

DorroughBUGS Years 3-4 Teachers kit DEEC Vision

The health of the earth and all its inhabitants, depends on insects and their vital role in the maintenance of self-regulating systems. Insects are among the oldest, most important, abundant and diverse animals on earth. Humans don't yet know how many types of insects exist, but we can estimate its over 20 million, of which we have only named 850,000. They can be found everywhere, from the city to the country all across the globe.

If we didn't have insects breaking down (decomposing) dead plants and animals we would be up to our necks in waste. Insects clean our water, help our soil and pollinate flowers that produce about 1/3 of the food we eat. If plants were not pollinated they would become extinct as would trillions of other animals like mammals, birds, fish and reptiles that use insects as their main food source. Insects are an integral part of our ecosystem. So if insects are so important why don't we value them more? Is it their size? Most insects are less than 3 centimetres long. Only a very small percentage of insect species are troublesome or destructive pests. Regardless of whether you believe insects to be beneficial or bothersome it is fascinating to think about what would happen if all insects suddenly disappeared from our planet? According to Harvard University biologist Edward O. Wilson the result would be catastrophic. "Entire ecosystems would be destroyed". The scary thing is if we didn't have insects performing their daily free services humans would soon disappear. But what if humans were to disappear? "The land ecosystems would return in a few centuries to near their original healthy, balanced condition."

DorroughBUGS	2
Overview of DorroughBUGS	5
Focus:	5
Attentiveness	6
Evaluate how you feel about Bugs:	8
what is an insect and why are they so important!	8
Insect Identification Activity for grade 4	11
Insect Identification Activity for grade 3	12
14 Misconceptions Kids Have About Insects	12
What is an Entomologist?	15
Phase Three	19
Post-excursion	19
Evaluate how you feel about Bugs:	19
Decide on action	19
Complete a 3-2-1 assignment about bugs:	19
Making digital stories	19
ADDENDUM A	20
Additional Insect Information	20
Resources	22

Overview of DorroughBUGS

Focus:

DorroughBUGS is unit of work based on a collaboration of what you offer the students at school before and after their visit to Dorroughby Environment Education Centre (DEEC) and the excursion experiences they engage in at DEEC.

This tool kit is full of lesson ideas that will enhance the students learning experience before, during and after your visit to DEEC.

The students need to understand that the health of the earth and all its inhabitants, depends on insects and their vital role in the maintenance of self-regulating systems.

Students will gain skills knowledge and understanding in relation to the following concepts:

- How important are insects?
- Why do so many people try to avoid them?
- How well do humans understand the role insects play in our world?
- What are the effects of pesticides on the delicate balance of our eco system?

DorroughBUGS is taught using environmental narrative, analysis, problem based learning and multi-literacies. It takes the students through four inquiry steps:

1. Deep thinking about the world and how insects fit into it;

2.connecting to insects in real contexts;

3.Communicating student learning through multi-literacies and the arts;

4.responding to learning about insects as active citizens.

This unit of work is taught using a multidisciplinary approach to learning with a particular focus on science and imaginative role play. After the students have learnt about the insects in their school grounds they will be enrolled as entomologists and invited to a bug conference at DEEC. After their excursion they will be asked to think deeply and decide on a group action of environmental stewardship.



Attentiveness

A great way to think deeply, and really get to know and understand yourself, others and the places around you is to be more 'attentive'. Being attentive means taking the time to pay attention and really observe in detail what is actually going on around you. Scientists, artists, architects, historians, researchers and, in fact, anyone who is trying to understand the world, use this skill all the time.

It means listening and paying attention with your ears, but also with your eyes, nose, skin, heart, mind and imagination. For us, there seems to be two main kinds of attentiveness: active exploring and deep listening. Both involve making a whole body/mind connection and both produce new, personal, embodied knowledge, understanding and values but in different ways. 'Active exploring' occurs when students are moving around discovering and investigating. 'Deep listening' requires stillness and allows students to notice the minute details that they can easily miss.

