



Bug Discovery Kit

POST-TRIP



Contents

What's in this **POST-TRIP**
resource kit

Introduction (topic overview)	1
How to use this kit	2
Planning your Zoo trip	3
Activity 1: Bug Logic	4
Activity 2: Everyday Bugs	11

Introduction

Topic Overview



What's this kit about?

This **Bug Discovery Kit** provides an introduction to the wonderful world of **insects and other invertebrates**.

The resources included in the kit may be used for independent learning on the topic of insects and invertebrates, or may also be used before, during, or after a field-trip to the Zoo. **This particular section contains activities to do after the field-trip!**

The activities may also be used to complement the following books on the P1 and P2 STELLAR reading list:

1. P2 book: A Butterfly is Born
2. P2 book: The Underground Dance
3. P2 book: Life in a Shell
4. P2 book: The Grasshopper and the Ant
5. P2 book: Walking through the Jungle

How to use this kit

PRE-TRIP PACK



This entire Bug Discovery kit consists of **3 resource packages**, which are divided into:

- **Pre-trip**
- **During-trip**
- **Post-trip** (*you are currently viewing the Post-trip package*)

Within each resource package, you'll find an introduction with a topic overview, information about the kit, and tips on how to plan your own visit to the Zoo.

You'll also find activity outlines and instructions, followed by a glossary of relevant terms, and all printable resources needed for each specified activity.

While some activities are more suited to pre-trip, during trip, or post-trip purposes, feel free to switch their order depending on how you have planned your lesson!



Planning Your Zoo Trip



Getting to the Zoo

Morning traffic is always unpredictable, so to make the best of your fieldtrip and arrive as planned, we recommend that you leave school earlier. Check out the [location and transportation information page](#) on the zoo website for more details to help you plan your arrival. You can also download a soft copy of the park map for your reference on that page.

Admission

Find out more about school rates, ride pricing, and even book your tickets on [our website's school groups portal](#).

Behaviour

Prepare your students on your chosen topic and what they should look out for at Singapore Zoo. You can let your students know more about [proper behaviour at the zoo](#), such as no teasing or unsupervised feeding of the animals.

Education programmes

If you're planning to sign your students up for an education programme offered by our Education department, you may get [more info about our different offerings here](#). For Primary school students, we suggest [Behind-the-Scenes tours](#), [Guided tours at exhibits](#), and [enrichment programmes](#).

Planning a teachers' recce trip

If you're planning a self-guided learning journey around the park, it's best to first familiarize yourself and the rest of the teaching staff with the Zoo! Visit our [Education pre-visit page here](#) to download a [recce form](#), or email us directly about a recce at eduadmin.zoo@wrs.com.sg.

Activity 1

BUG LOGIC

About this activity

Relevant subject discipline	Science, English language
Values in action	<ul style="list-style-type: none">✓ Social awareness - working together with a partner, overcoming conflicts and differences of opinion✓ Collaboration and communication skills – working together and communicating among each other to achieve a common goal✓ Responsible decision making – working together to make the best decisions for the team✓ Self-directed learning – being able to infer the correct answers despite not initially knowing them
Objective	This activity should preferably be conducted after the fieldtrip (having visited Fragile Forest), to revise the names of the animals and to learn simple roles they play in the ecosystem
Recommended group size	✓ Activity is conducted as a class
Materials included	<ul style="list-style-type: none">• Bug Logic cards<ul style="list-style-type: none">○ 16 cards (8 animals)○ 16 cards (8 food source / habitats)
Additional materials (not included)	None

Opening the activity

- Get the class together, and facilitate a quick recap session of the fieldtrip to the Zoo
 - What animals did you see?
 - What are insects? What kinds of insects did you see? Which were your favourites?
- Ask the class what they remember the insects eating – were they all eating the same kinds of foods? What do you think might happen if they eat the same kinds of food?

