Australian Curriculum Year 5 Science Sample assessment | Teacher guidelines

Adaptations

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| **Assessment description** | **Category** |
| Students research structural and behavioural adaptations and explain how they enable animals to survive in particular environments. They predict the impact of global warming on the survival and future adaptations of animals living in either Antarctica or the Sahara Desert. | Written |
| Technique |
| Research |
| Context for assessment | Alignment |
| Human beings are unique in that they engineer environments to suit the ongoing survival of the species. Other organisms are forced to adapt. This assessment explores different kinds of adaptations, how these adaptations assist organisms to survive in their environment, and the interactions occurring within environments.  Teachers could use Section 1 as a scaffolded teaching and learning experience and an opportunity to provide students with informal feedback before they engage in research to complete Sections 2 and 3 more independently. | *Australian Curriculum* v5.0,  Year 5 Science Australian Curriculum content and achievement standard ACARA — Australian Curriculum, Assessment and Reporting Authority  [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au/)  Year 5 Science standard elaborations  [www.qsa.qld.edu.au/downloads/p\_10/ac\_sci\_yr5\_se.doc](http://www.qsa.qld.edu.au/downloads/p_10/ac_sci_yr5_se.doc) |
| Connections |
| This assessment can be used with the QSA Australian Curriculum resource titled *Year 5 plan — Australian Curriculum: Science* exemplaravailable at:  [www.qsa.qld.edu.au/downloads/p\_10/ac\_science\_yr5\_plan.doc](http://www.qsa.qld.edu.au/downloads/p_10/ac_science_yr5_plan.doc) |
| Definitions |
| **Adaptation**: structural features and behaviours that help plants and animals to survive in the environment that they live in.  **Environment**: the surroundings, both living and non-living, that an animal or plant lives in.  **Organism**: an individual animal, plant (or single‑celled life form). |
| In this assessment | Assessment materials |
| * Teacher guidelines * Student booklet * Task-specific standards — continua * Task-specific standards — matrix * Assessment resource — Current scientific conceptions and student’s prior understandings | Not applicable for this assessment |

# Teacher guidelines

## Identify curriculum

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| Content descriptions to be taught | | |
| Science understanding | Science as a human endeavour | Science inquiry skills |
| Biological sciences   * Living things have structural features and adaptations that help them to survive in their environment   [ACSSU043](http://www.australiancurriculum.edu.au/Science/Curriculum/F-10#cdcode=ACSHE081&level=5) | Nature and development of science   * Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena [ACSHE081](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSHE081) | Communicating   * Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [ACSIS093](http://www.australiancurriculum.edu.au/Curriculum/ContentDescription/ACSIS093) |
| General capabilities (GCs) and cross-curriculum priorities (CCPs) This assessment may provide opportunities to engage with the following GCs and CCPs. Refer also to the Resources tab on the P–10 Science Curriculum and Assessment page: [www.qsa.qld.edu.au/yr5-science-resources.html](http://www.qsa.qld.edu.au/yr5-science-resources.html) | | |
| Description: gc_literacy **Literacy**  Description: gc_ict **ICT capability**  *Description: Description: gc_critical* **Critical and creative thinking** | | |
| Achievement standard This assessment provides opportunities for students to demonstrate the following highlighted aspects. | | |
| By the end of Year 5, students classify substances according to their observable properties and behaviours. They [explain](http://www.australiancurriculum.edu.au/Glossary?a=&t=Explain) everyday phenomena associated with the transfer of light. They [describe](http://www.australiancurriculum.edu.au/Glossary?a=&t=Describe) the key features of our solar system. They [analyse](http://www.australiancurriculum.edu.au/Glossary?a=&t=Analyse) how the form of living things enables them to function in their environments. Students [discuss](http://www.australiancurriculum.edu.au/Glossary?a=&t=Discuss) how scientific developments have affected people’s lives and how science knowledge develops from many people’s contributions.  Students follow instructions to pose questions for investigation, predict what might happen when variables are changed, and plan investigation methods. They use equipment in ways that are safe and improve the accuracy of their observations. Students construct tables and graphs to organise data and identify patterns. They use patterns in their data to suggest explanations and refer to data when they report findings. They describe ways to improve the fairness of their methods and communicate their ideas, methods and findings using a range of text types. | | |
| Source: ACARA, The Australian Curriculum v5.0, [www.australiancurriculum.edu.au](http://www.australiancurriculum.edu.au) | | |

