

BushBlitz: TEACHER RESOURCE BOOKLET

BushBlitz
SPECIES DISCOVERY PROGRAM

Contents

Acknowledgements

The author would like to thank the Centre for Biological Information Technology, The University of Queensland

Author: Margaret Watts (STANSW President, Science Education Consultant, NSW)
Graphic Designer: Josie West, Publications Manager, ASTA
Printer: Blue Star Print
Publisher: Australian Biological Resources Study
Front Cover Images: Charles Darwin Reserve - WA, Dunart (P. Taylor), Scorpion (C. Slatyer) and Barking Gecko

ISBN; 978-0-642-56863-2

Australian Government
Department of the Environment, Water, Heritage and the Arts

bhpbilliton
resourcing the future

EARTHWATCH INSTITUTE

Australian Science Teachers Association

CARING FOR OUR COUNTRY

Bush Blitz - Species Discovery Program

Australia is a megadiverse country with an estimated 566,398 species, but only one quarter of Australia's native species have been identified so far. Forty-five per cent of continental Australia has never been comprehensively surveyed by scientists.

Bush Blitz was launched in 2010, the International Year of Biodiversity. The concept is simple: teams of Australia's top scientists will survey hundreds of Australian reserves to document the native plants and animals they protect. The scientists will record all of the plants and animals that they find, and when they discover a new species, they'll describe it, name it and allocate it to the species family tree.

The surveys are expected to uncover hundreds of new species and provide baseline scientific data that will help protect Australia's biodiversity for generations to come.

The project is an innovative partnership led by the Australian Government, involving the global resources company BHP Billiton, not-for-profit conservation research organisation Earthwatch and rangelands survey group the National Scientific Reference Site Network.

You can follow the Bush Blitz team's progress through the Bush Blitz website at ***www.bushblitz.org.au***

CHAH
Council of Heads of Australasian Herbaria

OZCAM
Online Zoological Collections of Australian Museums

ATLAS OF LIVING AUSTRALIA
sharing biodiversity knowledge

2010 International Year of Biodiversity

Bush Blitz Activities

The overall thrust of the Bush Blitz activities provides opportunities for students to develop their knowledge and understanding about:

- the meaning of *biodiversity* in the context of Australian ecosystems
- the classification processes used in describing organisms and how these processes may lead to the identification of previously unknown species
- species that are threatened within Australian ecosystems.

For all students

Contact local Indigenous Australians in your community – ask them to talk to your students and tell them what they know about the movement and interactions between animals in the local area.

Do you have a 'Bush Tucker' expert in your region? Learning about bush tucker is an excellent introduction to Australian plant species.

Activities Yrs P-3

Living and Non-living Things

Begin these activities by providing students with opportunities to distinguish between living and non-living things.

http://www.instructorweb.com/lesson/livingthings.asp has a lesson with worksheets to assist with this part of the activity. Please note that there is a membership fee for full access to this website.

Young students can then be introduced to the broad spectrum of Australian organisms by observing just the plants around them. The purpose of the following activity is to begin awareness-raising of the similarities and differences in plants. If it is possible to walk in a garden or bush zone with Australian native flora, the students will see plants with grey-green, narrow leaves, rather than broad leaves, many of which have spiky margins.

1. Organise to take your students for a supervised and carefully-planned walk in a local park or bush area.
2. Before you go, introduce words that are used to describe plants and parts of plants, such as:
   - Leaf
   - Stem
   - Trunk
   - Branch
   - Tree
   - Grass
   - Bush
3. Then focus on the words:
   - Same
   - Different

Ask students to look at the plants around them. What words can be used to describe them?

- How high?
- How wide?
- Thick or thin?
- Do they have bark?

Ask them to collect samples of leaves that are:

- The same shape
- The same colour
- The same size

Then ask them to sort the leaves in terms of differences, for example:

- If they are the same size, how do you tell them apart; what differences do they have?
- How do they smell?
- How do they feel?

If it is possible to keep the leaves, collect some samples that can be used for leaf rubbing.

http://squigglemum.com/activities/leaf-rubbings-with-rainbow-crayons/ has an interesting idea on how to use leaf rubbings.