(RonTooth, 2013 Pullenvale Environment Education Centre, QLD)

In DorroughBUGS, both kinds of attentiveness, active exploring and deep listening, as well as the reflection that follows, can be used to heighten students' awareness and connect them to the 'places' around them in authentic ways. Being attentive allows people to see, and value, the 'extra' in the most 'ordinary' of situations.

When students are taught the skill of deep attentive listening or observation, they begin to discover what is special and important – about themselves, other people and the places around them. When they do this, they often begin to care more and to act with respect towards themselves, other people and the natural world.



This teacher kit is divided into Three sections to use in conjunction with the excursion to DEEC.

Phase One

Pre-excursion

Students learn about the role of insects and engage with the role play of being an entomologist.

Connect the students to their local environment and explore the key skills, knowledge and values needed.

Begin getting to know the local place through research, class activities and attentiveness. Record and reflect on the students' discoveries & progress throughout this pre-visit phase. The students are engaged in the story when they receive a letter from the teachers at DEEC inviting them to begin investigating 'bugs' along with a copy of the DEEC radio play *Bugs of Dorroughby*. the students are to become Entomologists in-

training and attend an excursion at DEEC.

Phase Two

Excursion

Students connect to people and places by stepping into the story.

At DEEC, the Entomologists-In-Training (E.I.T.s) attend the 'Annual Arthropods Conference' sponsored by 'Norteen Enterprises' and undertake research in the field to discover more about the *Bugs of Dorroughby* and their behaviours. As the conference gets underway, they soon find that they must apply their knowledge and understandings, and make some serious decisions that will affect the life of the 'bugs'. The students will be asked if they want to star in an advertisement for bug poisin?

Phase Three

Post-excursion

Students make links between the story and their own lives by reflecting on their experiences and then communicating personal insights and understandings. Students respond to the story as active citizens by finding ways to make life better in their place. Back at school, reflecting on their experiences so far, the students decide if they will support Norteen Enterprises new bug poison or if they will choose to educate others about the value of bugs. They will articulate their new skills, knowledge and values though the making of a digital story.

Phase One

Pre-excursion

Evaluate how you feel about Bugs:

Brainstorm Bugs

Objective:

The students will list all the words they think of when the teacher says 'BUGS' and then they will consider how they feel about bugs.

Materials: butchers paper Markers pens, Timer

Process:

Divide class into three lines, students race from one end of the class room to the paper and write the first word they think of when you say insects/bugs.

Each group continues making their brainstorm list for 5 minutes.

Then the class as a whole work with the list to underline feeling words and circle describing words (keep this list to compare with the same brainstorm at the end of this unit.)

what is an insect and why are they so

important!

The information below is from The Australian Museum. http://australianmuseum.net.au/What-are-insects/

What is an insect?

In order to answer this question, we must look at where insects fit in the animal kingdom. The animal kingdom is divided into several groups called phyla. An example of a phylum is the Chordata, which holds all the backboned animals. Insects belong to the phylum Arthropoda. Insects are Arthropods

Arthropods are characterised by having the following features:

- a hard external skeleton (called a exoskeleton)
- a segmented body (head, thorax, abodomen)
- at least three pairs of jointed legs



The Arthropoda is divided into a number of classes. These include the: Crustacea (crabs, crayfish, prawns) Arachnida (spiders, mites, scorpions) Myriapoda (millipedes & centipedes) Insecta (insects)

Successful and important

The insects have proved to be the most successful arthropods. There are far more species in the class Insecta than in any other group of animals. These amazingly diverse animals have conquered all the environments on earth except for the frozen polar environments at the highest altitudes and in the immediate vicinity of active volcanoes. Insects are the only invertebrates (animals without backbones) with wings. Much of their success results from their ability to fly and colonise new habitats. The study of insects is called entomology and entomologists are scientists who study insects.

