Animal adaptations

Year 5

Learning area: Science

Science Understanding (sub-strand):   
Biological sciences

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Animal adaptations — Year 5

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# Unit overview

| Unit title | Animal adaptations |
| --- | --- |
| Learning Area | Science |
| Science Understanding (sub-strand) | Biological sciences |
| Year level | 5 |
| Duration | Approximately nine weeks (17 lessons)\*  *\*based on 2 lessons of science per week for Year 5 (50 minutes per lesson)* |
| Unit description | In this unit, students will investigate structural and behavioural adaptations of animals and plants. They will understand how these adaptations help animals and plants survive in the environments they live in. Students will recognise how science knowledge, such as knowing how adaptations in living things help them survive in their environments, can be used to inform personal and community decisions. |

# Teacher information

## Safety and risk management

You will need to identify safety issues and conduct your own curriculum activity risk assessments for all activities and excursions in this unit.

For advice and documents refer to the Department of Education and Training Curriculum Activity Risk Assessment Guidelines: <http://education.qld.gov.au/health/safety/hazards/curriculum-activities.html>

The actual risk level for activities in this unit will vary according to the specific circumstances of the activity and your school and classroom context. You must consider all circumstances when you complete a risk assessment. Examples of considerations include, but are not limited to:

* Is the activity occurring within or outside of school grounds e.g. an excursion?
* Will students be in the sun? What sun protection will students have?
* How will students be supervised during the activity?
* What will students do during the activity?
* Are there any special student considerations e.g. medical, behavioural or special needs?
* What hazards do you need to take into account e.g. hazardous substances, tools, equipment or allergies e.g. allergies to certain plants?

## Unit details

The Great Barrier Reef Marine Park Authority (GBRMPA) Animal adaptations unit is a Year 5 Science unit of work. The content descriptions for this unit are from the Australian Curriculum: Science (Version 7.4 dated 30th March 2015 <http://www.australiancurriculum.edu.au>).

The unit follows the inquiry-based 5Es approach to teaching science. The inquiry questions that underpin the unit are:

What are structural and behavioural adaptations?

How do animals and plants adapt to the Australian environment?

What happens when species are introduced?

What happens when coastal development spreads?

What could be done to help native species survive?

## Time allocation

The unit is based on two lessons of science per week for Year 5 students. Each lesson is approximately 50 minutes long.

The overall unit, or the individual lessons, can be extended or shortened to cater for individual classes as deemed necessary by the class teacher.

## Unit aims

The lessons are structured to build students’ knowledge of how Australian native animals adapt to survive in the local environment. This knowledge will facilitate students’ understanding about animals’ needs in the Australian environment and how people and their activities can have an impact on species.

Understanding how animals adapt will enable students to further understand how the ecosystems of the Great Barrier Reef function. For more information on animal adaptations and the Great Barrier Reef, see the section ‘Background information - Adaptations’ and also [http://www.gbrmpa.gov.au](http://www.gbrmpa.gov.au/).

Teaching students about adaptations will build their environmental knowledge and encourage their understanding of sustainability and stewardship.

## Key threats to the reef

GBRMPA encourages teachers, students and communities to follow the main aim of Reef Guardians – to be custodians of their local ecosystems and stewards of the Reef. In the Great Barrier Reef Outlook Report 2014, the key threats to the Reef are climate change, land-based run-off, coastal development and other direct impacts such as unsustainable fishing activities and marine debris. (See [http://www.gbrmpa.gov.au](http://www.gbrmpa.gov.au/) for more information on the Outlook Report 2014).

## Stewardship

The Reef Guardian Schools Program encourages responsible use and protection of the Great Barrier Reef ecosystems. Schools are encouraged to take ownership of conservation activities and on-ground projects that involve students, teachers and their local communities. These environmental actions foster a greater appreciation and understanding of the Great Barrier Reef and empower students to become lifelong stewards.

The following are examples of stewardship activities that relate to the learning experiences of this unit:

* Habitat restoration projects in local wetland areas to improve biodiversity.
* Investigation of fishways and ladders.
* Research on and advocacy for shore birds that use local wetlands and beaches as resting places during migration. Use this research to suggest changes to behaviours e.g. keeping dogs on leashes on these beaches.

Citizen science participation

Citizen science is scientific research conducted by non-professionals – in this case by students, teachers and communities. Schools can participate in the collection and submission of scientific data to local management authorities including GBRMPA, local councils and local Natural Resource Management agencies where the data can be used to inform sustainable ecosystem management decisions.

Specific examples of citizen science participation are provided in the lesson plans of this unit which are found in the section ‘Teaching sequence’.

## Building partnerships

Delivery of this unit can be enhanced by building partnerships within the school and wider community.

Partner organisations could include the following:

* local zoo/wildlife park or aquarium
* local animal rescue organisation
* local wildlife organisations (e.g. Koala Care or Turtle Watch)
* access a BirdLife Australia representative to come and discuss the adaptations of local birds: <http://birdlife.org.au/>

Background information – Adaptations

### What are adaptations?

An adaptation is a characteristic of an organism, which helps it to be well suited to the places it lives and the kind of life it leads. Adaptations are linked to theenvironmental conditions an animal encounters.

### How do animals adapt to their environments?

Animals adapt to their environments in different ways. Two broad categories of adaptation are:

**Structural** – Structure is the internal and external arrangement and types of body parts. For example:

parrot fish have very strong jaws and large teeth that are used to scratch at coral to scrape off algae

barracudas have a very long, thin body that is excellent for short bursts of speed when chasing prey

the colour of animals is used for camouflage – a tiger’s stripes blend in with vegetation; a reef fish’s bright colours blend in with the coral

giraffes have very long necks to reach high up into the trees for food

dugongs have nostrils near the front of their heads enabling them to breath easily while the majority of their body remains under water.

**Behavioural** – Behaviour is what the animal does in response to certain stimulus. All animals do things whether they are sleeping, flying, swimming or sitting still. For example:

female turtles always return to the same area to lay their eggs and always lay their eggs above the high tide mark

fish form ‘schools’ to avoid predators

whales migrate to find the most suitable places for feeding and breeding

emperor penguins huddle together in the cold to keep warm

some birds in Queensland have learnt to tip cane toads over and eat their flesh from the underside so as to avoid the toad’s poison glands behind its eyes.

### What happens when animals don’t adapt?

Sometimes native animals find themselves in an environment in which they cannot adapt. This is mainly due to drastic changes in their environment over which they have no control. This can lead to the devastating consequence of an animal becoming endangered or even extinct.

Urban development can change habitats which leaves animals struggling to survive; development can also completely destroy habitats leaving animals with no place to live.

Introducing exotic species to native environments can affect food webs within an ecosystem, such as the introduction of Tilapia. Tilapia are an introduced species of fish that compete with native fish for food and stir up the muddy bottom of creeks, reducing the amount of light available for aquatic plants to grow. They change the way an ecosystem would naturally operate which means native species do not have as much chance of survival.