Activity instructions

Preparations	<ol style="list-style-type: none">1. Locate the “Bug Logic” printable package2. Print 1 deck of Bug Logic cards (16 cards for animals, 16 cards for habitats)3. 1 class (of 30 max) can play with 1 deck
Gameplay	<ol style="list-style-type: none">1. Shuffle the deck thoroughly, and give out 1 card to each student2. Tell the students that they will either have 1 half of an animal, or 1 half of a food source / habitat that an animal can be found on3. Their task is to roam around and try to find their missing half4. If a pair of students have completed their animal / food source, then they need to locate a pair of students that have completed the corresponding food source / animal!
Remarks	<p>Even if they don’t initially know the answers to the questions, this card design allows students to learn via self-correction, and discover the answers themselves</p>
Closing Activity	<ul style="list-style-type: none">• Get the students to share their experiences of the game<ul style="list-style-type: none">○ When did they feel best? When did they feel worst? What made them feel that way?• Facilitate the sharing and discussion<ul style="list-style-type: none">○ What are their favourite insects from this activity?○ How did they feel if they didn’t manage to find the right partners?○ What did they do to participate if they didn’t know the answer? (did they use the self-correcting mechanism?)• Get the students to imagine and act out what might happen if:<ul style="list-style-type: none">○ The food sources disappeared from the ecosystem○ The insects disappeared from the ecosystem

Further exploration

Level up!

Other than working within the provided paired cards, get the students to think about different insects might have an impact on each other. For example, how would a pollinator that feeds on flowers be affected by a different insect that also feeds on the same flower?

To make the game more challenging, or to recap on more concepts, you could also add more cards for each example!

Glossary

Adaptations	The process of change by which an organism or species becomes better suited to its environment
Antenna	A pair of long, thin, sensory appendages on the heads of insects, crustaceans, and other arthropods
Arachnid	An arthropod animal with 8 legs, of the class <i>Arachnida</i>
Biodiversity	The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable
Carnivorous	An animal that feeds on other animals
Decomposer	An organism, especially a soil bacterium, fungus, or invertebrate, that decomposes organic material
Ecosystem	An interconnected, biological community of interacting organisms and their physical environment
Exoskeleton	An exterior, protective or supportive structure or shell of many invertebrates
Habitat	The natural home or environment of an animal, plant, or other organism
Insect	A small arthropod animal with 6 legs, generally 1 or 2 pairs of wings
Invertebrate	An animal lacking a vertebral column, or backbone
Larva	The active, immature form of an insect. Usually one that differs greatly from the adult and forms the stage between egg and pupa
Leaf litter	Decomposing but recognizable leaves and other debris forming a layer on top of the soil, especially in forests
Nectar	A sugary fluid secreted within flowers to encourage pollination by insects and other animals
Predator	An animal that naturally preys on others
Prey	An animal that is hunted and killed by another for food
Pollen	A fine, powdery substance consisting of microscopic grains discharged from the male part of a flower
Pollinator	An organism that transfers pollen from male part (anther) of a flower to the female part (stigma) of a flower
Pupa	An insect in its inactive immature form, between larva and adult
Seed disperser	An organism that moves or transports seeds away from the parent plant, usually during consumption of the parent plant's fruits
Vertebrate	Animals that have a brain enclosed in a skull, and a segmented spinal column (backbone)

Printable package

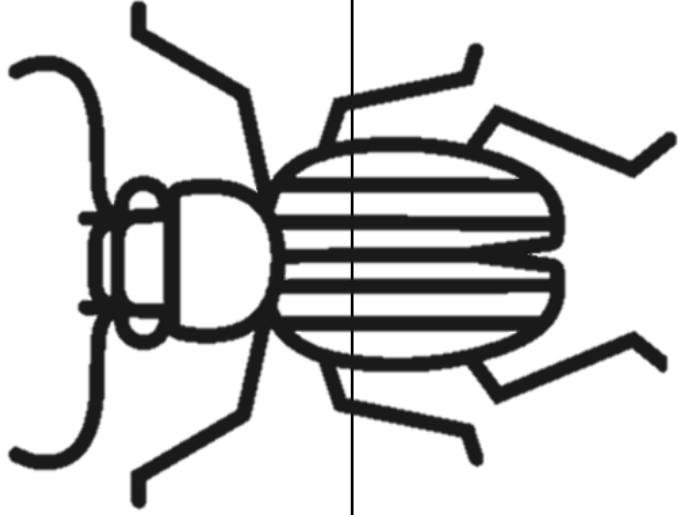
1) 15 Insect cards

- a. Beetle
- b. Ant
- c. Butterfly
- d. Bee
- e. Termite
- f. Dragonfly
- g. Wasp
- h. Cockroach