Insects play a very important role in the web of life, in every environment. Some of their jobs include pollinating flowering plants, being a source of food for insectivorous animals and assisting in the decomposition of plants and animals. Insect classification

Modern insect classification divides the Insecta into 29 orders, many of which have common names. Some of the more common orders are:

Mantodea - praying mantids Blattodea - cockroaches Isoptera - termites Siphonaptera - fleas Odonata - dragonflies and damselflies Dermaptera - earwigs Diptera - flies Lepidoptera - butterflies and moths Orthoptera - grasshoppers, katydids, crickets Coleoptera - beetles Hymenoptera - wasps, bees, ants, sawflies

The insect body

It is very difficult to provide a simple answer to the question: What external features characterise an insect? This is because the class Insecta is full of exceptions. It is not easy to produce a typical body plan for what most insects look like, but there are some very general features that most insects possess.

Insect FeaturesThe insect body is divided into three main parts, the head, thorax and abdomen. Insects have no internal skeleton, instead they are covered in an external shell (exoskeleton) that protects their soft internal organs.

No insect has more than three pairs of legs, except for some immature forms such as caterpillars that have prolegs. These are appendages that serve the purpose of legs. The typical insect mouth has a pair of lower jaws (maxillae) and upper jaws (mandibles) which are designed to bite. There are many variations to this structure, as many moths and butterflies have tubular sucking mouthparts, many bugs and other blood-sucking insects have sucking stabbing mouthparts and some adult insects simply don't have functional mouthparts.

Insects have one pair of antennae located on the head. Most insects have one or two pairs of wings although some insects such as lice, fleas, bristletails and silverfish are completely wingless.

Together these features can help us distinguish insects from other arthropods.

(Dr Dave Britton, 2012, Collection Manager, Entomology Australian Museum)



Butterfly Rearing Kits Available 800-405-1497 www.NatureGifts.com

To learn more about metamorphosis you may like to show this video on the life cycle of a butterfly!

After clicking on the link below choose the video "Butterfly Metamorphosis.

http://www.neok12.com/php/watch.php?v=zX7c567c746870536673686b&t=Meta morphosis

Insect Identification Activity for grade 4

Students collect and identify insects from the school yard using three different traps and then identify the insect using the identification key online from the CSIRO website: <u>http://www.ento.csiro.au/education/key/couplet_01.html</u> Watch clip to see how to make insect traps: http://www.gm.gld.gov.au/microsites/wild/identify-insects.asp

Insect Identification Activity for grade 3 Bug Buffet

Objectives

The students will observe the behaviour of bugs and experiment with the types of foods they like to eat.

Materials

- Bread crumbs
- Apple slices
- Shredded carrot
- Grass
- Cheese
- Cookie
- Cereal

Process:

Discuss different places you have observed bugs out on the playground. What do bugs like to eat? Make a list of the items that the children suggest.

In a quiet corner of the school grounds, create a "buffet" for the bugs. On the ground, sprinkle bread crumbs, apple slices, shredded carrots, cheese slices, cookies, cereal, and other foods suggested by the children.

Observe the food and see which insects come to feast. What are their favourite foods?

Have the children draw pictures of the insects and their paths.

Observe the "bug buffet" for several days and record what happens. What would insects on the playground eat if you didn't feed them?

(Science Surprises, 2012, http://www.sciencesurprises.com)

There are endless books, websites and activities online to help you explore insects and their role, please see resource list.

14 Misconceptions Kids Have About Insects

(Debbie Hadley, 2012 www.about.com) http://insects.about.com/od/teachingaboutinsects/tp/15misconceptions.htm

Children develop their early understanding of insects from books, movies, and the adults in their lives. Unfortunately, insects in works of fiction aren't always portrayed with scientific accuracy, and adults may pass down their own misconceptions about insects. This article outlines fifteen of the most common misconceptions kids have about insects.

1. Bees gather honey from flowers.

Flowers don't contain honey, they contain nectar. Honey bees convert that nectar, which is a complex sugar, into honey. The bee forages on flowers, storing nectar in a special "honey stomach" and then carrying it back to the hive. There, other bees take the regurgitated nectar and break it down into simple sugars using digestive enzymes. The modified nectar is then packed into the cells of the honeycomb. Bees in the hive fan their wings on the honeycomb to evaporate water out of the nectar. The result? Honey!