Useful websites

Reef vid – a resource of free coral reef video clips:  
<http://www.reefvid.org/>

General information at the BBC website: Nature wildlife: Animal and plant adaptations and behaviours  
<http://www.bbc.co.uk/nature/adaptations>

Reef Beat 2012 educational series - The Inshore Great Barrier Reef – Bursting with Biodiversity:  
<http://www.gbrmpa.gov.au/resources-and-publications/student-and-teacher-resources/reef-beat-series>

Wet Tropics Management Authority: understanding … cassowaries  
<http://www.wettropics.gov.au/cassowaries>

Queensland Wetlands Program: WetlandInfo:  
[http://wetlandinfo.ehp.qld.gov.au/wetlands/](http://wetlandinfo.ehp.qld.gov.au/wetlands/%20)

Dirtmeister’s Science Reporters: Animal Adaptations:  
<http://www.teacher.scholastic.com/dirtrep/animal/invest.htm>

Planet science - Under 11s: Games: Mission adaptation:  
<http://www.planet-science.com/categories/under-11s/games/2010/09/mission-adaptation.aspx>

How animals meet their needs:  
<http://www.harcourtschool.com/activity/animalneeds/>

Animal adaptations at pppst.com (good PowerPoints and games to explain adaptations):  
<http://www.animals.pppst.com/adaptations.html>

Teacher Vision: Animal Adaptations Resources (Adaptation experiments and ideas):  
<http://www.teachervision.fen.com/ecological-adaptation/animals/6989.html>

## Useful books

*The best beak in Boonaroo Bay*, Narelle Oliver

*Mister Seahorse*, Eric Carle

Wet Tropics Management Authority Cassowary Activities <http://www.wettropics.gov.au/site/user-assets/docs/cassbook.pdf>

*The Snail and the Whale*, Julia Donaldson

*Uno's Garden*, Graeme Base

*Amazing Facts about Australian Marine Life*, Tony Ayling and Steve Parish

*The Cat on the Island*, Gary Crew and Gillian Warden.   
(Teacher notes for this book at: <http://static.harpercollins.com/harperimages/ommoverride/Cat%20on%20the%20Island%20Brochure.pdf>)

*The Evolution of Australia 110 Million Years of Change*, Australian Museum

*The Frog Who Wouldn't Laugh*, Cecilia Egan

*Tiddalick: the Frog Who Caused a Flood*, Robert Roennfeldt

# Curriculum intent

## Australian Curriculum: Science

## Year 5 Level Description

The Science Inquiry Skills and Science as a Human Endeavour strands are described across a two-year band. In their planning, schools and teachers refer to the expectations outlined in the Achievement Standard and also to the content of the Science Understanding strand for the relevant year level to ensure that these two strands are addressed over the two-year period. The three strands of the curriculum are interrelated and their content is taught in an integrated way. The order and detail in which the content descriptions are organised into teaching/learning programs are decisions to be made by the teacher.

Over Years 3 to 6, students develop their understanding of a range of systems operating at different time and geographic scales. In Year 5, students are introduced to cause and effect relationships that relate to form and function through an exploration of adaptations of living things. They explore observable phenomena associated with light and begin to appreciate that phenomena have sets of characteristic behaviours. They broaden their classification of matter to include gases and begin to see how matter structures the world around them. Students consider Earth as a component within a solar system and use models for investigating systems at astronomical scales. Students begin to identify stable and dynamic aspects of systems, and learn how to look for patterns and relationships between components of systems. They develop explanations for the patterns they observe.

Content descriptions

This unit provides opportunities for students to engage in the following Australian Curriculum Content descriptions:

| Science Understanding (SU) | Science as a Human Endeavour (SHE) | Science Inquiry Skills (SIS) |
| --- | --- | --- |
| Biological sciences   * Living things have structural features and adaptations that help them to survive in their environment [(ACSSU043)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU043) | Use and influence of science   * Scientific knowledge is used to inform personal and community decisions [(ACSHE217)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE217) | Questioning and predicting   * With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be [(ACSIS231)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS231)   Planning and conducting   * Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate [(ACSIS087)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS087)   Processing and analysing data and information   * Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate [(ACSIS090)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS090)   Evaluating   * Suggest improvements to the methods used to investigate a question or solve a problem [(ACSIS091)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS091)   Communicating   * Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS093)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS093) |

Year 5 achievement standard

By the end of Year 5, students classify substances according to their observable properties and behaviours. They explain everyday phenomena associated with the transfer of light. They describe the key features of our solar system. They analyse how the form of living things enables them to function in their environments. Students 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.

General capabilities

This unit provides opportunities to address the following organising elements of the general capabilities:

| Literacy   * Comprehending texts through listening, reading and viewing * Composing texts through speaking, writing and creating * Text knowledge * Grammar knowledge * Word knowledge * Visual knowledge | ICT capability   * Investigating with ICT * Managing and operating ICT |
| --- | --- |
| Numeracy   * Use special reasoning | Critical and creative thinking   * Inquiring – identifying, exploring and organising information and ideas * Generating ideas, possibilities and actions * Reflecting on thinking and processes |
| Personal and social competence   * Self-awareness * Self-management * Social awareness * Social management | Ethical understanding   * Reasoning in decision making and action |
| Intercultural understanding   * Interacting and empathising with others | |

Cross-curriculum priorities

This unit provides opportunities for students to address aspects of the following cross-curriculum priorities:

| Sustainability  Students will:   * recognise the dependence of living things on ecosystems * identify how scientific knowledge, including understanding environments, informs personal and community decisions and actions for a sustainable future. |
| --- |

## Relevant prior curriculum

Students require prior experience from Year 4 with:

### Science Understanding

#### Biological sciences

* Living things have life cycles [(ACSSU072)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU072)
* Living things, including plants and animals, depend on each other and the environment to survive [(ACSSU073)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU073)

### Science as a Human Endeavour

#### Use and influence of science

* Science knowledge helps people to understand the effect of their actions [(ACSHE062)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE062)

Curriculum working towards

The teaching and learning in this unit works towards the following in Year 6:

### Science Understanding

#### Biological sciences

* The growth and survival of living things are affected by the physical conditions of their environment [(ACSSU094)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU094)

### Science as a Human Endeavour

#### Use and influence of science

* Scientific knowledge is used to inform personal and community decisions [(ACSHE220)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE220)

# Feedback

Supportive learning environment

| Differentiation  Consider the individual needs of your students – including gifted and talented, ESL and students requiring additional support.  For information refer to the Australian Curriculum, Assessment and Reporting Authority (ACARA) web pages on student diversity:  <http://www.australiancurriculum.edu.au/studentdiversity/student-diversity-advice>  Further information for Queensland state schools can be found as part of the P-12 curriculum, assessment and reporting framework and associated resources:  <http://education.qld.gov.au/curriculum/framework/p-12/> | Feedback to students  Teachers:   * plan opportunities for conversations to provide ongoing feedback (spoken and written) and encouragement to students on their strengths and areas for improvement * reflect on and review learning opportunities to individualise learning experiences required * provide multiple opportunities for students to experience, practise and improve knowledge, processes and skills.   Students:   * identify what they can do well and what they need to improve * provide feedback to a peer on interaction skills and suggest some strategies for improvement (written and spoken feedback). |
| --- | --- |
| Reflection on the unit plan  At the conclusion of the unit, teachers can reflect on the unit for future planning by answering the following questions:   * What worked well in this unit? * What was a stumbling block? * How would you refine it? * What trends and gaps in learning have you identified? * How will you build on these learning experiences next term and beyond? | |

# Assessment

Assessment is the purposeful, systematic and ongoing collection of information as evidence for use in making judgements about student learning and to support improving student learning.

## Monitoring student learning

Student learning should be monitored throughout the unit. Each lesson in this unit provides opportunities for monitoring learning and for gathering evidence of student progress. For examples of ways to monitor learning, refer to each of the lesson plans under the section ‘Teaching sequence’.

## Assessing student learning

| Summative assessment task: | Animal adaptations - animal design and report (Lesson 15 -17) |
| --- | --- |
| Description: | Students will design an animal that is adapted to suit a specific environment. Students will write a report or persuasive text on their animal outlining its structural adaptations (external features) and behavioural adaptations and explain how they help the animal to survive in its environment. Students will explain how the community living in and around the animal’s habitat needs to consider their actions to protect the animal and its habitat. |
| This assessment task provides opportunities to gather evidence of student learning in: | Science Understanding  Biological sciences   * The growth and survival of living things are affected by the physical conditions of their environment [(ACSSU094)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU094)  Science as a Human Endeavour Use and influence of science   * Scientific knowledge is used to inform personal and community decisions [(ACSHE220)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE220)   Science Inquiry Skills  Communicating   * Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS110)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS110) |

**See Resource section: *Resource 8* for the Student task sheet and the Guide for making judgements for the assessment task: Animal adaptations – animal design and report.**

# Sequencing teaching and learning

A suggested learning sequence for this unit is summarised below. For detailed information for each lesson in this sequence go to the section ‘Teaching Sequence’.

