VCE Environmental Science

Examples of assessment task contexts across Units 3 and 4

Four assessment tasks have been specified for VCE Environmental Science Units 3 and 4 Outcomes 1 and 2. Teachers must ensure that each assessment task is chosen only once across Units 3 and 4.

Assessment should be based on activities that form part of the planned teaching and learning program. For example, in Unit 3 Area of Study 1, a teacher may explore concepts related to biodiversity by investigating bird species on their school ground. Students may compare the effectiveness of the placement of various commercial and/or constructed bird box designs in different locations around the school and generate and record data about variables such as bird species, bird populations, and weather conditions over time. Assessment can be structured for each of the four assessment task types available. An example is shown below:

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| **Task type** | **Assessment task related to bird box**  |
| Presentation of recommendations using evidence-based decision-making, including analysis and evaluation of primary data | * Provide students with raw data from school ground fieldwork; students should organise, analyse and evaluate data to support recommendations as to further locations / bird box types to position in the school ground.
* Class fieldwork could include students conducting stakeholder (parents, students, local residents) surveys related to the installation of bird boxes at the school and/or in other locations in the community. Assessment task may include organisation and evaluation of primary data to determine stakeholder perspectives and their recommendations.
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| Designed or practical response to a real or theoretical environmental issue or challenge | Design and evaluate a new type of bird box to attract birds (threatened or otherwise, as selected by the student) at a nominated position in the school ground.  |
| Analysis and evaluation of a case study, secondary data or a media communication, with reference to sustainability principles and stakeholder perspectives | * Access online databases, citizen science projects or media articles, for example, [Nest boxes in Victoria](https://www.ari.vic.gov.au/research/people-and-nature/use-of-nest-boxes-in-victoria)  to develop a set of structured questions, including comparisons with data / information from school ground fieldwork activities.
* Class fieldwork could include students conducting stakeholder (parents, students, local residents) surveys related to the installation of bird boxes at the school and/or in other locations in the community. Assessment task may include evaluation of stakeholder perspectives.
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| Application of Earth systems thinking in the evaluation of a response to an environmental scenario, case study, issue or challenge | Evaluate the school ground fieldwork by using a graphic organiser scaffolding students’ responses to current and possible future implications of the fieldwork for the atmosphere, biosphere, hydrosphere and lithosphere. |

The following table provides examples of contexts for each of the four assessment task types for Units 3 and 4 Outcomes 1 and 2. Many of the stimulus resources can be used for alternative assessment task types.

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|  | **Assessment task contextual examples** |
| **Task**: presentation of recommendations using evidence-based decision-making, including analysis and evaluation of primary data***Note***: The SAC task must require students to graph primary data as a basis for making recommendations. | **Task**: designed or practical response to a real or theoretical environmental issue or challenge***Note***: Practical responses may be evaluated for effectiveness, whereas designed responses require justification since they would be difficult to test. | **Task**: analysis and evaluation of a case study, secondary data or a media communication, with reference to sustainability principles and stakeholder perspectives***Note***: Reference to sustainability principles and stakeholder perspectives must be included in the SAC task. | **Task**: application of Earth systems thinking in the evaluation of a response to an environmental scenario, case study, issue or challenge***Note***: Analysis / evaluation should be undertaken by students in terms of effects on the atmosphere, biosphere, hydrosphere, and lithosphere. |
| **Unit 3 Area of Study 1:**Explain the importance of Earth’s biodiversity and how it has changed over time, analyse the threats to biodiversity, and evaluate management strategies to maintain biodiversity in the context of one selected threatened endemic species | * ***Fieldwork*** involving data collection: species counts; evaluation of conservation strategies
* ***Citizen science*** Victorian projects (data generation and access to secondary data), e.g., lyrebird survey; waders and bird migration study; ReefWatch; Birdlife Australia; FungiMap; frog calls; scat counts
* ***Experiment*** to generate primary data, e.g., different plants’ photosynthetic rates
 | * ***Designed response***: aquarium for a specific fish species; zoo enclosure for a nominated animal; companion planting garden design; IUCN criteria for Red List of Threatened Species – students propose updated criteria
* ***Practical response***: construction, testing and evaluation of shelters such as bird boxes; schoolyard butterfly habitats
 | * ***Case studies:*** national / international examples, e.g., Eastern Barred bandicoot, Tanzanian turtles; microplastics
* ***Secondary data:*** use of databases (online or sourced on field trips - historical data of plant or animal populations)
* ***Media communication:*** local issues, e.g., council surveys / reports on stakeholder views; Letters to the Editor; YouTube – Grampians rock climbing
 | * ***Scenario***: ‘What if…koalas became extinct? Would it matter?
* ***Case study***: health benefits of Kakadu plums – ecosystem services (unfamiliar context for students for SAC task)
* ***Issue***: endangered Himalayan yew tree – pharmaceutical or fuel?
* ***Challenge***: Which type of trees should be planted in the local park?
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| **Unit 3 Area of Study 2:**Explain how sustainability principles relate to environmental management, analyse how stakeholder perspectives can influence environmental decision-making, and evaluate the effectiveness of environmental management strategies in a selected case study. | * ***Fieldwork*** involving data collection: surveys of local opinions about a proposed redevelopment project – implications for development
* ***Site visits***: farms; processing plants; recycling – water, sewage treatment plant; desalination plant – ‘real time’ monitoring data
 | * ***Designed response***: green roofs; erosion control; present ‘before’ and ‘current photographs / illustrations of a site – re-design as a future site
* ***Practical response***: evaluation of the re-planting of a school garden, e.g., to produce food / increase biodiversity – students evaluate data in the SAC task that has been recorded over a time period (may be on-going project)
 | * ***Case studies:*** Evaluation of environmental management projects, e.g., Victorian Coastal Wetland Restoration Program
* ***Secondary data:*** use of databases (online or sourced on field trips - historical data)
* ***Media communication:*** local projects, e.g., coastal erosion; evaluation of council development projects and consultation documents including stakeholder submissions
 | * ***Scenario***: ‘What if…we were living sustainably in the future… what would it look like?