Animal Blitz

Introduce the students to some common native animals that they might see in their gardens and in the bush. They will probably recognize different birds and possibly possums and kangaroos but include little lizards, snails and small common insects such as ants, beetles, flies and bees.

Draw up a grid on a poster with the name and images of animals that may be found in your area in the left-hand column. Then have a number of columns – say five for each day of one school week – so that the students can record any sightings.

Ask the students to put a dot on the grid every time an animal is sighted. At the end of the week, use the grid to introduce words such as 'none', 'few' and 'many' to summarise the number of different creatures seen during the week.

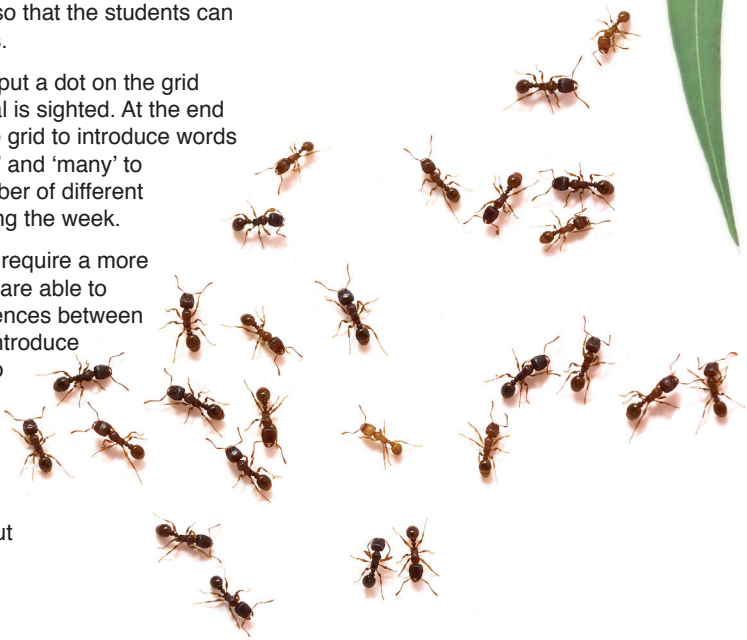
Older students may require a more complex grid if they are able to recognise the differences between smaller creatures. Introduce the word 'species' to describe animals of the same type, such as galahs, magpies or kookaburras. Or there are many species of ants about for little eyes to spy!

Conservation Clues

Young students can begin to learn the importance of caring for their country in simple ways. Encourage them to work in groups to collect samples of leaves, but teach them to take leaves only if the plant has plenty of foliage. Removal of leaves needs to be done in such a way that the rest of the plant is not damaged.

For more vulnerable plants, take photos only!

http://australianmuseum.net.au/Wild-Kids is a useful website to find images of animals from various habitats and will help with identification.



COMPETITION

Australia's Top 10 N

Students can vote for their **Number 1** at **www.bushblit**

© Andrew Hosie

1. Common name: Opera House Barnacle

Scientific name: *Calantica darwini*

Where discovered: Only found in the tropical waters off the Pilbara Coast in Western Australia.

Noteworthiness: Named in honour of Charles Darwin's contribution to the study of barnacles and their classification. Darwin's research into barnacles played an important role in developing and testing his theory of natural selection.

2. Common name: Kimberley Froglet

Scientific name: *Crinia fimbriata*

Where discovered: On the Mitchell Plateau in the north-west Kimberley, Western Australia

Noteworthiness: The very rugged region where the froglet was discovered has extremely important biodiversity assets but is impacted by tourism, industry, feral weeds, cattle and by invading cane toad populations.

© Ruchira Somaweera

© Claudia Arango

3. Common name: Sea Spider

Scientific name: *Paranymphon bifilarium*

Where discovered: Collected at a depth of 100 m off Ningaloo Reef, Western Australia.

Noteworthiness: This is the first record from this group of sea spiders in the southern hemisphere with only three other species from this genus known from the Atlantic and North Pacific.