| Inquiry phase | Lesson | Purpose |
| --- | --- | --- |
| Engage | **Lesson 1:** What are adaptations? | To identify what students know about animal and plant adaptations. |
| Explore | **Lesson 2 and 3:** Bird beak investigation | To investigate how birds’ beaks are adapted to suit their environments. |
| **Lesson 4:** How have fish adapted to survive in the environment they live in? | To explore the body parts of fish and identify how these structural features help the fish survive in its environment. |
| Explain | **Lesson 5 and 6:** What are structural adaptations? | To identify and explain how different structural adaptations help animals survive in their environments. |
| **Lesson 7 and 8:** What are behavioural adaptations? | To identify and explain how different behavioural adaptations help animals survive in their environments. |
| **Lesson 9 and 10:** How have plants adapted to survive in their environments? | To understand how different plants are adapted to survive in their environments. |
| Elaborate | **Lesson 11 and 12:** Why is the cane toad so successful? | To identify how the adaptations of the cane toad have influenced its success in Australian environments and to use this knowledge to inform personal and community decisions. |
| **Lesson 13 and 14:** How have cassowaries adapted to development? | To understand how cassowaries have adapted to coastal development and recognise how knowledge of adaptations of animals can inform personal and community decisions. |
| Evaluate | **Lesson 15 - 17:** Reflections and assessment task | To review and reflect on learning and introduce and complete the assessment task. |

**TOTAL: 17 Lessons *(50 minutes per lesson)***

# Making judgements

## Achievement standard

In this unit, assessment of student learning aligns to the following components of the Year 5 achievement standard.

By the end of Year 5, students classify substances according to their observable properties and behaviours. They explain everyday phenomena associated with the transfer of light. They describe the key features of our solar system. They analyse how the form of living things enables them to function in their environments. Students 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.

## Guide for making judgements

**See Resource section: *Resource 8* for the Student task sheet and the Guide for making judgements for the assessment task: Animal adaptations – animal design and report.**

# Teaching sequence

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 1:** What are adaptations?

**Duration:** 50 minutes

**Lesson objectives**Students will:

identify what they know about animal and plant adaptations.

Suggested learning sequence

**Introduction** – Observing animals

1. Take students on a quick walk around the school to observe different animals and plants and discuss how they are suited to survive in the environment they live in.
2. Give examples in the discussions e.g.:

a fish is suited to the ocean because it can breathe through its gills and has a body suited to swimming

humans are suited to land environments because we have lungs to breathe air.

1. Give students opportunities to explore and give/find their own examples. Students may not actually see many animals around the school yard, but being outside may help them think of animals in their natural environments.
2. As students give examples, introduce the term *adaptation*. Explain to students that animals and plants are suited to their environments because of adaptations they have that allow them to survive in certain environments. Students then return to class and share any findings.

**Activity –** Hot Potato

1. Back in the classroom, divide the students into groups of three or four.
2. Explain to the students they are going to do a Hot Potato activity.
3. Each group starts with a large piece of paper with one question relating to adaptations on it (see question examples below).
4. Students will have a short amount of time (1-2 minutes) to write answers to the question before rotating the papers around so that each group gets a turn at answering each question. They may not be sure about answers to some questions, but they should write down what they think. Read out all the questions to students first to clarify unknown words. Examples of questions include:

* What are structural adaptations?
* What are behavioural adaptations?
* How do people adapt to the weather?
* Give an example of how an animal might be adapted to a cold environment.
* Give an example of how an animal might be adapted to a hot environment.
* Does your behaviour change when you are at school? How?
* Give an example of what animals need to do to be able to live on land.
* Give an example of what animals need to do to be able to live in water.
* Give an example of how a plant might have adapted to a hot and dry environment

1. When all groups have had a chance to respond to each question, choose one person from each group to present the answers to the question their group started with. Students may have questions or wish to discuss some of the answers.
2. Display the questions and answers in the classroom. This could be used later on to reflect on what is true or false information and what has been learnt throughout the unit.
3. Start a word wall to continuously add to throughout the unit. (See *Resource 1 – Word bank* for examples of vocabulary). This should be displayed in a place where students can add to it each lesson. It may be done in alphabetical order or on moveable cards so that students can interact with the words and sort them into categories as they progress throughout the unit.
4. Have students start a science journal to record their learning and reflections after each science lesson. (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections). The science journal could be done in a simple ruled exercise book or a scrapbook, or done on a computer in a format suitable to the class.

 Science Journal

A science journal is a record of observations, experiences and reflections. It contains a series of dated, chronological entries. It may include written text, drawings, labelled diagrams, photographs, tables and graphs. The science journal can be used as a part of student assessment.

Opportunities to monitor student learning

**Diagnostic assessment opportunities:**

Observe students’ current knowledge of animal and plant adaptations. Use this when planning for future lessons.

Resources

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

Other resources

Large sheets of paper and marker pens for Hot Potato activity.

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 2 and 3:** Bird beak investigation

**Duration:** 1 hour 40 minutes

**Lesson objectives**Students will:

investigate how birds’ beaks are adapted to suit their environments.

Suggested learning sequence

**Introduction** – Birds

1. Look at a range of pictures of birds and discuss the habitats they live in, how they get food and water, what they use for shelter and what may prevent them from surviving in their habitat. Discuss some of the external characteristics of birds (See **useful web links** for ideas).

**Activity** – Bird beak investigation

1. Explain to the students they are going to do an experiment to investigate how different beak adaptations help birds gather different food found in their environments.
2. View the procedural text – *Resource 3 – Beak Experiment*. Discuss all the types of ‘beaks’ and ‘food’. Consider all groups doing the same four ‘beaks’ and four ‘food’ types to help with comparing class results later on.
3. Ask students what they think will be the best ‘beak’ type for each ‘food’? Why? Have students journal this as their prediction.
4. Arrange students into groups of four and step through the procedural text – *Resource 3 –Beak Experiment.* Ask each group to fill in the headings for their results table.
5. Discuss with students how to keep this experiment fair as they gather data on each beak type i.e.:

**Changing:** type of ‘beak’

**Measuring:** number of each ‘food’ type collected

**Keeping** the same:

number of food pieces on the tray

time to gather food

tray

sized cup (stomach)

student for that beak etc.

1. Have students do the experiment, gather results, then complete the questions provided.
2. Explore real bird beaks of different birds that live and eat in different environments (See **useful web links** for ideas).

* Discuss the class results from the experiment and compare their findings to real bird beak adaptations and food types. Can students see any similarities? Identify how different birds’ beaks are adapted to feed in their environments.

1. Ask students if they can think of how other animals’ mouths are adapted to feed in certain environments.
2. Start a class display of ‘amazing adaptations’ and set a challenge or even run a competition for students to find the most unusual or interesting adaptation they can themselves as the unit progresses. Students should find or draw images and write explanations of any amazing adaptations they discover. These can be added to the display.
3. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
4. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use students’ results and answers to questions to assess their science inquiry skills.

Resources

Useful web links

A general site to explore images and information about Australian Birds from different habitats (search by bird name, type or location): BirdLife Australia: Find a Bird  
<http://birdlife.org.au/all-about-birds/australias-birds/find-a-bird/>

Sites that give information and examples of different bird beaks:

Bird Adaptations – Beaks – <http://www.vtaide.com/png/bird-adaptations3.htm>

Bird Beaks – <http://fsc.fernbank.edu/Birding/bird_beaks.htm>

The wonderful world of bird beaks – <http://www.bbc.com/earth/story/20150223-the-weird-world-of-bird-beaks>

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

*Resource 3 – Bird beak experiment*

Other resources

Equipment for the experiment listed in *Resource 3 – Bird beak experiment*

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 4:** How have fish adapted to survive in the environment they live in?

**Duration:** 50 minutes

**Lesson objectives**Students will:

identify the body parts of fish and describe how these structural features help the fish survive in its environment.

Suggested learning sequence

**Introduction** – How do fish swim?

1. View footage on YouTube or other Internet sites to view different fish swimming. Include footage of fast fish (sharks, barracuda), slower moving fish (seahorses, whale sharks) and examples of different body shapes and colours (trigger fish, butterfly fish).
2. Generate a discussion about four different fish body parts and how these adaptations help the animal survive in their environment. Show photos of different fish to guide the conversation. Examples include:

**Mouth shape**

Whale sharks have very large mouths to open and filter as much water as possible in each gulp.

