and class resources to identify the benefits of mining for the Australian economy, for example jobs and tax revenue.

Work in small teams to research the extraction of coal seam gas through the process of hydraulic fracturing (fracking). Use this research to assist in completing written responses to the following:

* explain how coal seam gas is extracted using fracking
* analyse the impact of coal seam gas mining on the natural environment.

**Resources for this task**

* [Australian Parliament: The coal seam gas debate](https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/BriefingBook44p/GasDebate)
* [How does fracking work? – Mia Nacamulli (6:03)](https://www.youtube.com/watch?v=Tudal_4x4F0)
* [Coal and coal seam gas – About](https://www.dcceew.gov.au/water/coal-and-coal-seam-gas/about)
* [What is fracking and why is it controversial?](https://www.bbc.com/news/uk-14432401#:~:text=Fracking%20uses%20huge%20amounts%20of,groundwater%20around%20the%20fracking%20site.)

Complete a [Circle of Viewpoints](http://www.pz.harvard.edu/resources/circle-of-viewpoints) thinking activity that explores 3 different perspectives on coal seam gas. Examples of perspectives may include government, mining companies, farmers, and environmentalists. For each, you should explore the viewpoint using these sentence starters:

* ‘I am thinking of coal seam gas extraction from the worldview of (the viewpoint you have chosen).’
* ‘I think (describe coal seam gas from your worldview).’
* ‘A question I have from this worldview is.’

Use your research to write 2 paragraphs in response to the question ‘Mining for coal seam gas in Australia should be increased. Discuss.’ In this response:

* one paragraph should be from the perspective of a human-centred worldview
* the other paragraph should be from an earth-centred worldview.

### Aboriginal and Torres Strait Islander worldviews

Watch the [Story of Stuff (21:16)](https://www.youtube.com/watch?v=9GorqroigqM). As a class identify the factors that have led to widespread human-centered worldviews and an escalation of consumption.

Use your own research and [The Land Owns Us (6:14)](https://www.youtube.com/watch?v=w0sWIVR1hXw) to complete brief written responses to the following:

* explain the Aboriginal concept of ‘belonging to Country’
* analyse how this contrasts with the human-centered worldview described in the ‘Story of Stuff’.

Use the resources below to help explain each of the following in 1-2 sentences:

* how Indigenous fire management practices work
* the underlying worldview for this practice
* the long-term impact of this practice on the environment.

**Resources for this task**

* [How Indigenous fire management practices could protect bushland | Australian Story (26:52)](https://www.youtube.com/watch?v=d-9hmEiH828)
* [Can hazard reduction burning and cultural burning protect against catastrophic bushfires?](https://www.createdigital.org.au/hazard-reduction-burning-cultural-burning-protect-against-catastrophic-bushfires/)
* [What is cultural burning?](https://www.firesticks.org.au/about/cultural-burning/)
* [Traditional Aboriginal burning in modern day land management](https://landcareaustralia.org.au/project/traditional-aboriginal-burning-modern-day-land-management/)

### HPGE task: Extension

Use the recent decision to make the New Zealand, Whanganui River into a legal person as the basis for a [True for Who](http://www.pz.harvard.edu/resources/true-for-who) thinking routine. The steps in this activity will be as follows:

1. As a class, discuss the claim that ‘the environment should be made into a legal person with all rights and protections given to humans’.
2. In small groups, brainstorm all the different points of view in which you could look at this claim.
3. In small groups, each person chooses a viewpoint and imagines the stance a person or object from this viewpoint would be likely to take. Go around the group and dramatically speak from the viewpoint. Say: ‘My viewpoint is ...’; ‘I think the claim is true or false or uncertain because …; ‘what would convince me to change my mind is…’
4. Individually reflect on the claim and the viewpoints that you have heard expressed. Consider new ideas or questions that you now have. Use this reflection to assist in writing a one-page response to the following question: ‘The environment should be made into a legal person with all rights and protections given to humans. Discuss.’