4. Common name: Steve Irwin's Tree Snail

Scientific name: *Crikey steveirwini*

Where discovered: Inhabits the near summits of high mountains (above 1000 m) in the wet tropics of North Queensland, near Cairns

Noteworthiness: This extremely rare species was named in honour of the late Steve Irwin and his famous catch cry. The mountainous areas where the snail was discovered will be the first to feel the effects of climate change. This tree snail may be a suitable species for monitoring this change.

© Newspix/Jodie Richter

© A. J. McArthur

5. Common name: Spinifex Ant

Scientific name: *Camponotus triodiae*

Where discovered: Northern South Australia.

Noteworthiness: These ants make a distinctive entrance to their nests by constructing a long tube made from spiky spinifex grass and red outback soil.

*Primary and middle school students can win a class visit to their state or territory museum *Senior secondary

ew Species Finalists

WIN PRIZES

tz.org.au to WIN great prizes* Voting begins 9 August 2010.

© Karen Gowlett-Holmes

6. Common name: Pink Handfish

Scientific name: *Brachiopsilus dianthus*

Where discovered: Only known from four specimens collected in south-eastern Tasmania.

Noteworthiness: Handfish 'walk' on the seafloor using modified pectoral fins. Pink Handfish are a conservation concern as so few have either been caught or observed in an area subject to commercial and recreational fishing and diving. The last recorded specimen was collected in 1999.

7. Common name: Cape York Amber Fly (fossilized)

Scientific name: *Chaetogonopteron bethnorrisae*

Distribution: This is the first species to be described from Cape York amber found washed up on beaches on the coast of far-north Queensland.

Noteworthiness: Although a fossil, the Cape York Amber Fly is from a genus found today in Australia. In Australia, there are 20 distinct species (only 4 formally described), which occur in the monsoonal North and eastern rainforests. The presence of this genus in amber that is probably from 30 million years ago indicates it arrived in Australia before then.

© Beth Norris

© B Maslin

8. Common name: Bacchus Marsh Wattle

Scientific name: *Acacia rostriformis*

Distribution: Found in quite large numbers near Bacchus Marsh, Victoria with a small population also found at Werribee.

Noteworthiness: The seed of this species was first collected in 1853 but amazingly, despite the species being obvious and beautiful (a one to eight metre beacon of yellow when flowering), and found so close to the western suburbs of Melbourne, it was not named and described until 2009!

9. Common name: The Bandalup Buttercup

Scientific name: *Hibbertia abyssa*

Distribution: Bandalup Hill on the south coast of Western Australia.

Noteworthiness: This plant has a very localised distribution and its discovery and description will enable appropriate conservation and management strategies to be put in place, ensuring the long term survival of a species which otherwise may have been lost.

© Dr Adrienne Markey

© Teresa Lebel

10. Common name: Truffle-like Mushroom

Scientific name: *Cribbea turbinispora*

Distribution: Only known from two collections – one from Queensland and one from South Australia.

Noteworthiness: This is the first time a truffle-like fungus has been found in the mushroom family. It has received its common name because the whole stalk and white–cream, lower half of the cap is found buried like a truffle, whilst the upper, darker half of the cap sits above the soil.

y student winners will participate in a Bush Blitz survey. For full terms and conditions visit www.bushblitz.org.au

Activities Yrs 4-7

Spider Species Count

Harm minimisation – ensure that students do NOT touch any spiders or their webs!

Each species of spider makes its own type of web in terms of both size and design. If there is access to one or more digital cameras, why not send the students on a search for spider webs? By photographing spider webs, students can get an idea of the number of different spiders in their area. With the class divided into groups, they can also tally the actual number of each type of spider found, according to web counts.

Extensions to this activity could include some Internet research:

- To identify the spiders that have been found
- To find out what spiders eat
- To suggest a food chain that includes spiders.

Making and Using Dichotomous Keys

http://www.barwonbluff.com.au/education/teacher/tops/dichotomous%20keys%20tops.htm has useful information about how to introduce dichotomous keys to younger students.

http://www.biologycorner.com/worksheets/dichoto.html has a fun worksheet for younger students for download that could help cement the concept of using a dichotomous key.

