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Opening extract from

# Bug Detective Amazing facts, myths and quirks of nature

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# BEETLES

There are more species of beetle than any other creature on the planet and they live in all continents apart from Antarctica. How extraordinary. So get moving and see how many different kinds you can find in your own garden or local woods.

## BEETLE GUIDE

There are 3 kinds of dung beetle.

Tunnellers | Rollers | Dwellers



But which one's which?

Can you match the beetle to their category?

## DUNG HOME



Dung beetles make their homes out of poo! Roller beetles roll the dung into a ball using their legs and head. Dweller beetles just dive straight into the dung and live inside!

## BIG BEETLES



The Titan beetle can grow as big as 17cm and can snap a pencil in half with its enormous jaws!

## DUNG BABIES



Dung beetles lay eggs in their dung. Their babies hatch inside then eat their way out of it

## NATURE'S RECYCLERS



Dung beetles are nature's recyclers: they roll dung into balls which they eat later. Without them the earth would be piled high with manure!



## WE ARE FAMILY

Beetles come in all shapes and sizes, and include ladybirds, glow-worms, fireflies and the long-necked giraffe weevil of Madagascar!



Auntie Dot | Grandma Glow | Cousin Wilbur

## TUNNELLING BEETLES



Tunneller dung beetles bury their dung in an underground network of tunnels

## BEETLE WINGS




Many beetles are armed with fierce-looking horns and pincers. The bombardier beetle creates its own mini explosion from its backside, firing out a boiling hot fluid at its would-be attackers!

## BEETLE ENVIRONMENTS

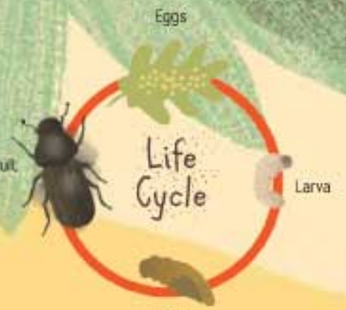
Which of these beetles looks like he's in the right environment?



A: All 3...they can live almost anywhere, just so long as they can eat!

## LITTLE TOUGH GUYS

## Life Cycle




## BAD EYES



Beetles can't see very well. They find things using smell, sound or by feeling vibrations. Our friend the dung beetle also uses the glow from the stars to find its way home!

# WORMS

Earthworm-like creatures have been around for at least a billion years and are one of nature's most useful creatures. They also have some pretty amazing tricks up their sleeve: they help plants grow, they can move without legs and can even survive being cut in half! Find out why they are so good to have around in your garden and just why they are so slimy.

Worms tunnel in the ground mixing soil which helps plants grow

## DID YOU KNOW?

Worms don't have lungs, they breathe through their skin. The mucus that covers their skin helps breathing easier...That's what makes them so slimy

## WORM PIE

Worms make a tasty treat for birds, toads, moles, beetles and slugs

When worms come to the surface they become vulnerable to predators

Worms have no arms and legs. Their bodies are covered in small bristles, which it uses to move and burrow

Worm poo is full of nutrients and is great for the garden

## NATURAL GARDENERS

Worms can eat their own weight in organic waste, soil and minerals every day

## WASTE DISPOSAL EXPERTS

## WORM HUNT

Worms come to the surface when it rains so they won't drown. That's the best time for you to go on a worm hunt!

## MISSION

Why not start your own worm farm and watch them wiggle and tunnel their way through the soil

## WORLD'S BIGGEST

The longest worm is the African giant earthworm which can grow to nearly 7m long!




## MUTANT WORMS

Worms can have up to 5 hearts!

## BLIND AS A...WORM

Worms cannot hear or see. It's no wonder they bump into each other all the time

## MYTH BUSTER

Many people think that if a worm is cut in half it becomes two worms. This is not true. Only the end with the head will survive

Hatchlings

Worms hatch from cocoons

## Life Cycle

Worms can live between 4-8 years!