2) 15 Food Source cards

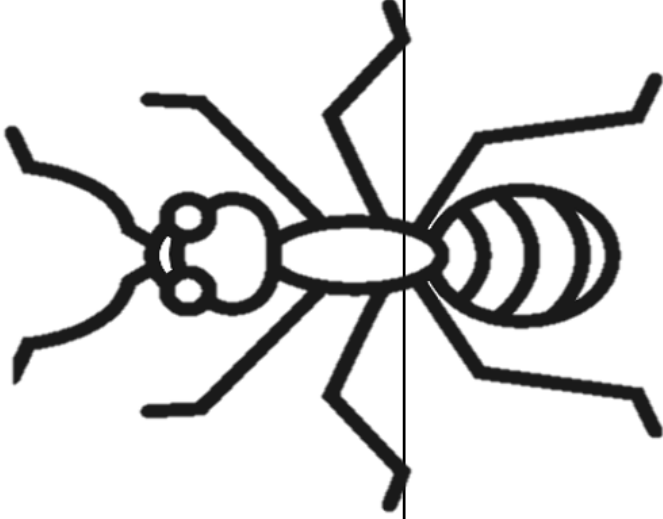
- a. Palm tree
- b. Fruits and seeds
- c. Flower nectar
- d. Flower nectar and pollen
- e. Decaying food
- f. Mosquitoes
- g. Flower nectar and insects
- h. Leaf litter

