# *Biodiversity study* Teaching and learning plan

## Learning intentions

Students will be able to:

* identify a range of habitats
* make predictions about biodiversity of habitats in their local area/school grounds
* measure the physical factors of a habitat
* collect and record data from a habitat
* construct representations of a habitat
* analyse findings from data collection
* infer how the physical factors of a habitat affect the survival of the living things within that habitat (cause-and-effect relationships)
* make conclusions about the health of a habitat
* communicate their ideas and findings using scientific language and representations.

## Suggested timeframe

The time needed to complete the *Biodiversity study* CLE will depend on the depth of the prior knowledge of students, the time to perform the six investigations—including the introductory activity ‘Biodiversity assessments’ and the optional activity on ‘Trophic levels and pyramid of numbers’ and follow up with any further extension activities. Allow 7–10 hours.

Allow a minimum of one (1) hour to complete each individual activity.

[**Planning ahead and equipment list**](http://assist.asta.edu.au/sites/assist.asta.edu.au/files/Planning%20and%20equipment%20list_Yr6_Biodiversity%20study.docx)

## Safety considerations

When you and your class are completing your Risk Assessment consider the following safety points and add any other relevant ones to the list.

* Students and other participants (such as accompanying parents or teachers) may have allergies to stings or bites from insects such as bees, wasps, ants and spiders.
* Students and other participants (as above) may have allergies to plants such as grasses or vines.
* Consider the habitat being studied and organise:
* appropriate sun-safe protective gear such as hats, umbrellas and pop-up shelters
* appropriate protective clothing such as closed-in footwear and long socks, long sleeves or head netting
* appropriate water safety gear such as life jackets.
* Carry a first aid kit and any Epipens® that may be required.
* Have access to communication and carry mobile telephone at all times.

## Introduction

**N.B. Downloading resources from the Queensland Museum website**: When you click on any of the website links you will asked for a username and password. In order to access the PDFs and videos, click ‘Cancel’ and then the PDFs and videos will open.

### Biodiversity assessments

This CLE focuses on how the physical (abiotic) factors of an environment affect the growth and survival of living things and links to Year 6 Australian Curriculum: Science.

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

### What to do

1. Ask students to suggest meanings for the term ‘biodiversity’*.*
2. Ask students to make suggestions about why biodiversity is important.
3. Ask students to make a list of areas in their school grounds they think would have a high level of biodiversity and a low level of biodiversity.
4. Show the video ‘Biodiversity assessments’ Queensland Museum website <http://www.qm.qld.gov.au/microsites/wild/plan-study.asp> (3:53 min)
5. Determine two sites (habitats) within the school grounds that would benefit from a biodiversity comparative study. Explain to the students that the main idea of studying two sites is to examine how the physical (abiotic) factors of a habitat affect its biodiversity.
6. Instruct students to read section 1 of the ‘Backyard Explorers User’s Guide (student workbook)’ from the Queensland museum website <http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf> to understand the habitats and living things that they may encounter when conducting their study.

**Teacher notes**

* Each of the group activities needs to be carried out for each study site so that a comparison between sites can be completed at the conclusion of the study.
* Each group activity is explained in the Backyard Explorer User’s Guide (student workbook)
* Options for completion—carry out each study concurrently, dividing the class into half with each half studying one site OR complete one study before commencing the next.

### Group activity 1—Naming the habitat

This activity is fully explained in the Backyard Explorers User’s Guide (student workbook) pages 3–4

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

Per group:

* 30 cm ruler
* 1m2 quadrat, made with plastic irrigation piping or similar. (A quadrat is a square plot of land marked off for the study of plants and animals.)
* transect line or tape measure
* tent peg, to measure soil compaction
* Copy of downloadable student resource ‘Science Skills: How to name habitats’, Queensland Museum website, <http://www.qm.qld.gov.au/microsites/mangrove/pdf/scienceskills/QM_how_to_name_habitats.pdf>

#### **What to do**

1. Read through the activity with the students and answer any questions they may have.
2. Allocate students to groups and instruct them to collect the required equipment.
3. Move to the nominated study sites in their groups. (Remind students of safety considerations)
4. Students follow the instructions on page 3 of the student workbook

Students:

1. construct a grid area to study
2. sample the vegetation in their grid
3. measure the ground cover.
4. Students complete the table ‘Habitat identification data’on page 4 of the student workbook.
5. Students use the table in *Science Skills: How to name habitats* to determine the type/name of the two habitats they are studying.
6. Students share their findings.
7. Discuss ideas about the living things they expected to find in the environment and if these were found. Ask why/why not.

## Core

### Teacher notes

* Explain to students that over the next series of lessons they will now be working towards fully assessing the chosen areas for their biodiversity.
* Remind students of the safety considerations of working outdoors.
* Ensure students have access to the student workbook to complete the activities.

### Group activity 2—What is my habitat like?

This activity is fully explained in the Backyard Explorers User’s Guide (student workbook) pages 5–7

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

Per group:

* thermometer
* tent peg
* water
* gloves
* anemometer (to measure wind speed)
* hygrometer (to measure relative humidity)

### What to do

1. Read through the activity with the students and answer any questions they may have.
2. Groups collect the required equipment.
3. Students move to the nominated study sites in their groups.
4. Students follow the instructions on page 5 of the student workbook

Students:

1. measure soil temperature fir their chosen area
2. use a ‘Soil Type Key’on page 24 of the student workbook to identify soil type
3. use a hygrometer to measure relative humidity
4. use an anemometer to measure wind speed
5. use a thermometer to measure air temperature
6. Students complete the sheet ‘What’s my habitat like?’on page 6 of the student workbook
7. Students answer the analysis questions regarding their findings on page 7 of the student workbook’
8. Students share their findings.
9. Discuss with students how the conditions of the environment might impact on the living things that live there.