Sharks have very sharp teeth and large mouths to grip and rip the flesh off their prey.

Parrot fish have strong beaks like teeth to scrape and bite coral to remove algae.

**Body shape**

Sharks have long, streamlined bodies and are built for speed to catch prey.

Slower moving animals like the seahorse have a body shape that helps them blend in and hide in their environment.

**Tail shape**

A lot of reef fish have short rounded tails for short bursts of speed to escape from predators.

Bigger fish like sharks and whale sharks have larger, longer tails to swim long distances.

**Colour**

Brightly coloured reef fish blend in with the reef (camouflage).

Bright colours can also be a warning to stay away.

Some animals have dull grey colours so they do not stand out or can be hard to see in water.

**Activity –** Create a fish

1. Explain to students they are going to draw a fish of their own design and explain their choice of adaptations.
2. Students will consider four main parts of the fish: mouth shape, body shape, tail shape and colour.
3. Have pictures for students to view to get ideas of the different types of shapes of the fish. (See **‘Useful web links’** for ideas).
4. You could step through one fish first with the class to provide an example.
5. With their drawing, students will need to write an explanation of their choice of each of the four main parts of the fish and how these adaptations help the fish survive in their environment.
6. Ask students to name their fish and share their design with the class. Display the fish designs.

**Optional activity:** Students could create a 3D fish model of their drawing and display these in class.

1. If there is time, students can build a digital fish and play a game to see if it survives in its environment. Build-a-Fish is at the website: <http://www.pbslearningmedia.org/resource/lsps07.sci.life.evo.buildafish/build-a-fish/>
2. Remind students about the ‘amazing adaptations’ challenge. See if anyone can discover amazing adaptations for animals that live on the Great Barrier Reef or marine environments.
3. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
4. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Student designs and explanations of fish can be used to assess the development of their knowledge of adaptations.

Resources

Useful web links

Pictures or video footage of a range of different kinds of fish for discussion. For example at:

<http://www.reefvid.org>

<http://www.greatbarrierreef.com.au/animals/fish/>

<https://www.daf.qld.gov.au/fisheries/species-identification>  
(search under ‘Fresh water fish’, ‘Reef fish web guide’ and ‘Inshore and estuarine species’).

**Hint:** Access and pre-load video clips before the lesson so that you can play them immediately for students when required.

Build-a-fish game:  
<http://www.pbslearningmedia.org/resource/lsps07.sci.life.evo.buildafish/build-a-fish/>

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

Other resources

*Uno's Garden* by Graeme Base. This book can be used to demonstrate what happens when animal features are combined.

Materials for students to draw or make a fish.

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 5 and 6:** What are structural adaptations?

**Duration:** 1 hour 40 minutes

**Lesson objectives**Students will:

identify and explain how different structural adaptations help animals survive in their environments.

Suggested learning sequence

**Introduction –** visual explorations of structural adaptations

1. Introduce and explore types of structural adaptations in different animals. Consider using one or more of the following ideas:

Read the story Tiddalik the Frog Tiddalick: the Frog Who Caused a Flood by Robert Roennfeldt

(See **‘Useful web links’** for an audio or video version of this story). Pause at key points in the story and ask students to identify Tiddalik’s structural adaptations for life in the desert. Students could also identify the structural adaptations of other animals in the story.

* View the video of the catchy camel song Camel Adaptation Song with Subtitles – Lyrics at:   
  <https://www.youtube.com/watch?v=sJH-01WLEg0>

Create 5 – 10 quiz questions about camel adaptations viewed in the video. Challenge students to watch and remember as much as possible from the video then run a short class quiz. Discuss the structural adaptations and how they help the camel survive.

* Explore a range of images of animals. As each animal is viewed, students brainstorm what they see and why they think the adaptation helps the animal survive in the environment they live in. Try to include adaptations such as camouflage.
* Watch one or two videos that unpack structural adaptations of certain animals and take time to discuss them in detail (See **‘Useful websites’** for ideas).

1. Start a ‘structural adaptations’ retrieval chart with students to sort different types of structural adaptations. Use an animal explored so far, e.g. camel, to start this chart. In the chart, include where the animal lives. Introduce new terms. Examples of adaptation types for the chart might include:

**body design** e.g. monkeys moving through trees

**mouth and teeth shape** e.g. crocodiles

**tongue shape** e.g. giraffes

**tail shape** e.g. kangaroos

**eye shape** e.g. owls

**body fat** e.g. seals and penguins

**camouflage** e.g. some reef fish are patterned to blend in with their surroundings

**camouflage and body shape** e.g. stick insects that are both shaped like a stick and coloured like a stick

**colour warnings** e.g. the poison dart frog is brightly coloured to be a warning

**Other adaptations**.

**Activity** – Research

1. Explain to students they are going to form groups to research structural adaptations in different animals. At the end of the research, their group will need to present their findings to the class.
2. Depending on students’ needs and resources available, have the Internet and a range of books available for them to research their animal.
3. Allow students to choose one animal from a list. This list should be generated to cater for students’ needs. Choose animals with obvious structural adaptations such as a kangaroo or polar bear as this will ensure students are able to find answers for their research.
4. Students will need to answer a list of questions when doing their research. Some suggestions are:

What is the name of the animal?

What country or countries is the animal found in?

What is the animal’s habitat?

What does the animal eat?

Is the animal a carnivore, omnivore or herbivore?

What structural adaptations does the animal have to help it survive in its environment? Why does it help the animal survive?

**Hint:** Get students to think about what body parts the animal uses to move, eat, see, hunt, stay warm, stay cool, or hide to help them think about the structural adaptations. (The retrieval chart will also remind them of structural adaptation types.)

1. When students have finished, ask each group to share their findings with the class. As they are doing this, record the animal, where it lives and their structural adaptations in the structural adaptations retrieval chart.
2. For each structural adaptation shared, ask students and/or the whole class to explain why it helps the animal survive in its particular environment. Add this to the chart.
3. Review the answers from the Hot Potato Activity in Lesson 1. Ask questions such as:

What are structural adaptations?

Were some of the answers true?

Were some false?

Can we answer the questions better with our new knowledge?

1. Remind students about the ‘amazing adaptations’ challenge and see if they can search for and find unusual structural adaptations in different animals.
2. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
3. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Citizen science

Visit a local wetland and record numbers of bird species present.

BirdLife Australia representatives may be able to assist.  
<http://birdlife.org.au/>

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use student research to assess their ability to develop and apply their knowledge to their research.

Resources

Useful web links

Tiddalik the Frog Tiddalick: the Frog Who Caused a Flood by Robert Roennfeldt:

**NOTE:** Aboriginal and Torres Strait Islander viewers should be aware that this video may contain images, voices or names of people who have passed away.

Audio version by Lydia Fucsko The story of Tiddalik – <http://frogs.org.au/arc/storyoftiddalik.php>  
or as a video at Dreamtime Stories – Tiddalick the Frog –<https://www.youtube.com/watch?v=0y3Ta5xcKV4>

Camel adaptation song with subtitles –  
<https://www.youtube.com/watch?v=sJH-01WLEg0>

Images of animals to help brainstorm different adaptations –   
<http://a-z-animals.com/animals/>

A summary introducing the basic adaptations of camels, giraffes and penguins: Animal Adaptations – <https://www.youtube.com/watch?v=fRX2JtKFUzk>

25 examples of camouflage in animals. You might listen to the information or silently watch the images and discuss with students. 25 Incredible Camouflaged Animals – <https://www.youtube.com/watch?v=XpdoDBYuHIA>

Videos of animal adaptations from the Queensland Museum – <http://www.qm.qld.gov.au/Find+out+about/Behind+the+Scenes/Museum+Experts#.VfIYuNKqpBd>

Nature wildlife: Animal and plant adaptations and behaviours – <http://www.bbc.co.uk/nature/adaptations>

Student fact files produced by GBRMPA on a range of marine animals. Go to:

* <http://elibrary.gbrmpa.gov.au/jspui/index.jsp> and search for ‘Student fact files’
* or go directly to: <http://elibrary.gbrmpa.gov.au/jspui/simple-search?query=student+fact+files&submit=Go>

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

Hand out references

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 7 and 8:** What are behavioural adaptations?