What if human populations multiplied ten-fold…effect on Earth’s systems?* ***Case study***: Local community, industry or school development project
* ***Issue***: How are Earth systems affected by alternative development proposals?
* ***Challenge***: How can waste materials be better utilised?
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| **Unit 4 Area of Study 1:**Analyse the major factors that affect Earth’s climate, explain how past and future climate variability can be measured and modelled, and evaluate options for managing climate change | * ***Fieldwork*** involving data collection, e.g., urban heat mapping at school, with SAC tasks requiring cooling solutions
* ***Citizen science*** Victorian projects (contribution of data and access to data), e.g., ClimateWatch
* **Experiment** to generate primary data, e.g., growth of different seedlings at different temperatures – which vegetables will grow best at elevated temperatures? SAC task will involve students analysing collated class data and making recommendations.
 | * ***Designed response***, e.g., evaluation of different carbon sequestration designs forms classwork, with assessment task being the design of a process for a teacher-nominated scenario
* ***Practical response***, e.g., albedo effect - best choice for road surfaces: colour / components (concrete mix variations) in terms of energy absorption / reflection – students conduct an experiment as part of learning activities, with SAC task requiring data analysis / scientific report.
 | * ***Case studies***, e.g., ‘Public and stakeholder attitudes towards energy, environment and CCS’ report
* ***Secondary data***, e.g.,access reports such as the Urban Microclimate Citizen Science Project – provide a set of relevant data and representations for SAC task – link data to sustainability principles / stakeholder views
* ***Media communication,*** e.g., media releases from university research departments – green cement (MOC) from Western Sydney University.
 | * ***Scenario***: What if we could only be vegetarians?
* ***Case study***, e.g.,Climate-ADAPT 10 case studies – SAC task requires students to identify issues and outcomes in terms of Earth systems
* ***Issue***: Does geosequestration have risks? …Is it feasible? …What risks are there for Earth’s systems?...How should the precautionary principle be applied?
* ***Challenge***: Would you choose a real or an artificial Christmas tree?
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| **Unit 4 Area of Study 2**: Compare the advantages and disadvantages of using a range of energy sources, and evaluate the suitability and impacts of their use in terms of upholding sustainability principles | * ***Fieldwork*** leading up to SAC task re future school strategy based on analysis and evaluation of energy audit data; suggested location of a solar-powered BBQ using fieldwork microclimate data; analysis of stakeholder survey data re energy habits
* **Experiment**, e.g., heat-absorbing capacity of natural materials – SAC tasks analysis and recommendations for classroom ceiling insulation.
 | * ***Designed response***, e.g.,sketched model for adesign of wind turbine blades; annotated design / plan for a toy powered by renewable energy
* ***Practical response***, e.g., personal plan for reducing energy consumption – 3-column table identifying current practice compared to proposed actions and justification; improved design of a pizza box solar oven.
 | * ***Case studies***, e.g., c40 cities – Kolkata (India)’s electric tram library innovation; GreenMoves renovation case study
* ***Secondary data*** collated from a literature review; or data from site visits, e.g., energy-efficient window glazing manufacture and customisation for consumer purpose and location
* ***Media communication***, e.g., advertisements for energy-efficient cars (hybrid, EV)
 | * ***Scenario***: What if people were not allowed to live in houses within a kilometre of a shoreline?
* ***Case study***: CitySwitch – Psaros case study: evaluation of effects on Earth’s systems
* ***Issue***: Nuclear power for Australia?
* ***Challenge***: How can an Earth systems thinking approach address a ‘not in my backyard’ attitude to the installation of a community wind turbine?
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