2. An insect has six legs, attached to the abdomen.

Ask a child to draw an insect, and you'll learn what they really know about the insect body. Many children will place the insect's legs incorrectly at the abdomen. It's an easy mistake to make, since we associate our legs with the bottom end of our bodies. In truth, an insect's legs are attached at the thorax, not the abdomen.

3. You can tell the age of a lady bug by counting the number of spots on its wings.

"A lady beetle's spots might tell its species, but don't tell its age. Once a lady beetle reaches adulthood and has wings, it is no longer growing and malting. Its colours and spots remain the same throughout its adult life; they are not indicators of age. Many lady beetle species are named for their markings, however. The seven-spotted lady beetle, for example, has seven black spots on its red back.

4. Insects live on land.

Few children encounter insects in aquatic environments, so it's understandable for them to think no insects live on water. It is true that few of the world's millionplus insect species live in aquatic environments. But just as there are exceptions to every rule, there are some insects that make their living on or near the water. Caddisflies, stoneflies, mayflies, dragonflies and damselflies all spend part of their lives in fresh water bodies. Intertidal rove beetles are true beach bums that live along the shores of our oceans. Marine midges inhabit tidal pools, and the rare marine sea skaters spend their lives at sea.

5. Spiders, insects, ticks, and all other creepy crawlies are bugs.

We use the term bug to describe just about any creeping, crawling invertebrate we encounter. In the true entomological sense, a bug is something quite specific – a member of the order Hemiptera. Cicadas, aphids, hoppers, and stink bugs are all bugs. Spiders, ticks, beetles, and flies are not.

6. Insects try to attack people.

Kids are sometimes afraid of insects, especially bees, because they think the insects are out to hurt them. It's true that some insects bite or sting people, but it isn't their intent to inflict pain on innocent children. Bees sting defensively when they feel threatened, so the child's actions often elicit the sting from the bee. Some insects, like mosquitoes, are just looking for a meal.

7. All spiders make webs.

The spiders of storybooks and Halloween all seem to hang out in large, circular webs. While many spiders do, of course, spin webs of silk, some spiders build no webs at all. The hunting spiders, which include wolf spiders, jumping spiders, and trapdoor spiders among others, pursue their prey rather than entrap them in a web. It is true, however, that all spiders produce silk, even if they don't use it to build webs.

8. Insects aren't really animals.

Kids think of animals as things with fur and feathers, or perhaps even scales. When asked whether insects belong in this group, however, they balk at the idea. Insects seem different somehow. It's important for children to recognize that all arthropods, those creepy crawlies with exoskeletons, belong to the same kingdom we do – the animal kingdom.

9. A daddy longlegs is a spider.

A daddy longlegs, also called a harvestman, has exceptionally long legs. It's easy to see why kids would mistake the daddy longlegs for a spider. This long-legged critter behaves in many ways like the spiders they've observed, and it does have eight legs, after all. But daddy longlegs, or harvestmen, as they are also called, lack several important spider characteristics. Where spiders have two distinct, separated body parts, the cephalothorax and abdomen of the harvestmen are fused into one. Harvestmen lack both the silk and venom glands that spiders possess.

10. If it has eight legs, it's a spider.

Just because it's got eight lets doesn't mean it's a spider.

While it's true a spider has eight legs, not all critters with eight legs are spiders. Members of the class Arachnida are characterized, in part, by having four pairs of legs. Arachnids include a variety of arthropods, from ticks to scorpions. You just can't assume that any creepy crawly with eight legs is a spider.

11. If a bug is in the sink or tub, it came up from the drain.

You can't blame a kid for thinking that. After all, most adults seem to make this assumption, too. Insects don't hide in our plumbing, waiting for an opportunity to pop out and scare us. Our homes are dry environments, and insects and spiders seek out moisture. They're drawn to the more humid environment in our bathrooms and kitchens. Once an insect slips down the slope of a sink or bathtub, it has a hard time crawling back up and ends up stranded near the drain.