**Duration:** 1 hour 40 minutes

**Lesson objectives**Students will:

identify and explain how different behavioural adaptations help animals survive in their environments.

Suggested learning sequence

**Introduction** – Different kinds of behaviour

1. Explain to students that just as there are different kinds of structural adaptations, there are different kinds of behavioural adaptations. These can be broken into two main categories – instinctive behaviour and learned behaviour.
2. Explain learned behaviour when an animal, or even a person, learns to behave in a certain way. Reflect back on the Hot Potato activity in Lesson 1:

Does your behaviour change when you are at school? How?

Discuss how people change their behaviours in certain situations. Who taught them to do this?

Do animals learn behaviour? Think about training animals, or a mother koala teaching its young which leaves to eat.

1. Ask students if they can think of examples where animals have learned a specific behaviour. Start a ‘behavioural adaptation’ retrieval chart to record students’ answers.
2. Explain to students what instinctive behaviour means i.e. when an animal is born with the knowledge to do something in a certain way. Turtles are a good example.
3. Read *Resource 4 – Turtles on the Great Barrier Reef* with students and identify the instinctive behavioural adaptations. Add this information to the ‘behavioural adaptation’ retrieval chart.
4. Show some further examples of behavioural adaptations (See ‘**Useful web links’** for ideas). Remind students that they are challenged in this unit to discover the strangest, most interesting adaptations for the class display. This includes behavioural adaptations.

**Activity** – Research

1. Explain to students that they are going to research different animals and their behavioural adaptations and share their findings with the class.
2. Depending on students’ needs and resources available, have the Internet and a range of books available for students to research their animal.
3. Provide a list of animals for students to choose from (choose animals that demonstrate a range of behavioural adaptations e.g. migration, schooling, nocturnal/diurnal, animals that change colour and ambush predators).
4. Students will need to answer a few questions when doing their research. Some suggestions are:

What is the name of the animal?

What is the animal’s habitat?

What behavioural adaptation/s does this animal have to help it survive in its environment?

Why does this behaviour help the animal survive?

1. When students have finished, ask them to share their findings with the class. As they are doing this, record the animals, where they live and their behavioural adaptations in the behavioural adaptations retrieval chart.
2. For each behavioural adaptation shared, ask the students and/or the whole class, to explain why it helps the animal to be suited to and more able to survive in its particular environment. Add this to the chart.
3. Review the answers from the Hot Potato activity in Lesson 1. What are behavioural adaptations? Were some of the answers true? Were some false? Can we answer the question better with our new knowledge?
4. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
5. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections.

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use student research to assess their ability to develop and apply their knowledge to their research.

Resources

Useful web links

Animal behavioural adaptation – huddling in penguins: Penguin wave – <http://www.abc.net.au/catalyst/stories/3323886.htm>

Animal behavioural adaptation – Lizard dance to stay cool in the dessert: Amazing lizard dance & dive – Dune – BBC wildlife – <https://www.youtube.com/watch?v=1rkkKyYCxio>

Animal behavioural adaptation – Dolphin make fishing nets made of mud: Dolphins trick fish with mud “nets” – One Life – BBC –   
<https://www.youtube.com/watch?v=bzfqPQm-ThU>

Examples of animal adaptations, including behavioural adaptations: Nature wildlife – Animal and plant adaptations and behaviours –   
<http://www.bbc.co.uk/nature/adaptations>

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

*Resource 4 – Turtles on the Great Barrier Reef*

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 9 and 10:** How have plants adapted to survive in  
 their environments?

**Duration:** 1 hour 40 minutes

**Lesson objectives**Students will:

understand how different plants adapt to survive in their environments.

Suggested learning sequence

**Introduction** – Plant explorations

1. As a class, discuss the needs of plants. Then brainstorm together the external features of plants and discuss how each of these features or parts helps a plant to meet its needs, survive and reproduce.
2. Watch the following videos or others on plant adaptations (see ‘**Useful web links’** for ideas). As students watch the videos, have them jot down individually any plant adaptations they hear and if possible, *why* the plant has such an adaptation:

**Plant adaptations – animation:**  
<http://studyjams.scholastic.com/studyjams/jams/science/plants/plant-adaptations.htm>

**Meet Spiky, thorny and carnivorous plants!:**  
<http://splash.abc.net.au/home#!/media/86152/how-plants-survive-in-different-places?source=upper-primary-science>

1. In small groups, have students share their lists with each other and discuss, clarify or alter them.
2. Create a class T chart with the headings ‘Plant adaptation example’ and ‘Purpose’ then ask each group to share an adaptation of a particular plant they heard about and give its purpose for plant survival. Clarify ideas and link this purpose to the type of environment the plant lives in and plant survival needs.

**Activity** – Cactus observations

1. As a class, introduce and discuss the adaptations of cacti and succulents that help them survive in hot, dry environments. E.g. watch the first half of the following video:

**Cacti and succulents:**  
<http://splash.abc.net.au/home#!/media/106476/>

1. Group students and provide each group with a small cactus or succulent to observe closely. Students can also use hand lenses to examine their plant. Ask students to draw a diagram of the plant, labelling adaptations and explaining their purpose.

**Safety consideration:** Ensure students know to not touch the spines of cacti.

1. **Alternative activity:** if you are unable to source these plants easily, display some images of cacti from websites and have students draw and label from these or make a cacti model with a written description of the adaptations. (Students could use sponge or plasticine and tooth picks etc. for their cacti plant).

**Optional Activity** – Plant hunt

1. If time permits, as a class go on a plant hunt around the school grounds (or if at home, a back garden hunt). Students can photograph or sketch structural adaptations of different local plants. Examples might be different designs of flowers, spines and spikes, tendrils and leaf shape, and size. Can students identify how this structural adaptation helps the plant survive in its environment? Students may need to do some research.
2. As an alternative to a plant hunt, students could go on a seed hunt and create a classroom collection of seeds. Observe the seeds closely and as a class, discuss how the seeds have adapted to aid survival e.g. wings for wind dispersal or burrs to stick to animals.
3. Remind students that they are challenged in this unit to discover the strangest, most interesting adaptations for the class display. This includes amazing plant adaptations.
4. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
5. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections).

### Opportunities to monitor student learning

**Formative assessment opportunities:**

Use students’ diagrams (or models) and written descriptions to assess their knowledge of how a plant is adapted to survive in its environment.

Resources

Useful web links

Animation of plant adaptation examples: Plant Adaptations – <http://studyjams.scholastic.com/studyjams/jams/science/plants/plant-adaptations.htm>

Video on spiky, thorny and carnivorous plants: Meet spiky, thorny and carnivorous plants! – <http://splash.abc.net.au/home#!/media/86152/how-plants-survive-in-different-places?source=upper-primary-science>

Plants with tendrils climb to the top of rainforest canopies: Tree and plant life in the jungle – David Attenborough – BBC wildlife – <https://www.youtube.com/watch?v=H9MV5CgPgIQ>

Close-up video of carnivorous plants: Flesh Eaters: Carnivorous Plants Lure Insects Into Their Deadly Clutches – <https://www.youtube.com/watch?v=MnY_cCRELvs>

How the fig tree strangles: How the fig tree strangles other plants for survival in the rainforest – David Attenborough – BBC wildlife –  
<https://www.youtube.com/watch?v=UCUtpmwacoE>

Examples of plant adaptations by type of environment: Biology of plants: Plant Adaptations –  
<http://www.mbgnet.net/bioplants/adapt.html>

Seed dispersal and adaptations (with videos): Biology of plants: Seed Dispersal –  
<http://www.mbgnet.net/bioplants/seed.html>

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

Other resources

Cacti or succulents in pots and hand lenses

Green plasticine, toothpicks, sponge or other materials to make a cactus (if done)

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 11 and 12:** Why is the cane toad so successful?

**Duration:** 1 hour 40 minutes

**Lesson objectives**Students will:

identify how the adaptations of the cane toad have influenced its success in Australian environments and use this knowledge to inform personal and community decisions.