**Resources for this task**

* [The New Zealand river that became a legal person](https://www.bbc.com/travel/article/20200319-the-new-zealand-river-that-became-a-legal-person)
* [Can we protect the natural world by giving it legal rights?](https://environmentvictoria.org.au/2019/09/12/legal-rights-for-nature/)

## Learning sequence 4: Investigative study – Riverine environments

Select ONE type of environment in Australia as the context for a comparative study with at least ONE other country.

Students:

* investigate the biophysical processes essential to the functioning of the selected environment
* explanation of how the biophysical processes operating in the environment maintain its functioning
* investigate the causes, extent and consequences of the environmental change (**ACHGK073**)
* examination of the causes and extent of change to the environment in each country
* analysis of the short and long-term consequences of the environmental change in each country
* investigate the management of the environmental change, for example: (**ACHGK074, ACHGK075**)
* discussion of the factors influencing the management responses in each country e.g. worldviews, competing demands, technology, climate change
* comparison and evaluation of the effectiveness of the management responses in achieving environmental sustainability
* proposal of how individuals could contribute to achieving environmental sustainability for the environment in each country.

**Note:** The following activities form the basis for a comparison between the management of human-induced environmental changes in the Clarence River catchment in Northern NSW, Australia and the Ganges River in India. The students start by exploring the biophysical geographical processes that operate in riverine environments.

Use the resources below to complete the table, summarising the biophysical processes that operate in a riverine environment.

* [Rivers – Weathering, Erosion, and Deposition (21:27)](https://www.youtube.com/watch?v=3YdEkegvJCQ)
* [The Water Cycle](https://www.waternsw.com.au/education/learning-about-water/the-water-cycle)
* [Understanding Rivers](https://www.nationalgeographic.org/article/understanding-rivers/?utm_source=BibblioRCM_Row)

Table 3 – Biophysical processes in rivers

|  |  |
| --- | --- |
| Biophysical process | How process operates in the riverine environment |
| weathering |  |
| erosion |  |
| deposition |  |
| the water cycle |  |

### Clarence River catchment, NSW

**Note:** The following investigative study is based on the [‘Save our Catchment](https://sites.google.com/education.nsw.gov.au/save-our-catchment/home)’ virtual excursion. This aims to engage students through studying a real-world land and water management issue, while demonstrating geographical fieldwork skills. It allows for independent study of the impacts and management of the invasive weed, the Cats Claw Creeper in the Upper Clarence Catchment in Northern NSW. Save Our Catchment is divided into 12 units. Each unit aligns to a video episode and accompanying worksheet in the learning materials booklet. Solutions to tasks in the electronic answer booklet are provided for teachers to view and download.

Students should be provided with a copy of the workbook and work through activities in the sequence provided below.

Between activities, there should be discussion, additional activities, or explanation as appropriate for the school context.

Sample instructions: Use the ‘Save our Catchment’ workbook and the episodes noted below to study the impacts and management of the invasive weed, the Cats Claw Creeper in the Upper Clarence catchment in northern NSW:

Watch [Save Our Catchment – EP01 – Acknowledgement of Country (1:45)](https://www.youtube.com/watch?v=X5UZU8xnFnM) and [Save Our Catchment – EP02 – Introduction (2:06)](https://www.youtube.com/watch?v=oQ58OXAd6tQ) and read the learning materials to assist you in completing the activities on page 13 of the workbook.

Watch [EP03 – Geography of the Clarence River Catchment (3:55)](https://www.youtube.com/watch?v=ytUyohnl4fg) and read the learning materials to assist in completing the activities on pages 15-21.

Watch [EP04 – Origins of the Clarence River Catchment (1:48)](https://www.youtube.com/watch?v=LhQkuvibVt0) and read the learning materials to assist in completing the activities on pages 24.