### Group activity 3—Habitat profiles: What animals could live in this habitat?

This activity is fully explained in the Backyard Explorer User’s Guide (student workbook) pages 8–11

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

Per group:

* digital camera, optional (may assist students to draw images)

### What to do

1. Read through the activity with the students and answer any questions they may have.
2. Groups collect the required equipment.
3. Students move to the nominated study sites in their nominated groups.
4. Students follow the instructions on page 8 of the workbook to draw their habitat profile.

Students:

1. label plant types in their area
2. draw a profile diagram of the area
3. list animals seen in the area.
4. Students answer the analysis questions regarding their findings on page 9 of the student workbook.
5. Students then follow the instructions on page 10 of the student workbook to identify possible food sources and make predictions about possible living things in the habitat.
6. Use the focus questions on page 11 ‘Finding the habitat’s consumers’ to guide the students.
7. Remind students of safety precautions before searching for living things.
8. Students search for and record the living things in the area.
9. Students share their findings.
10. Discuss the types of living things found in the different habitats and how the environmental conditions may have influenced them being able to live there.

### Group activity 4—Trapping and identifying invertebrates

This activity is fully explained in the Backyard Explorer User’s Guide (student workbook) pages 12–17.

**Teacher note:** This activity requires the use of an interactive key to identify the invertebrates found. The use of keys and classification of organisms is the Science Understanding strand from year 7. Students are not expected to develop or examine the key—the key is meant as an assistive tool.

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

Per group:

* relevant equipment for your chosen insect collection technique (beating, netting, pitfall traps, pan traps and leaf litter collection)
* magnifying glasses
* tweezers

#### **What to do**

**Prior to lesson**

1. If using pan traps, set them up in key areas to enable insects to be readily available for collection.
2. Students discuss and understand the reasoning for accurate labelling of specimens—refer to page 12 of the student workbook.
3. Students read the instructions on how to label a specimen prior to collecting.

**Body of lesson**

1. Students follow the instructions in the student workbook on page 14 to collect their insect specimens from under bark and leaf litter.
2. Students document their findings on the sheet ‘Invertebrate collection results’ on page 15 of the student workbook.
3. Students answer the analysis on pages 16–17 of the student workbook.
4. Students use the CSIRO interactive, *Key to the Invertebrates* to identify the insects collected. <http://www.ento.csiro.au/education/key/couplet_01.html>
5. Students share their findings.
6. Discuss with students the types of invertebrates found in each habitat and how the environmental conditions may have influenced them being found there.

### Group activity 5—Other consumers: reptiles and birds

This activity is fully explained in the Backyard Explorer User’s Guide (student workbook) page 18.

**Teacher note:** The activity ‘Trophic levels and pyramid of numbers’ on page 21 of the student workbook is considered optional at this year level, as this science understanding is more suited to year 7. Refer to the teacher guide and student workbook if you wish to progress through this activity.

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

Per group:

* binoculars

### What to do

1. Students use the sheet *Bird watch data* on page 19 of the student workbook to record birds observed within the study site.

Students:

1. find a quiet space to observe birds
2. use the binoculars to look for birds
3. list and identify birds seen in the area.
4. Students answer the analysis questions on page 20 of the student workbook.
5. Students share their findings.
6. Discuss with students the types of birds found in each habitat and make suggestions about the influence of the environmental conditions on the birds found there.

### Group activity 6—Physical factors of the study area

This activity is fully explained in the Backyard Explorer User’s Guide (student workbook) page 22–24.

### Equipment needed

Per student:

[Backyard Explorers User’s Guide (student workbook)](http://www.qm.qld.gov.au/microsites/wild/pdf/backyard-explorer-user-guide.pdf) (PDF, 2MB)

Per group:

* Equipment required is dependent on the physical factors chosen to measure. Refer to the student workbook page 22 for specific details.

### What to do

1. Students conduct their measurements of the study site and conduct further testing on soil samples.
2. Students answer the analysis questions on page 23 of the student workbook.
3. Students share their findings.
4. Discuss with students how these physical factors may have affected the survival of the plants and animals in each habitat.

## Conclusion

Students have collected a large range of data during the activities and should complete a report about their study site(s)—suggestions are made in the student workbook.

1. Students make comparisons between sites.
2. Students consider the effect the physical conditions of the two habitats and how this has affected the growth and survival of the living things in each habitat.
3. Students make judgments about why biodiversity differs between sites.

### Expected results and explanations

Results will vary according to your local area and the nominated study sites.

In a sparse habitat, expect to see a limited number of living things. Ants will be the most commonly observed living thing in any habitat.

The types of invertebrates that you would expect to see in a rich, biodiverse habitat could include but will not be limited to:

* Assassin beetles
* Ants
* Spiders
* Stink bugs
* Dragonflies
* Butterflies
* Flies
* Grasshoppers
* Mosquitoes
* Earwigs
* Bees
* Birds
* Reptiles—skinks, lizards or snakes

### Assessment opportunities

Formative and ongoing assessment of Science Inquiry Skills could be made as students work through the different activities.

Teachers could use the student workbook as an assessment task for the students.

Teachers could use the biodiversity study report to assess students understanding of the factors that influence the biodiversity of an area.

A rubric for these assessments should be developed.