**Sequence learning**

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| **Suggested learning experiences** |
| This assessment leads on from the learning experiences outlined in the QSA’s Year 5 Science Year level plan. The knowledge, understanding and skills in the Year level plan will prepare students to engage in this assessment:   * See *Year 5 plan — Australian Curriculum: Science* exemplar   [www.qsa.qld.edu.au/downloads/p\_10/ac\_science\_yr5\_plan.doc](http://www.qsa.qld.edu.au/downloads/p_10/ac_science_yr5_plan.doc) |
| Adjustments for needs of learners |
| To make adjustments, teachers refer to learning area content aligned to the student’s chronological age, personalise learning by emphasising alternate levels of content, general capabilities or cross-curriculum priorities related to the chronological age learning area content. The emphasis placed on each area is informed by the student’s current level of learning and their strengths, goals and interests. Advice on the process of curriculum adjustment for all students and in particular for those with disability, gifted and talented or for whom English is an additional language or dialect are addressed in *Australian Curriculum — Student Diversity* materials.  For information to support students with diverse learning needs, see:   * Queensland Studies Authority materials for supporting students with diverse learning needs [www.qsa.qld.edu.au/10188.html](http://www.qsa.qld.edu.au/10188.html) * Australian Curriculum Student Diversity [www.australiancurriculum.edu.au/StudentDiversity/Overview](http://www.australiancurriculum.edu.au/StudentDiversity/Overview) * The *Melbourne Declaration* *on Educational Goals for Young Australians* [www.mceecdya.edu.au/mceecdya/melbourne\_declaration,25979.html](http://www.mceecdya.edu.au/mceecdya/melbourne_declaration,25979.html) * The *Disability Standards for Education* [www.ag.gov.au](http://www.ag.gov.au). |
| Resources |
| **Online**   * BBC, *Nature: Wildlife*, ‘Animal and plant adaptations and behaviours’   [www.bbc.co.uk/nature/adaptations](http://www.bbc.co.uk/nature/adaptations)  **Organisations**   * Queensland Museum learning resources   [www.qm.qld.gov.au/Learning+Resources/Resources](http://www.qm.qld.gov.au/Learning+Resources/Resources)  **Animal ethics**   * Queensland Department of Education, Training and Employment   <http://education.qld.gov.au/curriculum/area/science/animal-ethics.html>  All schools must consider the 3 Rs of animal welfare:   * *replacement* of animals with other methods (alternatives) * *reduction* in numbers of animals used * *refinement* of techniques used, in order to reduce adverse impacts on animals.   These principles must be applied to all activities and should drive decision making in the classroom and within the school. |

## Develop assessment

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| **Preparing for the assessment** |
| Learning experiences in preparation for the assessment could include:  Revising key concepts   * Revise from Year 3 that living things can be grouped on the basis of observable features (and can be distinguished from non-living things). * Revise from Year 4 that living things (including plants and animals) depend on each other and the environment to survive.   Exploring adaptions   * Create a glossary or word wall of scientific language related to adaptations * Use stimulus material such as photos or video footage to identify and classify adaptations as structural or behavioural. * Use animal and plant specimens to: * identify structural adaptations * describe structural adaptation * explain why the adaptation is necessary in order for the animal or plant to survive in its environment. * Identify the adaptations of plants and animals in the students’ local area and explain how they assist in the survival of the organisms. * Make predictions about how global warming might affect the survival and future adaptations of the living things in the local area. * Appreciate Aboriginal and Torres Strait Islander understandings of adaptations.   Developing research skills   * Record details of sources of information used when researching. * Develop research and summarising skills. * Practice organising information in logical ways. * Develop explanations and draw conclusions and use evidence to support claims. |