Begin any lessons on dichotomous keys by separating organisms into the major Kingdoms. For example, students can identify those structures that distinguish plants from animals and plants from fungi.

Students in this age group will be able to 'drill down' in the classification sequence to at least Class level. For example, they can identify those structures that group insects together, that distinguish fish from amphibians, flowering plants from ferns and mammals from birds.

The activity sequences below concentrate on birds but any group of organisms could be studied. For older students, perhaps assign each group the responsibility for surveying a different group of animals or plants. If you decide to expand the activity to include all the major groups of animals, some interesting and simple activities are available for download at *http://qldscienceteachers.tripod.com/worksheets/junior/biology/#class*

Developing and Trialling a Key for Identifying Birds

The purpose of this exercise is to develop students' understandings of the processes involved in classifying and identifying species. They may then appreciate how these processes can be used to identify new species.

1. Show students a series of bird photos that include:

a. a parrot such as a galah, king parrot or cockatoo
b. a magpie, currawong or butcher bird
c. a finch or wren
d. a honeyeater
e. a duck or wader

As a whole-class introduction, ask students to suggest words that could be used to describe the birds and build and display a word list.

Ask the students to form groups and list the similarities and differences in features that could be useful in describing the birds and distinguishing between them.

Guide your students to include:

• size • feather colours and patterns • song or call • head shape, body shape, tail shape • characteristics of beaks and feet

2. Ask them to brainstorm features that are different in each of the birds and might be useful in separating them into groups.

3. Ask the students to use the Yes/No answer to a series of questions to build up a dichotomous key.

Once your students are familiar with the use of dichotomous keys, they could extend their understanding into a 'Bush Blitz' experience by surveying plants or animals in the local environment over a period of time.

Read the instructions on page 5 for the 'Animal Blitz' for younger students. This could be adapted for older students by requiring them to keep their own records of sightings of one or more groups of animals such as birds, an insect group such as butterflies, or perhaps the procession of grass and weed species that grow in an undisturbed bush area near your school.

As part of the Bush Blitz program, such a survey might even identify rare and/or previously unknown organisms. If you cannot identify an organism, contact your nearest university, zoo, botanic gardens or museum, just in case it is a new species!

For example, an activity such as a bird survey could be conducted over a few days or could become a year-long activity which would identify migratory and changing patterns in bird populations.

A focus on birds would require:

- Current guide to the bird species of Australia
- Guide to bird shapes and their features such as • Beak • Head • Wing • Feet • Tail

A useful shape guide is available at *http://www.parkweb.vic.gov.au/education/1primary_home.cfm*

- Guide to bird colouration
- Binoculars (if available)
- Camera (if available)

Steps

1. Brief your students on strategies to assist when bird watching, such as the need for silence, stealth and patience!
2. Choose some objects that can be used to assist in estimating the size and length of birds, such as a 30cm ruler, pencil and paddle-pop stick. Would the observed bird fit into a lunchbox? A matchbox?
3. Use the bird shape outlines to give students words to describe various features of birds:
   a. beak is curved or straight
   b. beak is shorter or longer than head
   c. head and body shape is long and sleek or round and stocky
   d. tail is pointed or wedge-shaped
4. Use the bird guide book to identify each bird species observed.
5. If particular bird species are abundant in the local area, strategies for counting and/or estimating numbers can be included in the process.

Conservation Clues

"Over the last 200 years Australia has suffered the largest documented decline in biodiversity of any continent. Despite efforts to manage threats and pressures to biodiversity in Australia, it is still in decline." **This quote is from *http://www.environment.gov.au/biodiversity/conservation/index.html* from where more information is available on the threats to biodiversity in Australia.**

As part of their Bush Blitz activities, give students the opportunity to find out about possible rare and/or endangered species in their local area via Internet research or interviews with local biologists.

For younger students *http://www.kidcyber.com.au/topics/Austendangered.htm* is a good place to start. However, this site was last updated in 2006 and students will need to search for more up-to-date information.