Watch [EP05 – Cat's Claw Creeper a Contemporary Land and Water Management Issue (5:18)](https://www.youtube.com/watch?v=JOnho2XNq9I) and read the learning materials to assist in completing activity 5.1 on page 31 and activity 5.2 on page 37.

Watch [EP06 – Plant description](https://www.youtube.com/watch?v=OO8nVHj-qKo) and read the learning materials to assist in completing Activities 6.1 and 6.2 on pages 43-44.

Watch [EP07 – Impact of CCC on riparian zone (3:29)](https://www.youtube.com/watch?v=KtZ1RrzfLLE) and read the learning materials to assist in completing Activities 7.1 and 7.2 on pages 48-49.

Watch [EP08 – Weed Control (8:17)](https://www.youtube.com/watch?v=Hit1hCmWneU) and read the learning materials to assist in completing Activity 8.1 and 6.2 on pages 52-53.

Watch [EP09 – In The Field – Data Collection (4:59)](https://www.youtube.com/watch?v=5PyA7Ef1FpY) and read the learning materials to assist in completing Activities 9.1 and 6.2 on page 56.

Watch [EP10 – In The Field - Data Analysis (3:46)](https://www.youtube.com/watch?v=qrluvwQtFAU) and read the learning materials to assist in completing Activities 10.1, 10.2 and 10.3 on pages 62-66.

Watch [EP11 – Different Perspectives - Stakeholders (5:32)](https://www.youtube.com/watch?v=pC7VnWB_MxM) and read the learning materials to assist in completing Activities 11.1 on pages 68-69.

Watch [EP12 – Total catchment management plan (3:57)](https://www.youtube.com/watch?v=4Icm82U07uA) and read the learning materials to assist in completing Activity 12.1 and 6.2 on pages 71-72.

**View** [Weeds of National Significance (WONS)](https://weeds.org.au/weeds-profiles/) **and identify one invasive weed in your yard or local area. For this weed, view its profile on the website and complete a summary in the following table.**

Table 4 – Invasive weeds

|  |  |  |
| --- | --- | --- |
| Description | Impacts | Management strategies |
|  |  |  |

**Use your research on this invasive weed to prepare a poster in** [Canva](https://app.education.nsw.gov.au/digital-learning-selector/LearningTool/Card/653) **that educates the public on:**

* **why the weed is a problem**
* **how individuals can contribute to the sustainable management of this issue.**

### Case study: Ganges River

**Note**: Divide students into small teams and provide access to a video editing tool such as [iMovie](https://app.education.nsw.gov.au/digital-learning-selector/LearningTool/Card/617).

In your assigned team, research one human-induced change to the Ganges River. You will use this research to complete a short video in the style of the ‘nature is speaking’ videos below. Your video must cover the following:

* where the Ganges River is located
* the significance of the Ganges River
* how humans have changed the Ganges River, for example flow, pollution, or erosion
* the short- and long-term consequences of this change
* the factors that are influencing how this issue is managed, for example worldviews and competing demands
* a judgement on whether the issue is being well managed.

**Resources for this task**

* [Nature is speaking, I am Water (1:28)](https://www.youtube.com/watch?v=fwV9OYeGN88)
* [Nature is speaking, I am The Ocean (2:03)](https://www.youtube.com/watch?v=rM6txLtoaoc)
* [The race to save the river Ganges](https://graphics.reuters.com/INDIA-RIVER/010081TW39P/index.html)
* [The Ganges: Must More Than Just a River](https://learningenglish.voanews.com/a/the-ganges-much-more-than-just-a-river/5548367.html)

As your class watches the videos, you should collaboratively assess each of the peer videos using the marking criteria table below:

Table 5 – Marking criteria

|  |  |  |  |
| --- | --- | --- | --- |
| Criteria | Displays extensive knowledge | Displays sound knowledge | Displays elementary knowledge |
| Describes river location and its significance |[ ] [ ] [ ]
| Explains human changes to the river |[ ] [ ] [ ]
| Explains the short- and long-term consequences of this change |[ ] [ ] [ ]
| Assesses management and issues impacting on this |[ ] [ ] [ ]

### Comparison

**Note:** Because the scale of the issues in the Clarence River and Ganges River catchments are so different, students should be encouraged to make their comparison based on the one issue on the Ganges that they studied in the previous activity.