Beetle



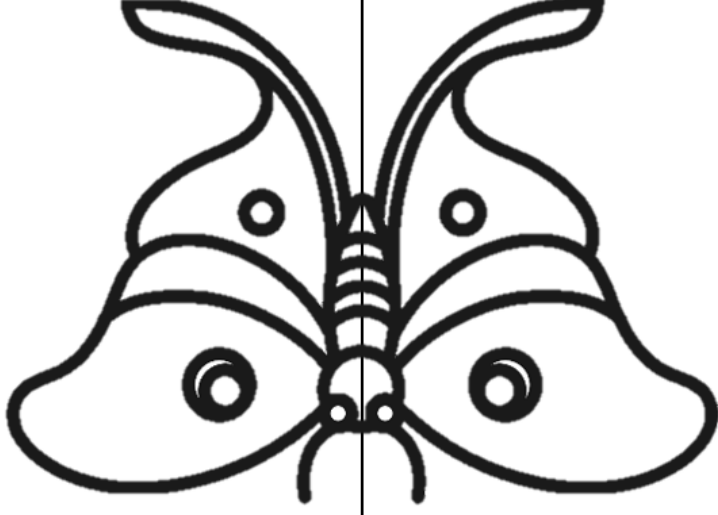
Pollinator of
PALM TREE
flowers

Ant



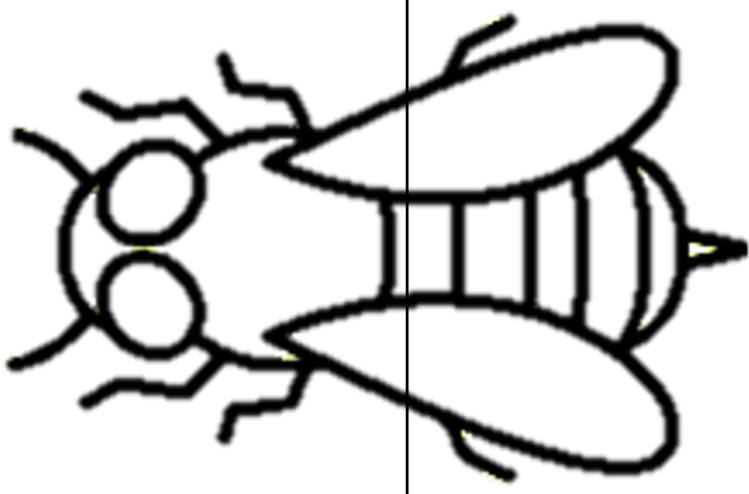
Helps disperse
FRUITS AND
SEEDS

Butterfly



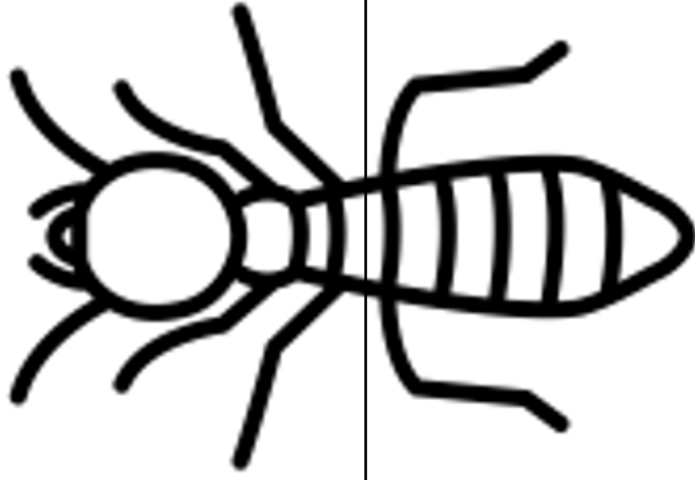
Pollinator
feeding on
FLOWER
NECTAR

Bee



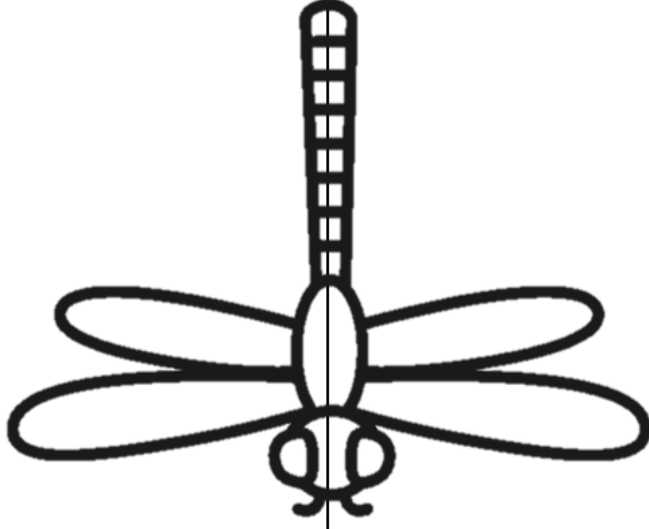
Pollinator feeding
on **FLOWER**
NECTAR &
POLLEN