## WORMS EVERYWHERE

You can find a million worms in an acre of land

# ANTS

They might be tiny but ants are mighty insects! With super human strength ants work together as a team to build and maintain their homes. Ants are social beasts and live in large groups called colonies, just like you and me, and our families. Next time you go outside have a look at the ants and see if you can follow their trail!

## KNIGHTS IN SHINING ARMOUR

An ant's skeleton is on the outside of its body instead of inside. This 'exoskeleton' protects the ant like a suit of armour

## TEAMWORK

Ants are great at teamwork. They can join together and turn themselves into a 'raft' to escape big puddles, or climb on top of one another so they can reach up high

## WORLD'S HEAVIEST

They may be tiny but if you weighed all the ants in the world they would weigh more than all the humans!

## ANTEATER ALERT!

They have to be careful though, predators such as anteaters love eating ants!

## JOIN THE ANT GYM

Ants can lift and carry things many times their own weight. If you were as strong as an ant you could lift a car above your head!

## CATERPILLAR HERDERS

Some ants herd caterpillars, just like a farmer herds cows. They take them out in the day to feed on leaves, then keep them safe in the nest at night. In return the ants 'milk' the caterpillars for their delicious honeydew

## ANTS NEST

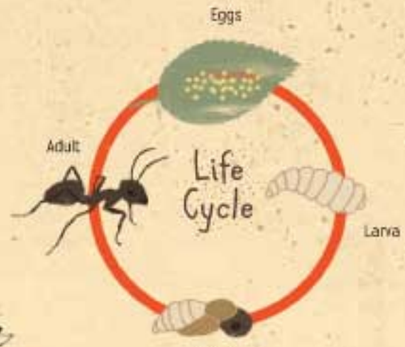
Most ants build a nest to live in. Inside there are lots of chambers rooms connected by tunnels. The rooms are used for different things, like storing food, sleeping, or as a nursery. There's even a special chamber just for the queen

## SPRING CLEANING

Ants are very clean and tidy. They even take their rubbish out like we do!

## GIRL POWER

All worker, soldier and queen ants are female. The male ants usually only live long enough to mate with the queen and then they die




## TINY FARMERS

Ants have been farming even longer than humans. Leaf-cutter ants bring leaves back to their nest and grow fungi on them to feed the colony

## CHAMPIONSHIP RUNNERS

Ants have extra strong legs so they can run really quickly. If you could run as fast for your size, you would be as fast as a racehorse!

# BEES

Bees are amazing! They are essential to the enviroment and help plants and flowers grow through a process called pollination. They also produce something we humans can eat, honey! Bees live in colonies which are like families and are ruled over by a queen.

## AMAZING POLLINATORS

Bees fly from flower to flower, sipping nectar and collecting pollen

When they move to the next flower they leave some pollen behind. This helps the flower make new seeds and grow fruit like blackberries and strawberries

## DANCING BEES

Bees can tell each other where to find the best nectar by performing a special dance called a 'waggle dance'




## MYTH BUSTER

Bees die if they sting you. Not true! There are more than 20,000 species of bees and only honeybees die after stinging

## MISSION

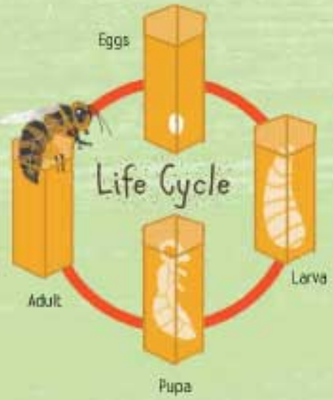
Next time you see a bee look for the little yellow sacs on its legs. They're filled with pollen the bee has collected from flowers

When a bee looks at a flower it can see special little landing strips that guide it to the nectar

## WHATS THE BUZZ?

The bee beats its wings an amazing 200 times a second (that's fast!). This is what helps make their buzzing sound.