Identify 5 key ideas that may help you to respond to the following question: ‘To what extent has the management of the Clarence River in NSW been more effective than the management of the Ganges River in India?’

Using a [+1 Routine](http://www.pz.harvard.edu/node/773277), pass your paper to the right for a classmate to read your ideas and add one point. The addition might be an elaboration (adding a detail), a new point (adding something that was missing), or a connection (adding a relationship between ideas). Do this at least 2 more times before returning the paper to the original owner.

Write an extended response to the question: ‘To what extent has the management of the Clarence River in NSW been more effective than the management of the Ganges River in India?’ This question will require you to:

* make a qualified judgement, for example to a significant extent or to a limited extent
* include an introduction and a conclusion
* separate ideas into paragraphs
* demonstrate extensive knowledge of geographical processes and influences that form and transform rivers
* display extensive knowledge of the geographical issues in both rivers and their management.

## Assessment task

**Note:** When using this task, ensure it is placed on the school template and follows all assessment requirements.

The task involves students preparing a physical model or plans for technology that might solve a particular issue relating to human-induced environmental change. Students will prepare a short information page to accompany the model. Both parts of the task will be displayed at a class or whole school trade fair on environmental solutions. The task can be completed in small groups.

### Outcomes

* **GE5-3** analyses the effect of interactions and connections between people, places and environments
* **GE5-5** assesses management strategies for places and environments for their sustainability
* **GE5-8** communicates geographical information to a range of audiences using a variety of strategies

### Syllabus content

Students:

* investigate human-induced environmental changes across a range of scales (**ACHGK070**)
* investigate the causes, extent and consequences of the environmental change (**ACHGK073**)
* investigate the management of the environmental change, for example: (**ACHGK074, ACHGK075**).

### Task

**Select a human-induced environmental change** that is causing, or is likely to cause, challenges for the natural environment and humans across a local, national, or global scale.

#### Part A: Model of a solution to human induced change

For this human-induced change to the environment, recommend an innovative solution that will prevent the issue or repair damage already done.

For your solution, make:

* a physical model of the product, or
* annotated plans, or
* a computer design of the product or technology.

The model will be presented at an environmental trade fair, for the class or whole school to visit.

The following is a list of actual examples that may assist in getting your creativity flowing:

* in April 2021, a Melbourne couple launched cling wrap made from potatoes. This innovative solution has the potential to prevent tonnes of petroleum based plastic ending up in landfill ([see Melbourne couple launch Australia’s first compostable cling wrap](https://www.9news.com.au/national/melbourne-couple-launch-australias-first-compostable-cling-wrap/53374e0a-2a80-4b2f-a30f-0d32e4711a21))
* in 2018 a winery in in Nebraska developed a machine to turn glass wine bottles into sand to reduce waste (see [New technology turns glass bottles into sand, reduces waste (1:42)](https://www.youtube.com/watch?v=Cbe-RbFH26g))
* [Amazing Aussie inventions that are saving the planet](https://careerswithstem.com.au/amazing-australian-inventions/#gsc.tab=0).

#### Part B: Summary explaining the model

Accompanying the product should be the following one-page table. This will be displayed along with the model on your stand at the class or whole school trade fair. This table will be used as a guide for verbally explaining your product to visitors at the stand. It should be in bullet point form to enable visitors to your stand to be able to read the information easily.