12. Insects sing like we do, with their mouths.

Insects like cicadas might "sing," but they don't have vocal cords. While we refer to the mating and defensive calls of insects as songs, insects can't produce sounds in the same way we do. Insects do not have vocal cords. Instead, they produce sounds by using different body parts to make vibrations. Crickets and katydids rub their forewings together. Cicadas vibrate special organs called tymbals. Locusts rub their legs against their wings.

13. Small insects with wings are baby insects that will grow up to be adults.

If an insect has wings, it's an adult, no matter how tiny it might be. Insects only grow as nymphs or larvae. During that stage, they grow and malt. For insects that undergo simple, or incomplete metamorphosis, the nymph malts one final time to reach winged adulthood. For those that undergo complete metamorphosis, the larvae pupates. The adult then emerges from the pupa. Winged insects have already reached their adult size, and will not grow any larger.

14. All insects and spiders are bad and should be killed.

Children follow the lead of adults when it comes to insects. An entomophobic parent who sprays or squashes every invertebrate in her path will undoubtedly teach her child the same behaviour. But few of the arthropods we encounter in our everyday lives are threats of any kind, and many are vital to our own well-being. Insects fill many important jobs in the ecosystem, from pollination to decomposition. Spiders prey on insects and other invertebrates, keeping pest populations in check. It's worth knowing when (if ever) an insect warrants a squishing and when it deserves to be left alone, and teaching our children to respect invertebrates as they would any other wildlife.



DEEC 'DorroughBUGS' Teacher Resource Kit What is an Entomologist?



Entomologists are people who study bugs. Their studies help us to understand how bugs affect the food chain. When Entomologists notice the habit or the numbers of bugs changing it helps to understand changes in the natural world.

Watch a video on entomology from the Australian Museum http://australianmuseum.net.au/movie/Behind-the-Scenes-Entomology

Scootle has some great units of work -School yard safari :TLF-IDS7168

This comprehensive teacher resource explores the external features of small animals and how their features help them survive in their habitats, through a series of collaborative inquiry-based learning activities. Investigations into how a range of small animals move, feed and protect themselves are conducted, and comparisons ...

Teacher resource Where would we be without bees? TLF-IDS8321

This inquiry sequence investigates the importance of bees in the natural world and how living things depend on each other and the environment to survive. Students are also provided with activities to investigate the life cycle and food chains of a range of animals including bees.

Teacher resource Creating a picture book with an environmental theme - unit of work TLF-IDR11370

This unit of work is designed to help students create a well-written story with an environmental theme and then to self-publish it as a picture book. It focuses on: the symbiosis and synergy between creatures and their habitat; the research required to write a story that has a strong basis in fact; the elements of a picture ...

Teacher resource What does your garden grow? - unit of work TLF-IDR11376

Students investigate their school garden. They look at the needs of the garden, what creatures live there and the importance of how these creatures interact with the garden.

Teacher resource Bug business - unit of work TLF-IDR11378

This unit of work focuses on minibeasts - the bugs, insects and other tiny creatures usually found under our feet. Students investigate: how to recognise common minibeasts; the characteristics of insects in particular; their life cycles and needs; their habits and habitats; their contribution to the environment; and how ...

Teacher resource Bedtime stories - Teacher idea TLF-IDR11390

In this Teacher idea students create picture storybooks integrating digital and non-digital resources. Engaging student-centred classroom activities supports students as they apply their learning to developing and publishing their 'bedtime stories'.

Teacher resource Who lives in the tall, tall grass? - unit of work TLF-IDR11469

Students investigate the creatures that live in a garden and their importance to it.