Using Keys for Classification

Older students will be better prepared for a successful 'Bush Blitz' if they are aware of the details required to assist in identification of living organisms. Students can be taught to use both dichotomous keys and more complex keys once they have a fundamental grasp of the anatomy of organisms. As an introduction to the following activities, review and expand your students' knowledge of the anatomical features of the various groups of organisms.

Any introduction to classification procedures must begin with identifying the basic groups of living things and the further subdivisions, from Phyla through to the Species level of classification. Encourage your students to research specific animals via the Internet or guides to plants and animals. Let them 'learn by doing' about the details that are needed to identify specific plants and/or animals.

http://www.biologycorner.com/worksheets/zoobook2.html has a group activity that could be used to review students' understanding of the processes and structures used to classify organisms.

Bush Walk

Before the walk

1. Give students time to find out about the type of ecosystem they will be exploring. For example, are there likely to be endangered species of plants or animals in the area? How can they be recognised?
2. Outline the importance of caring for the country that they visit. For example, look before stepping if they move off a sealed path. Take no unnecessary specimens – use the camera instead – and leave nothing (except footprints) behind.
3. If suitable field guides on the various species are available, allocate these to the groups as appropriate.

During the walk

For a successful 'Bush Blitz', organise students into groups and allow each group to select a focus for their bush walk.
If possible, arrange for digital cameras to be available for each group. This reduces the need for taking samples and/or specimens but allows for information to be gathered to assist with identification.

As a minimum, allocate one of the following as a focus for each group:

- Trees – note height, numbers, distribution, structure, leaf shape and arrangement, and flowers if present
- Shrubs – as for trees
- Ground cover – as for trees
- Birds
- Reptiles – it is unlikely that larger reptiles will appear, but students need to keep an eye out for little skinks and other lizards
- Evidence (such as tracks and scats) of larger animals
- Evidence (such as cocoons, caterpillars and trails) of insects
- Read the exercise on page 8 about spider webs. One group could be armed with a camera and given the responsibility of surveying spider types via the webs they find.

After the walk

Each group will need to:

- Use field guides and/or Internet keys to identify the organisms discovered
- Prepare a short presentation on their findings, or use a jigsaw method to share the information gathered with the rest of the class.

Most commercial and free-to-download keys for identification focus on one group of organisms, such as birds, insects or eucalypts. Once students begin the classification process, they will need access to a reasonably specialised classification key.

The following reference sites are well worth a visit: *http://www.cbit.uq.edu.au/software/diversityorganisms/default.htm*

Diversity of organisms – A CD-ROM tool for teaching taxonomy to Biology students that covers the core curriculum topic of taxonomy, incorporating the concepts of Species classification, and the five Kingdom system. This package will assist in identifying the key structures used to classify the main groups of organisms. The fully electronic package includes teacher reference notes, student activities and solutions. RRP $39.

http://www.lucidcentral.org/ has a database of specialist keys for online use. Many of these can be accessed free of charge.

Image © Leo Berzins

Conservation Clues

Ask your students to research specific conservation strategies in use in the local community. The prompt questions to help them can include:

- **What is the focus of local conservation groups? Are they involved in whole ecosystem recovery? Are they more concerned with specific species, such as koalas or wombats, or specific ecosystems, such as grasslands?**
- **What is the difference between the terms *critically endangered*, *endangered*, *vulnerable* and *extinct* with respect to species? Are there any 'at risk' species in your local area? If so, what measures are being taken to assist their survival?**

The following sites are suitable for starting an Internet search, but remind students that information about local conservation issues can also be found in print and on TV.

***http://www.environment.gov.au/biodiversity/index.html* is an excellent site to start any research on the conservation of biodiversity in Australia.**

As a final activity, why not hold a class debate on the topic *"Conservation of Australian species is not a waste of time and money"*? Need some help to organise a class debate? *http://www.actdu.org.au/archives/actein_site/basicskills.html* is helpful. *http://www.shtm.org.au/pdfs/Debating.PDF* has a two-page downloadable document that could be handed out to students to help them prepare for a debate.