Table 7 – Title of product and issue

|  |  |
| --- | --- |
| Prompt | Response |
| How humans have interfered with natural processes |  |
| Prediction of the short- and long-term consequences of this |  |
| An existing solution for this issue |  |
| How my solution works |  |
| Why this solution will solve this environmental issue |  |

## Marking criteria

Table 8 – Assessment marking criteria

|  |  |
| --- | --- |
| Grade | Criteria |
| **A** | * Demonstrates extensive knowledge and understanding of the interactions and connections between people, places and environments
* Displays extensive knowledge and understanding of geographical issues and their management
* Displays sophisticated skills to select, acquire and process complex geographical information, using an extensive range of strategies to communicate effectively.
 |
| **B** | * Demonstrates thorough knowledge and understanding of the interactions and connections between people, places and environments
* Displays thorough knowledge and understanding of geographical issues and their management
* Displays high-level skills to select, acquire, process and communicate complex geographical information using a broad range of strategies.
 |
| **C** | * Demonstrates sound knowledge and understanding of the interactions and connections between people, places and environments
* Displays sound knowledge and understanding of geographical issues and their management
* Displays sound skills to select, acquire, process and communicate geographical information using a range of strategies.
 |
| **D** | * Demonstrates basic knowledge and understanding of the interactions and connections between people, places and environments
* Displays basic knowledge of geographical issues and their management
* Displays basic skills to select, acquire, process and/or communicate geographical information.
 |
| **E** | * Demonstrates elementary knowledge and understanding of interactions and/or connections between people, places and environments
* Identifies some aspects of geographical issues and their management
* Displays elementary skills to select, acquire, process and/or communicate geographical information.
 |

## Appendix: Capacity matrix

**Note:** A general concept and glossary list has been outlined. However, you may wish to add further terminology or skills to the capacity matrix.

**Key classification**

* information – recall basic facts or heard of this before
* knowledge – can explain and know what it means
* know-how – can draw connections between this geographical term or concept and relate to other concepts or situations
* wisdom – can use the term or concept in new contexts or teach others.

Shade or tick: information, knowledge, know-how, and wisdom as you progress with your understanding of the geographical concept or term. At the end of the learning sequence reflect on your progress and discuss with your teacher if you observe any areas you can improve.

Table 6 – Glossary of concepts and terms

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Glossary word or concept | Information | Knowledge | Know-how | Wisdom |
| environment |[ ] [ ] [ ] [ ]
| worldview |[ ] [ ] [ ] [ ]
| sustainability |[ ] [ ] [ ] [ ]
| biodiversity |[ ] [ ] [ ] [ ]
| biophysical processes |[ ] [ ] [ ] [ ]
| atmosphere |[ ] [ ] [ ] [ ]
| biosphere |[ ] [ ] [ ] [ ]
| hydrosphere |[ ] [ ] [ ] [ ]
| lithosphere |[ ] [ ] [ ] [ ]
| source function |[ ] [ ] [ ] [ ]
| sink function |[ ] [ ] [ ] [ ]
| ecological footprint |[ ] [ ] [ ] [ ]
| hydraulic fracturing |[ ] [ ] [ ] [ ]
| aquifers |[ ] [ ] [ ] [ ]
| belonging to country |[ ] [ ] [ ] [ ]
| weathering |[ ] [ ] [ ] [ ]
| erosion |[ ] [ ] [ ] [ ]
| deposition |[ ] [ ] [ ] [ ]
| the water cycle |[ ] [ ] [ ] [ ]
| river mount |[ ] [ ] [ ] [ ]
| meander |[ ] [ ] [ ] [ ]
| catchment |[ ] [ ] [ ] [ ]
| watershed |[ ] [ ] [ ] [ ]
| floodplain |[ ] [ ] [ ] [ ]
| environmental weeds |[ ] [ ] [ ] [ ]
| ecosystem |[ ] [ ] [ ] [ ]
| riparian zone |[ ] [ ] [ ] [ ]
| cats claw creeper |[ ] [ ] [ ] [ ]
| introduced species |[ ] [ ] [ ] [ ]
| distribution |[ ] [ ] [ ] [ ]
| abundance |[ ] [ ] [ ] [ ]

## References

**Links to third-party material and websites**

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