Hand out for teachers/Parents

Welcome and thank you

Welcome to Dorroughby Environment Education Centre, thanks you for your time today. We believe that your active participation will contribute to the success of the program. Here are some ways you can help-

Your Role Today

Please become involved and enjoy yourself today. This models that it is ok to imagine, pretend and have fun. Our goal is to help the children think deeply, make discoveries and solve problems during the excursion day. As their adult helper you can add a curios comment or an extra question that can help promote a spirit of inquiry and discussion. Please help the children to stay safe and follow instructions form the leaders and other adult helpers. When we are walking near the dam please share your discoveries with the children. If you get a spare moment during the day we would love to hear your feedback, so pleas feel free to leave a comment in the visitors book. We hope you enjoy your day

The DEEC Team

Phase Three

Post-excursion

Evaluate how you feel about Bugs:

Brainstorm Bugs (same activity as phase one, discuss the changes in the describing words and feeling words)

Decide on action:

Students decide as group whether they will support bug killer ad and communicate their decision to Dr Norteen CEO of Norteen Enterprises

Complete a 3-2-1 assignment about bugs:

Students are asked to write and discuss three things they learned, two things that surprised them, and one question they still have.

Making digital stories:

Students make a Digital stories or mini-documentary demonstrating their new understanding of insects and their need for protection.

Free software can be downloaded from: Microsoft Photo Story 3 <u>http://www.microsoft.com/photostory</u>

Some examples can be seen on the Queensland Museum website, available at: www.qm.qld.gov.au/learningresources

ADDENDUM A

Additional Insect Information

Modern insect classification divides the Insecta into 29 orders, many of which have common names. Some of the more common orders are:

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Insects have one pair of antennae located on the head. Most insects have one or two pairs of wings although some insects such as lice, fleas, bristletails and silverfish are completely wingless.

Together these features can help us distinguish insects from other arthropods.

Insect evolution

Insects are an ancient group of animals. The first insects probably appeared before the Devonian period (400 - 360 million years ago) and by the Carboniferous period (360 - 285 million years ago) had taken to the air.

Adaptation to flight proved a highly successful strategy and during the Permian period (285 - 245 million years ago) insects achieved their greatest diversity. No other arthropod group has achieved flight. By the Permian, the basic physical structure of many of the modern orders of insects had evolved.

The more recently evolved Hymenoptera (ants, bees, wasps and sawflies) and Lepidoptera (butterflies and moths) appear as fossils in the Jurassic period (210 -145 million years ago). The Mantodea (praying mantids) appeared in Eocene period in fossilised amber (60 - 35 million years ago).

(Dr Dave Britton, 2012, Collection Manager, Entomology Australian Museum)

ADDENDUM B

Resources

Insects are fascinating creatures. Explore all sorts of creepy crawlers with insect lessons, printable, and quizzes for elementary, intermediate, and secondary school students. You'll find a variety of cross-curricular activities on these invertebrates that connect science with art, math, language arts, and social studies.

http://www.pedagonet.com/Insectclopedia/IspIns.html

http://bogglesworldesl.com/insect_flashcards.htm

http://www.teachervision.fen.com/insects/teacher-resources/47559.html

http://www.teachervision.fen.com/tv/printables/hmco/TwoBadAnts_TG.pdf

Insect BINGO

http://bogglesworldesl.com/bingo/insectseasy.php

Insects and Bugs Bingo Cards this game has range of printout playing pieces for grade 2, 3 and 4. Teachers can print as many unique cards as is necessary for their class. After you go to the card generator (which opens in a new browser) print the card and then just simply refresh the browser to get a new card. You should also print a set of 'bingo balls' to put in a paper bag for drawing.

Animal Planet's Introduction to Insects http://animals.howstuffworks.com/animal-facts/insect-info.htm

Lots more about insects can be found at Animal Corner <u>http://www.animalcorner.co.uk/insects/insects/html</u>

Museum of Victoria Bug Catcher Game - a variety of online activities designed for primary school aged kids to help them identify different types of invertebrates <u>http://www.ento.csiro.au/about_insects/for_kids/index.html</u>

Australian Entomological Supplies - supplies for all your entomological needs including collecting equipment, pinning supplies and display boxes http://www.entosupplies.com.au/