Suggested learning sequence

**Introduction** – Introduced species

1. Review learning so far in this unit by looking at the class displays and retrieval charts of animal adaptations.
2. Explain to students that animals often have to change their behaviour when their environment changes. One way their environment may change is when a new type of animal moves in.
3. A classic Australian example of this is the introduction of the cane toad. Ask students if they know anything about the cane toad, when it was introduced or why.
4. Read *Resource 5 – Cane Toads*, and ask students to identify structural and behavioural adaptations of cane toads that contribute to their survival success in a variety of environments.
5. Can students identify any adaptations that may have happened to native animals because of the introduction of the cane toad? Are there native animals that are unable to adapt and their population numbers decreasing because of the cane toads?
6. Ask students if they know of other examples of introduced species impacting on native animals. Provide more examples if necessary e.g. tilapia, northern pacific sea star, foxes, rabbits or camels.

**Activity** – Cause-and-effect charts

1. Ask students to create a cause-and-effect chart on the introduction of the cane toad. Teachers may need to demonstrate how to do this. How detailed the chart is will depend on the needs of the class (see *Resource 6: Cause-and-effect charts* for examples).
2. Ask students to think about the wide-reaching effects of the introduction of cane toads or other animals on habitats, native animals, the economy, or even tourism. Get students to add their responses to the chart.
3. With their chart, students should also include some ideas about what might be done to help get rid of harmful, introduced species. You may need to give some examples e.g. a disease was created to eradicate rabbits, events are held to humanely kill as many toads and tilapias in one day as possible to reduce their number and also to raise awareness.
4. If time allows, you could then research more about introduced species and how native animals have had to adapt to them. This information could be used to write reports for newsletters, class books or community awareness pamphlets and/or posters.
5. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
6. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use a cause-and-effect chart to assess students’ knowledge of adaptations and ability to apply that knowledge to inform decisions.

Resources

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

*Resource 5 – Cane toads*

*Resource 6 – Cause-and-effect charts*

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 13 and 14:** How have cassowaries adapted to  
 development?

**Duration:** 1 hour 40 minutes

**Lesson objectives**Students will:

understand how cassowaries have adapted to coastal development and recognise how knowledge of adaptations of animals can inform personal and community decisions.

Suggested learning sequence

**Introduction** – Cassowaries

**Note:** This lesson is based on how cassowaries have adapted to coastal development. You may choose to use an example of another animal that has had to adapt to development in the context of your local area. This could include housing developments, industrial developments, marine developments or road network developments.

The aim of this lesson is for students to become aware that when developments take place, animals may adapt to those developments in different ways, or they may not adapt and may become endangered.

Students will need to reflect during this lesson on the fact that these developments need to take place due to the demands of society and population increases, but environmental considerations must also take place. What are some of those environmental considerations and can students think of ideas to resolve some of these issues?

1. View books, pictures, websites and YouTube clips about cassowaries.
2. Ask students to find out what they eat, where they live, are they endangered, why are they endangered, what is so special about cassowaries?
3. Students should also identify cassowaries’ behavioural and structural adaptations and how these should be considered when planning development.
4. Record the information in a retrieval chart.

**Activity** – Adaptation to development

1. Read *Resource 7 – Cassowaries – Adapting to Development*. Discuss the questions on *Resource 7* and record students' responses in a retrieval chart.
2. Ask students to create a cause-and-effect chart relating to coastal development and cassowaries (See *Resource 6 – Cause-and-effect charts*).
3. Explain to students that people still need houses to live in which raises the question – what is a solution? In pairs or individually, ask students to respond to this question. They will need to consider what cassowaries need to survive, so will need to draw on their knowledge of cassowaries. They will also need to draw on their knowledge of what people need and want when they build a house or a community. Students will need to explain their answer.
4. Add new words to the word wall (See *Resource 1 – Word bank* for examples of vocabulary).
5. Students add their learning and reflections to their science journal (See *Resource 2 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use students’ cause-and- effect charts and responses to find solutions to issues of development to assess their ability to apply knowledge to inform decisions.

Resources

Useful web links

Cassowary overview – <http://a-z-animals.com/animals/cassowary/>

Cassowary facts: Curious Cassowary Facts – <https://www.youtube.com/watch?v=GztoIsNk3n8>

Printable resources

*Resource 1 – Word bank*

*Resource 2 – Student reflections*

*Resource 6 – Cause-and-effect charts*

*Resource 7 – Cassowaries – adapted to development*

Other resources

Photos, books about cassowaries

Pens and large piece of paper for retrieval chart

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 15-17:** Reflections andassessment task

**Duration:** 2 hours 30 minutes

Suggested learning sequence

**Introduction** – reflections and task introduction

1. As a class, reflect on what has been learnt throughout the unit.
2. Explain to the students that they are going to begin their final assessment task. Present them with the task sheet and the Guide for making judgements *(Resource 8 – Student task sheet and Guide for making judgements).*
3. Read through the task sheet and Guide for making judgements together and identify all the requirements of the task.
4. Discuss available resources (identify all the work done throughout the unit that will help the students complete the task).
5. Set out a plan for time management and resource management.

**Activity –** Start preparing projects

1. Allow students time to research and prepare their project.
2. Students may need scaffolding for different parts of the task; this will depend on the needs of the class.

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Opportunities to monitor student learning

**Summative assessment opportunities:**

Students’ tasks can be used to assess their knowledge and understanding of science understandings, science as a human endeavour and science inquiry skills.

Resources

Printable resources

*Resource 8 – Student task sheet and Guide for making judgements*

Resources

Resource 1 – Word bank

| Adaptation | Behavioural adaptations | Structural adaptations | Camouflage |
| --- | --- | --- | --- |
| Features | Environment | Streamlined | Survival |
| Carnivore | Omnivore | Herbivore | Instinctive behaviour |
| Learned behaviour | Migration | Schooling | Nocturnal |
| Diurnal | Ambush predator | Seed dispersal | Carnivorous plant |
| Tendrils | Cacti | Succulent | Introduced species |
| Native species | Coastal development | Endangered | Pest species |

Resource 2 – Student reflections

Consider displaying sentence starters or questions, such as below, in the classroom. Alternatively they could be turned into laminated thought bubbles that are directly passed to students. Students could choose two or three to complete in their journal then share their responses with the class.

| End of lesson reflections | | Guiding students to reflect on their own thinking | |
| --- | --- | --- | --- |
| Today I discovered …  I want to know more about …  Something new I found out was …  I am excited about …  Something I am finding interesting is …  The most challenging thing was … | I am most proud of …  I feel confident about …  I am enjoying … because …  I am confused by …  Today I asked …  A question I have is … | I am starting to think differently about …  I got stuck when … and I got back on track by …  I figured out that …  I solved a problem by …  I first thought … but then I realised that … | This idea is useful for …  Some things I didn’t understand are …  To help me understand better I will …  Before I didn’t know …  Now I realise/know … |
| Reflecting on stewardship and taking action | | End of unit reflections – where I was and where I am now | |
| This information can make a difference by …  It is important to know about this because …  Something I will now do as a result of my learning is …  Something I want to do next is … | Something I will now help others understand is …  I can make a difference by …  An action I/we can take is …  If we don’t … the consequences could be …  It is important to … because … | 1. I used to think … 2. Now I know … 3. This causes me to (re)think/ wonder … | * **Revisit** your first journal entry. What do you understand now that you didn’t back then? * **Review** your work so far. What has been the biggest discovery/learning/challenge? * **Reconsider** your initial ideas. Have your ideas changed? If so how? |
| 1. I didn’t know how to … 2. Now I can … 3. In the future I will … |