Termite



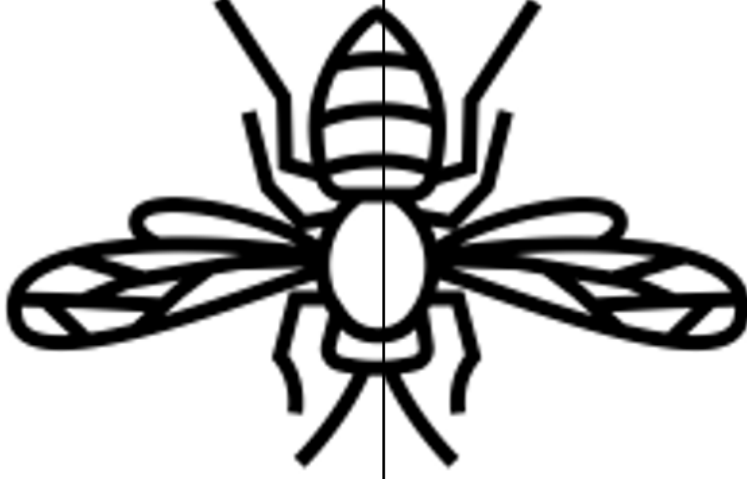
Decomposer
of **DECAYING**
WOOD

Dragonfly



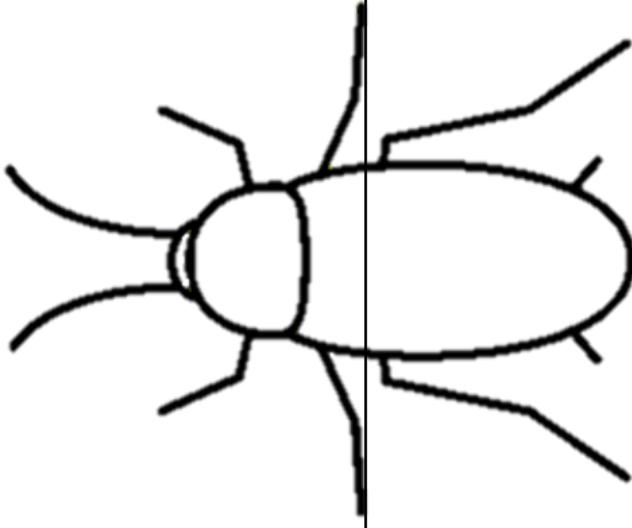
Predator of
MOSQUITOES

Wasp



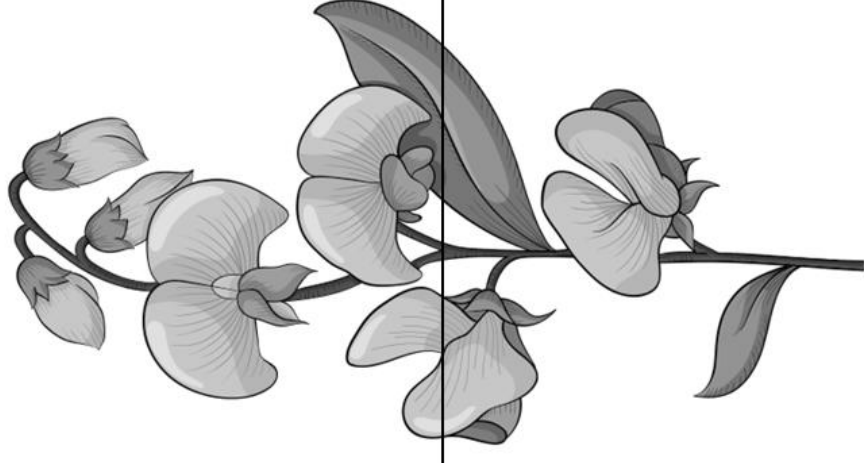
Pollinator
and predator
of **INSECTS**

Cockroach



Decomposer
of **LEAF**
LITTER

**Flower
nectar**



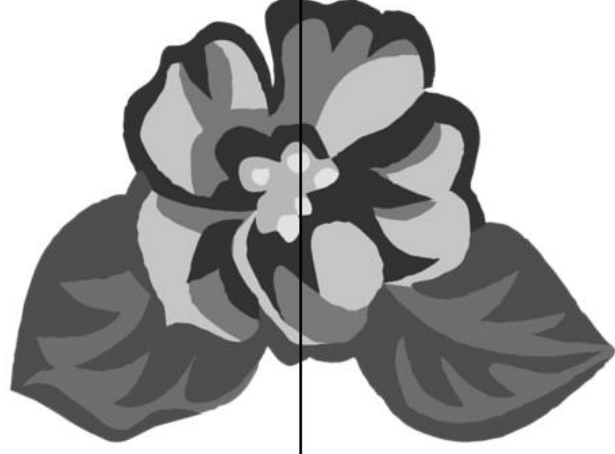
**and
pollen**

Flower



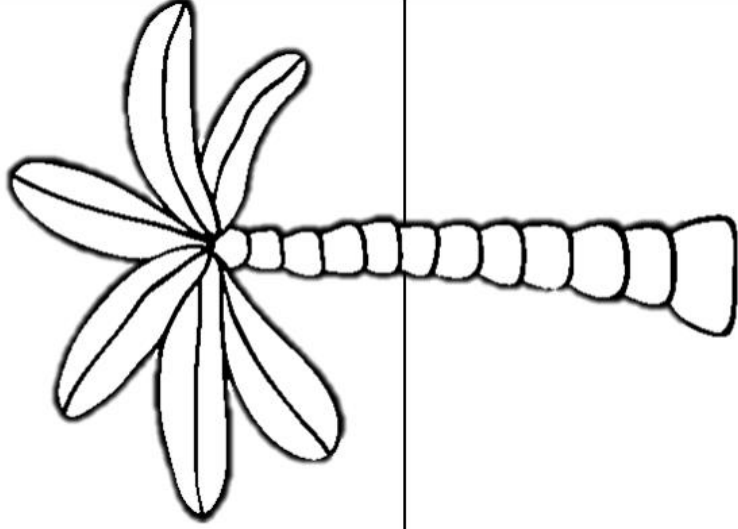
nectar

Fruits



**and
seeds**

Palm



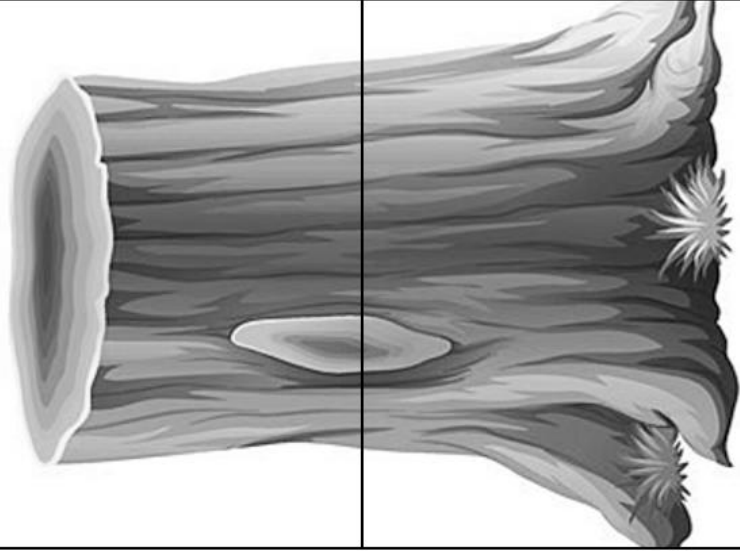
tree

Decaying

Mosquitoes

**Flower
nectar**

Leaf



wood

**and
larvae**

**and
other insects**

litter

Activity 2

EVERYDAY BUGS

About this activity

Relevant subject discipline	English language, science
Values in action	<ul style="list-style-type: none">✓ Responsibility - exercising personal responsibility and integrity in taking ownership of a self-directed task✓ Critical and inventive thinking – being able to apply the content learnt earlier to a new context✓ Self-directed learning – self-guided learning and discovery
Objective	To encourage self-directed learning on insects, to extend learning beyond the classroom and the fieldtrip
Recommended group size	<ul style="list-style-type: none">✓ Sheet is completed individually
Materials included	<ul style="list-style-type: none">• Everyday Bugs sheet
Additional materials (not included)	None

Opening the activity

- Get the class together, and facilitate a quick recap session of the fieldtrip to the Zoo
 - What animals did you see?
 - What are insects?
 - What kinds of insects did you see?
 - Which were your favourites?
- Ask the class whether they would be able to find such insects at home, around the school, or in their everyday lives
- Challenge them to find out for themselves!