| **Implementing** | |
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| Section 1. Researching animal adaptations | |
| **Student role**   * Read the instructions for Section 1 in the Student booklet. * Select one of the animals to research — echidna, platypus or camel. * Conduct research into the environment of the animal and its structural and behavioural adaptations. * As you research keep a record of the details of the sources of information you use. * Complete the table in Section 1 of the Student booklet: *Researching animal adaptations.* | **Teacher role**   * Revise the definitions of structural adaptations, behavioural adaptations and environment with students. * Remind students of the importance of collecting source details and completing the associated table as they are researching. * Provide opportunities for students to access online and print resources to research animal adaptations. * Support students with their research and nominate a checkpoint stage where students discuss the progress towards the assessment. |

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| Section 2.Researching adaptations of animals that live in extreme environments | |
| Student role   * Read the instructions for Section 2 in the Student booklet. * Select one of the extreme environments to research – Antarctica, Sahara Desert. * Conduct research into the adaptations of the animals that live in the chosen environment. * As you research keep a record of the details of the sources of information you use. * Complete the table in Section 2 of the Student booklet: *Researching adaptations of animals that live in extreme environments.* | Teacher role   * Remind students of the importance of collecting source details and completing the associated table as they are researching. * Provide opportunities for students to access online and print resources to research animal adaptations. * Support students with their research and nominate a checkpoint stage where students discuss the progress towards the assessment. |
| Section 3. Analysing adaptations | |
| **Student role**   * Read the instructions for Section 3 in the Student booklet. * Complete the questions in Section 3 of the Student booklet: *Analysing adaptations.* | **Teacher role**   * When the research phase is complete, discuss strategies with students for identifying patterns and similarities in information. * Read the questions in Section 3 to students and encourage them to consider the ‘bigger picture’ when developing their response. |

## Make judgments

When making judgments about the evidence in student responses to this assessment, teachers are advised to use the task-specific standards provided. The development of these task-specific standards has been informed by the Queensland Year 5 standard elaborations. See [www.qsa.qld.edu.au/downloads/p\_10/ac\_sci\_yr5\_se.doc](http://www.qsa.qld.edu.au/downloads/p_10/ac_sci_yr5_se.doc).

### The Queensland standard elaborations for Science

The Queensland Year 5 standard elaborations for Science is a resource to assist teachers to make consistent and comparable evidence-based A to E (or equivalent) judgments. It should be used in conjunction with the Australian Curriculum achievement standard and content descriptions for the relevant year level.

The Queensland Science standard elaborations provide a basis for judging *how well* students have demonstrated what they know, understand and can do using the Australian Curriculum achievement standard.

The Australian Curriculum achievement standards dimensions of Understanding and Skills are used to organise the Queensland Science standard elaborations. Understanding and Skills in Science are organised as Understanding dimension and Skills dimension.

The valued features of Science drawn from the achievement standard and the content descriptions for Understanding dimension and Skills dimension are organised as:

* Science understanding
* Science as a human endeavour
* Questioning and predicting
* Planning and conducting
* Processing and analysing data and information
* Evaluating
* Communicating.

#### Task-specific standards

Task-specific standards give teachers:

* a tool for directly matching the evidence of learning in the student response to the standards
* a focal point for discussing student responses
* a tool to help provide feedback to students.

Task-specific standards are not a checklist; rather they are a guide that:

* highlights the valued features that are being targeted in the assessment and the qualities that will inform the overall judgment
* specifies particular *targeted aspects* of the curriculum content and achievement standard
* aligns the valued feature, task-specific descriptor and assessment
* allows teachers to make consistent and comparable on-balance judgments about student work by matching the qualities of student responses with the descriptors
* clarifies the curriculum expectations for learning at each of the five grades (A–E or the early years equivalent)
* shows the connections between what students are expected to know and do, and how their responses will be judged and the qualities that will inform the overall judgment
* supports evidence-based discussions to help students gain a better understanding of how they can critique their own responses and achievements, and identify the qualities needed to improve
* encourages and provides the basis for conversations among teachers, students and parents/carers about the quality of student work and curriculum expectations and related standards.