Resource 3 – Procedural text – Bird beak experiment

| Aim |
| --- |
| To investigate how birds’ beaks have adapted to suit their habitats. |
| Equipment per group |
| * For ‘beaks’ - examples: pliers, chopsticks, tweezers, straws, slotted spoons, strainers, tongs, skewers * For ‘food’ - examples: worm or snake lollies, sunflower seeds, polystyrene cubes or balls, popped popcorn, rice, marshmallows * trays to put food on * cups to represent stomach * stopwatch or clock (to time 20 seconds) |
| Procedure |
| 1. Gather four ‘beaks’ and four types of ‘food’ as directed by your teacher. 2. Add headings to your results table according to which four ‘foods’ and four ‘beaks’ you have been given. It doesn’t matter about the order. 3. Give one beak to each student in your group. This will be your beak for the whole experiment. 4. Add the first food type onto a tray and choose your first beak to test. 5. Using this ‘beak’, you have 20 seconds to collect as much ‘food’ from the tray as possible and place it in the cup (stomach). 6. Record how many pieces of ‘food’ are collected for this ‘beak’ in the results table (only include food that is dropped into the cup). 7. Replenish the tray with the same food type and rotate to a new student with a different ‘beak’. 8. Repeat the test with the new beak for 20 seconds and record the results in the table. Keep rotating until all four beaks have been tested. 9. Change to the next food type and repeat the experiment. 10. Once you have gathered all of your results, complete the questions provided. |

### Results table

*Remember to fill in the headings for the four beak types and food types you are testing (where you see a \*).*

| Beak type  (e.g. tweezers) | Food type (e.g. sunflower seeds) | | | |
| --- | --- | --- | --- | --- |
| \* | \* | \* | \* |
| \* |  |  |  |  |
| \* |  |  |  |  |
| \* |  |  |  |  |
| \* |  |  |  |  |

### Questions

| Looking at your results, write down which ‘beak’ type/s were the best for gathering each of the four ‘food’ types you tested.  Can you explain why each ‘beak’ type was best at gathering that ‘food’? (Hint: Think about its shape/size/way it worked etc.) | |
| --- | --- |
| What problems or challenges did you have in doing this experiment? | How could you improve this experiment? (think about fairness and accuracy) |

Resource 4 – Turtles on the Great Barrier Reef

All information is from the Great Barrier Reef Marine Park Authority – <http://www.gbrmpa.gov.au>

The highlight of any visit to the Great Barrier Reef may be spotting a marine turtle.

Of the seven species of marine turtles, six are found in Queensland’s shallow coastal waters. Green, hawksbill and loggerhead turtles are the most frequently sighted but flatback, leatherback and olive ridley turtles are also occasionally seen.

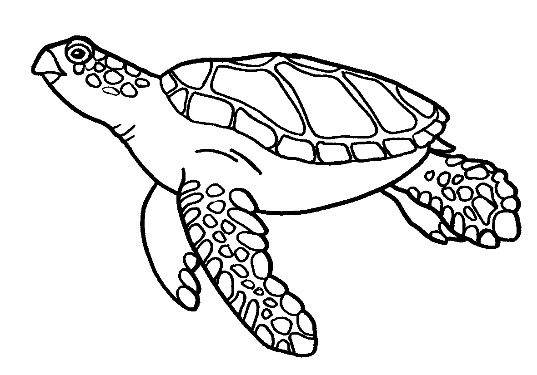
All year round in the protected, shallow reef waters, divers and snorkelers can see juvenile and adult turtles swimming about or feeding on plants and small animals.

### Where turtles breed

Turtles breed mostly in the northern and southern regions of the Great Barrier Reef. In the southern rookeries, marine turtles nest only in the summer months, but in the northern rookeries some nesting takes place all year round, with a summer peak.

### Nesting

When female turtles go ashore to nest, they usually go ashore at night when the tide is high. They drag themselves high up the beach and dig a nest for their eggs.



Loggerhead and green turtles lay about 100 round, white eggs about the size of ping-pong balls, and flatback turtles lay larger eggs in clutches of about fifty. No marine turtle species stays with or cares for its young.

Each female lays several clutches of eggs in the one season. This takes place about every two weeks during the breeding season and usually on the same beach.

Two to eight years pass before a female turtle is ready to breed again. Each turtle returns to breed in the region where it was born even though it might swim as far away as Papua New Guinea, Solomon Islands, New Caledonia or Indonesia to find food.

When a turtle comes ashore to nest, the weight of her body and the action of her flippers and tail carve out tell-tale tracks in the sand. The tracks resemble one metre wide tractor tracks. One-way tracks suggest that a turtle is in the process of egg-laying somewhere near the top of the beach.

Egg-laying takes 1-3 hours from start to finish. First the turtle digs strongly with her front flippers, sending the loose sand flying everywhere.

Then she positions her tail over the shallow nest and, very slowly and methodically, she uses her two hind flippers to carve out a vertical, pear-shaped egg chamber.

Shielding the hole with these flippers, she then lays her leathery-shelled eggs inside the warm, moist chamber. The hind flippers are used to cover the eggs with sand and flatten out the nest.

When the work is all done, the turtle returns to the sea.

### Line illustration - turtles hatchingThe early years of life

The eggs incubate in the nest for 7-12 weeks. The temperature of the surrounding sand determines the gender of the offspring. Male hatchlings result from cool nests (25°C), while females are produced from warm nests (31°C). Both genders may occur in nests at intermediate temperatures.

As a group, the hatchlings dig their way up through the 50cm or more of sand to the surface. Then, generally in the early evening, the sand will erupt and the hatchlings will scurry down to the sea.

Many hatchlings do not survive the early stages of life. Some are eaten on the beach by ghost crabs, dogs, feral pigs and foxes. Others are taken in the coastal shallows by gulls, fish, sharks and crocodiles.

### Line illustration - sea turtleFeeding

Different species of turtles feed on different things. Green turtles eat algae and seagrass; loggerhead and olive ridley turtles eat shellfish and crustaceans; hawksbills eat algae and sponges; and flatbacks eat sea pens, sea cucumbers and soft corals. Leatherback turtles feed almost exclusively on jellyfish.

Resource 5 – The Cane toad – An introduced species

All information is from the Great Barrier Reef Marine Park Authority – <http://www.gbrmpa.gov.au>

### Where do cane toads come from?

Cane toads are native to the southern United States, Central America and tropical South America. In their natural environment their numbers are controlled as there are enough natural predators to stop them from becoming a pest.

### Why were cane toads introduced to Australia?

Cane toads were introduced to Australia in 1935. They were introduced into North Queensland to help control the cane beetles that were destroying sugar cane crops.

The cane toads adapted so well to the Australian environment, that they soon started breeding and spreading throughout Queensland.



About 3000 cane toads were released in North Queensland to help control the cane beetles. They now number in their millions and have spread into the Northern Territory, Western Australia and New South Wales and show no signs of stopping.

### Why did cane toads adapt to the Australian environment so well?

Cane toads immediately adapted well to the Australian environment because:

they use a wide variety of habitats including sand dunes, rainforest, mangroves, urban areas, grasslands, woodlands and wetlands

they eat a lot of different kinds of food including beetles, honey bees, ants, winged termites, crickets, bugs, marine snails, frogs, snakes and small mammals. Toads will eat just about anything they can swallow, including dog food left behind by your pet dog!

they breed very quickly. A female cane toad can lay over 8000 eggs twice a year

there are not many natural predators in Australia that can eat cane toads.

### Why are cane toads a problem?

Cane toads are now considered a pest in Australia. There are so many cane toads in Australia that they are threatening Australian wildlife and ecosystems. They are a threat for a number of reasons:

They are poisonous. Native animals that try to eat cane toads will most often die because of the poisonous glands that are found over the cane toads’ shoulders.

Cane toad eggs and tadpoles are also poisonous.

Cane toads are predators to many native animals.

Cane toads compete with native frogs for their habitat.

### How have native animals adapted to cane toads?



Some animals have learnt to adapt to cane toads living in their habitat. Scientists have found that some birds have learnt to flip cane toads over when they catch them. The birds then use their beaks to eat out the guts of the cane toad. Eating the cane toad this way allows the bird to avoid the poisonous glands found over the cane toad’s shoulders.

Keelback snakes can eat young toads as they are able to handle low levels of the cane toad’s poison. Scientists have also found that wolf spiders, freshwater crayfish, freshwater crocodiles, water rats and giant white-tailed rats can eat cane toads but always run the risk of ingesting too much poison and dying.

However, sometimes native animals do not adapt to the cane toads. Many native animals have died from eating toads. Many native frogs have been pushed out of their native habitats by cane toads as cane toads eat frogs.