Activity instructions

Preparation	<ol style="list-style-type: none">1. Locate the “Everyday Bugs” printable package2. Print 1 Everyday Bugs sheet per student
Gameplay	<ol style="list-style-type: none">1. Hand out a sheet to each student2. Each sheet has 2 locations: “my home” and “my school garden”3. Students are to follow the instructions on the sheet – to go to those locations and observe what insects they can find in the respective places4. They are to draw or describe briefly the insects they saw5. Students can try to figure out the type of insect they saw using the help of a parent or the internet6. Give the class a week to complete this reflections sheet, and to bring it to class and share with their friends once the week is up
Closing activity	<ul style="list-style-type: none">• Set aside some time for the students to sit in their table groups (if applicable) and share some of the insects they found with each other

Further exploration

Young Naturalists

Encourage the students to practice **science process skills**! They can even do so before getting started on Everyday Bugs. Split them into small groups (3 - 5 students per group) and facilitate their discussion for the following procedures (encourage them to think creatively!):

- **Form a hypothesis:** What types of insects do they think they'll find? Will they find only insects? What else might they find? Which environment and which location might have the most number of insects found? Would weather affect the number and type of insects found?
- **Collect data related to the hypothesis:** Look in all the locations listed on the activity sheet! Note down all the insects, and other animals that they've found. Note down the weather. If they want to get more hands-on, they could conduct the same experiments over different days!
- **Finding connections:** Are there any similarities between the places with most insects found? Are there differences between places with most insects and places with least insects? What are the most common insects found? Which weather is best for finding insects?
- **Returning to the hypothesis:** Did the connections they found support or reject the hypothesis (initial guess)? Are there ways to further change the activity? Are there new hypotheses the students are interested in exploring?

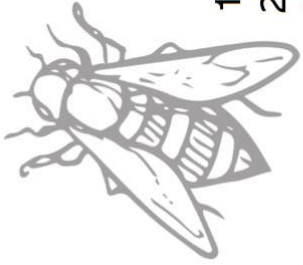
Glossary

Adaptations	The process of change by which an organism or species becomes better suited to its environment
Antenna	A pair of long, thin, sensory appendages on the heads of insects, crustaceans, and other arthropods
Arachnid	An arthropod animal with 8 legs, of the class <i>Arachnida</i>
Biodiversity	The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable
Carnivorous	An animal that feeds on other animals
Decomposer	An organism, especially a soil bacterium, fungus, or invertebrate, that decomposes organic material
Ecosystem	An interconnected, biological community of interacting organisms and their physical environment
Exoskeleton	An exterior, protective or supportive structure or shell of many invertebrates
Habitat	The natural home or environment of an animal, plant, or other organism
Insect	A small arthropod animal with 6 legs, generally 1 or 2 pairs of wings
Invertebrate	An animal lacking a vertebral column, or backbone
Larva	The active, immature form of an insect. Usually one that differs greatly from the adult and forms the stage between egg and pupa
Leaf litter	Decomposing but recognizable leaves and other debris forming a layer on top of the soil, especially in forests
Nectar	A sugary fluid secreted within flowers to encourage pollination by insects and other animals
Predator	An animal that naturally preys on others
Prey	An animal that is hunted and killed by another for food
Pollen	A fine, powdery substance consisting of microscopic grains discharged from the male part of a flower
Pollinator	An organism that transfers pollen from male part (anther) of a flower to the female part (stigma) of a flower
Pupa	An insect in its inactive immature form, between larva and adult
Seed disperser	An organism that moves or transports seeds away from the parent plant, usually during consumption of the parent plant's fruits
Vertebrate	Animals that have a brain enclosed in a skull, and a segmented spinal column (backbone)

Printable package

- 1) 1 Everyday Bugs record sheet

Everyday Bugs!



- 1) Head to your School Garden or look around at Home
- 2) Search for bugs in all these locations
- 3) Be careful and observant!
- 4) Draw or describe what you find

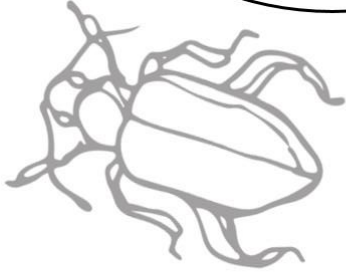
Tips on how to behave:

- 1) Don't squash or kill anything
- 2) Put everything back the way you found it – it could be a bug's home!
- 3) Be careful, safety first!

Under a rock



In the grass



On a plant



In my home