#### Task-specific valued features

Task-specific valued features are the discrete aspects of the valued features of Science targeted in a particular assessment and incorporated into the task-specific standards for that assessment. They are selected from the Queensland Science standard elaborations valued features drawn from the Australian Curriculum achievement standard and content descriptions.

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| **Task-specific valued features for this assessment** | | |
| The following identifies the valued features for this assessment and makes explicit the understandings and skills that students will have the opportunity to demonstrate. This ensures that the alignment between what is taught, what is assessed and what is reported is clear. | | |
| Australian Curriculum achievement standard dimensions | Queensland standard elaborations valued features | Task-specific valued features |
| Understanding  dimension | Science understanding | Analysis of how the form of living things enables them to function in their environments  **Sections 1, 2** |
| Science understanding | Analysis of adaptations that are common to animals living in the same extreme environment; prediction of the impact of global warming on future adaptations  **Section 3** |
| Skills dimension | Communicating | Communication of ideas, information and explanations  **Sections 1, 2 and 3** |

The task-specific standards for this assessment are provided in two models using the same task‑specific valued features:

* a matrix
* a continua.

#### Matrix and continua

Task-specific standards can be prepared as a matrix or continua. Both the continua and the matrix:

* use the Queensland standard elaborations to develop task-specific descriptors to convey expected qualities in student work — A to E or equivalent
* highlight the same valued features from the Queensland standard elaborations that are being targeted in the assessment and the qualities that will inform the overall judgment
* incorporate the same task-specific valued features, i.e. make explicit the particular understanding or skills students have the opportunity to demonstrate for each selected valued feature
* provide a tool for directly matching the evidence of learning in the student response to the standards to make an on-balance judgment about student achievement
* assist teachers to make consistent and comparable evidence-based A to E or equivalent judgments.

##### Continua

The continua model of task-specific standards uses the dimensions of the Australian Curriculum achievement standard to organise task-specific valued features and standards as a number of reference points represented progressively along an A–E continuum. The task-specific valued features at each point are described holistically. The task-specific descriptors of the standard use the relevant degrees of quality described in the Queensland standard elaborations.

Teachers determine a position along each continuum that best matches the evidence in the students’ responses to make an on-balance judgment about student achievement on the task.

The continua model is a tool for making an overall on-balance judgment about the assessment and for providing feedback on task specific valued features.

##### Matrix

The matrix model of task-specific standards uses the structure of the Queensland standard elaborations to organise the task-specific valued features and standards A to E. The task-specific descriptors of the standard described in the matrix model use the same degrees of quality described in the Queensland standard elaborations.

Teachers make a judgment about the task-specific descriptor in the A to E (or equivalent) cell of the matrix that best matches the evidence in the students’ responses in order to make an on‑balance judgment about how well the pattern of evidence meets the standard.

The matrix is a tool for making both overall on-balance judgments and analytic judgments about the assessment. Achievement in each valued feature of the Queensland standard elaboration targeted in the assessment can be recorded and feedback can be provided on the task-specific valued features.

## Use feedback

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| Feedback to students | Evaluate the information gathered from the assessment to inform teaching and learning strategies. Focus feedback on the student’s personal progress and the next steps in the learning journey.  The task-specific standards for this assessment can be used as a basis for providing feedback to students.  Offer feedback that:   * maximises students’ opportunities to succeed in the assessment by providing feedback on: * conducting effective, focused research * developing explanations (rather than descriptions) * identifying patters and similarities across information collected during research * making evidence-based predictions * involves students in the process by providing opportunities to ask follow-up questions * focuses on each student’s personal progress relative to previous achievements * identifies the characteristics of a high-quality response that aligns with the descriptors in the task-specific standards. |
| Resources | For guidance on providing feedback, see the professional development packages titled:   * *About feedback* [www.qsa.qld.edu.au/downloads/p\_10/as\_feedback\_about.doc](http://www.qsa.qld.edu.au/downloads/p_10/as_feedback_about.doc) * *Seeking and providing feedback* [www.qsa.qld.edu.au/downloads/p\_10/as\_feedback\_provide.doc](http://www.qsa.qld.edu.au/downloads/p_10/as_feedback_provide.doc) |