### What can be done about controlling cane toads?

Scientists are still trying to find a way to control the spread of cane toads. Some towns hold “Toad Buster” days to humanely catch and kill as many cane toads as possible to stop them from breeding and spreading further around Australia.

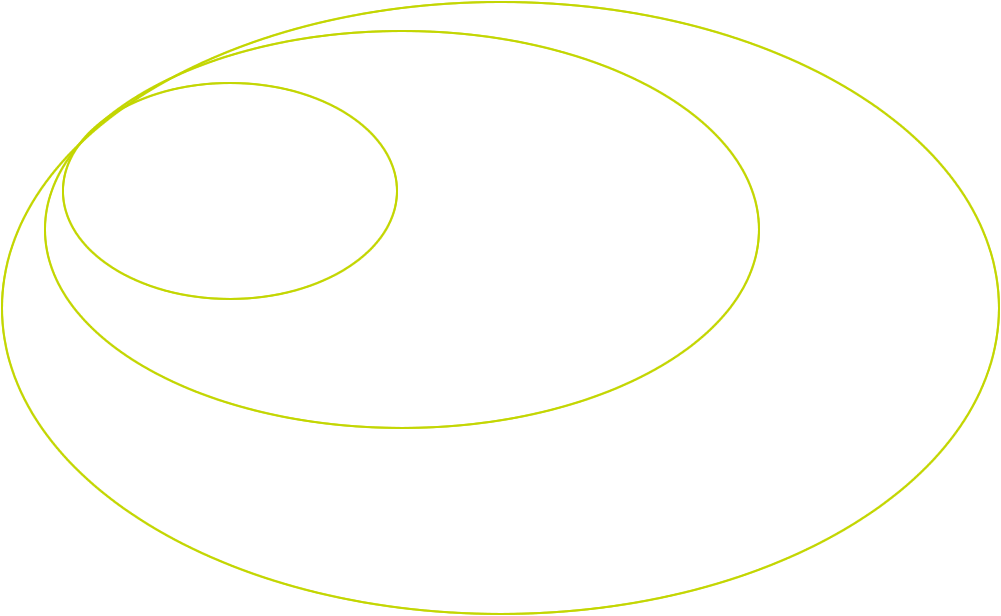
Resource 6 – Cause-and-effect chart 1

| CAUSE |
| --- |
| What was the event? Who or what caused it? |

| IMMEDIATE EFFECT |
| --- |
| What might happen because of the event? What could be the immediate effect? |

| SHORT AND LONG-TERM EFFECTS |
| --- |
| What might happen next? What could be the short and/or long-term effects? |

Resource 6 – Cause-and-effect chart 2



**SHORT AND LONG TERM EFFECTS**

* What might happen next?
* What could be the gradual effects?

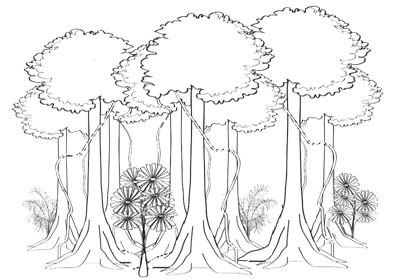
**CAUSE**

* What was the event?
* Who or what caused it?

**IMMEDIATE EFFECT**

* What might happen because of the event?
* What could be the immediate effect?

Resource 7 – Cassowaries – Adapting to development

*Photos and information from Mission Beach Bulletin March 2010 No. 153, The Community for Coastal and Cassowary Conservation Inc. (C4) Porter Promenade, Mission Beach Tel. (07)4068 7197,Fax (07)4068 7298* [(http://www.cassowaryconservation.asn.au/C4bulletin.htm)](http://www.cassowaryconservation.asn.au/C4bulletin.htm))

The photos below show an area of coastal development at a place called Garner’s Beach. Garner’s Beach is a special area as it is home to a number of cassowaries. They use the area to find food and shelter, lay their eggs and raise their young and are even known to visit the beach while searching for food. Cassowaries eat native rainforest fruit found in the rainforest. They spend each day walking through large areas of rainforest looking for fruit to eat.

### Discussion questions

1. **Look at Figure 1.** Describe what you can see. How would cassowaries use this as a part of their habitat?
2. **Look at Figure 2.** How has the habitat changed over the years after Cyclone Larry? How would this be affecting the cassowaries?
3. **Look at Figure 3.** The numbers all represent blocks of land that have been approved for residential development. How will these houses change the cassowaries’ habitat?
4. **Look at Figure 4.** The Department of Environment and Heritage Protection map shows how the houses and roads will clear the land. What will happen to the cassowaries that use the area to find food and shelter, lay their eggs and raise their young? Will they still safely be able to do all these things in this area? Where will they go? What if the other areas they go to are being developed as well?
5. Describe how cassowaries have had to adapt to development in their habitats. Think about people, roads, cars, dogs, houses and fences.

  
**Figure 1.** 2005 Pre cyclone Larry

  
**Figure 2.** Dwellings 2010

  
**Figure 3.** Approved configuration of lots and infrastructure

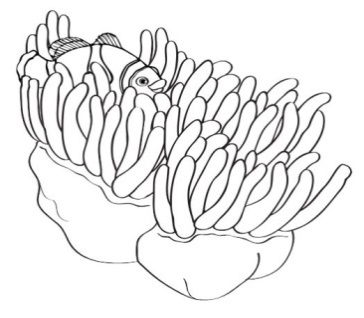
  
**Figure 4.** EPA vegetation mapping showing unprotected area

Resource 8 – Student task sheet and Guide for making judgements

### Line illustration - frogAnimal adaptations – Year 5 – Animal design and report

### Your task:

**Part A: Design an animal that is adapted to suit one of the following environments:**

* Great Barrier Reef
* Daintree rainforest
* mangrove estuary
* open ocean
* Australian desert
* Antarctica
* freshwater wetland

You will need to research your chosen environment to find out the climate, what shelter and food sources are available.

You need to provide a drawing of your animal or you can construct a 3D model.

**Part B: Provide a report or persuasive text** on your animal. Your report will need to include the following information:

Describe your animal’s habitat and what it needs to survive:

what it eats

where it finds water

where it shelters or hides from predators

where it sleeps or nests.

Describe your animal’s structural adaptations (its external features).

Describe your animal’s behavioural adaptations.

Explain how your animal’s structural and behavioural adaptations help it to survive in its environment.

Discuss why the community living in and around the animal’s environment should consider their actions in order to protect the animal.

|  |  |
| --- | --- |
| Year 5 Science: Animal adaptations – Animal design and report | Name: |

**Purpose:** To describe the structural and behavioural adaptations of their animal. To explain how these adaptations help the animal to function and survive in its environment. To discuss how the local community should consider their actions in order to protect the animal.

Explains how relationships with other living things and the [environment](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=Environment) assist or hinder its survival

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Science Understanding | | Science as a Human Endeavour | | Science Inquiry Skills | |  |
| Biological sciences | | Use and influence of science | | Communicating | |
| Describes the structural and behavioural adaptations of their animal. Explains how these adaptations help the animal to function and survive in its environment. | | To discuss how the community living in and around the animal’s environment should consider their actions in order to protect the animal. | | Communicates their ideas, methods and findings using a range of text types. | |  |
|  | * Integrates descriptions and explanations with scientific knowledge. |  | * Discussions are reasoned. |  | * Communicates coherently. | A |
| * Links descriptions and explanations with scientific knowledge. | * Discussions are informed. | * Communicates using relevant scientific terminology throughout. | B |
| * Describes the structural and behavioural adaptations of their animal. Explains how all of these adaptations help the animal to function and survive in its environment. | * Discusses how the community living in and around the animal’s environment should consider their actions in order to protect the animal. | * Constructsmulti-modal texts to communicate ideas. | C |
| * Partially describes adaptations of their animal. Partially explains how some of these adaptations help the animal to function and survive in its environment. | * Discusses the community living in and around the animal’s environment taking actions. | * Communicates ideas using everyday language. | D |
| * Recalls some adaptations in animals. | * Statements about communities living in and around the animal’s environment. | * Fragmented communication of ideas. | E |
| Teacher feedback: | | | | | | |