## Life Cycle




## QUEEN BEE

The queen bee lays ALL of the eggs in a hive. She is so busy laying eggs that she has no time for any chores

## HONEY MONSTERS

The honeybee is the only insect that produces a food we can eat

Worker bees are all female and do most of the work, from collecting nectar to cleaning the hive and attending to the Queen

The 'forager' bees take the nectar back to the hive in their special 'honey stomachs' then pour it into honeycomb cells

The 'processer' bees fan the honeycomb by flapping their wings. This helps 'dry out' the nectar and turn it into delicious honey

## BUSY AS A BEE

Making honey doesn't come easy – to make a single jar of honey a hive of bees would need to visit 2 million flowers

## HELP SAVE THE BEES

Many fruits and vegetables would disappear if it weren't for bees. You can help save the bees by growing bee-friendly plants in your garden

# BUG DETECTIVE ACTIVITIES

Now you know a little more about the weird and wonderful lives of bugs it's time to put your bug detective skills to the test. With your magnifying glass you can discover a world of activity that you've never seen before. So put on your wellies and head into the garden to see what you can find. Tread carefully and leave no leaf unturned!

## GO ON A BUG HUNT!

### Where to look

The best place to look is under things - leaves, stones, plant pots and logs. Bugs also like to hang around flowers, trees and plants. Remember, some bugs are very good at camouflage so you'll need to look up close. Don't forget to be as quiet as you can so you don't scare them away and be careful not to squish them!

Remember to set your newfound friends free after you've inspected them!

What you need
* Magnifying glass
* Glass or plastic jar
* A wooden spoon
* Notebook and pen

BUG DETECTIVE FINDINGS

Name of bug:

Where I found it:

Description:

*Top Tip!*
Bugs love sweet things. Try mashing up a bit of banana mixed with sugar then spreading onto a tree trunk. Wait a few hours then see who's turned up for dinner!




## MAKE A BEE HOTEL

Bee numbers are in decline which is not just bad news for honey monsters. One in three mouthfuls we eat is the result of an insect pollinators' work so dinnertime really would be boring without them (imagine no apples, strawberries or tomatoes!) You can lend a hand by giving the bees somewhere to rest their weary wings and lay their eggs in the long winter months.

1. Bundle together some hollow plant stems like bamboo and cow parsley

2. Tie them together with some string

3. Hang the hotel in a sunny, sheltered spot, at least 1m from the ground

4. Now watch and see who drops by! As well as bees, the odd ladybird and other insects may pop in

5. Keep an eye out for the tiny mud doors covering the entrance holes. This means a female bee has laid an egg inside.

## WORM V SNAIL

Set up a race between these two slimy plodders and see who can out-slow the other! Who do you think will win?



## MAKE A WORM FARM

What better way to watch these wiggly creatures up close than to build your very own worm farm.

What you need
* Two clear plastic bottles (one big one, one small one)
* Sand
* Soil
* Leaves
* Vegetable peel



STEP 1 — Cut the tops off the plastic bottles (better still, ask a grown up!)

STEP 2 — Put the small bottle, upside down, inside the big bottle. This will make it easier for you to see the worms' trails

STEP 3 — Alternate layers of sand, soil and leaves, then top with some vegetable peel, coffee grounds or tea leaves

STEP 4 — WORM HUNT! Time to find your new tenants. Try digging in the soil just after it rains. Worms prefer things moist so wet your hands before picking them up

STEP 5 — Add the worms then cover with kitchen roll and secure with an elastic band to stop the worms wriggling away

STEP 6 — Wrap a sheet of black paper around the bottle. Worms love the dark and this will help them get settled in

STEP 7 — Leave in a cool dark place for a couple of days (remember to water it every now and again so the worms don't get thirsty)

STEP 8 — Take off the black paper and watch the worms as they mix the soil, build tunnels, munch up the food and even have babies!

Remember to set your worms free after a few days. The lovely fluffed up soil can be used in your garden to help the plants grow.

## CATERPILLAR HOUSE

Make a comfy home for a caterpillar using an old egg carton. Find some nice green leaves for it to munch on, then add lots of soft moss and grass to make it nice and cosy.



## MAKE A LADYBIRD

Turn a simple stone into your very own ladybird. Find a nice flat pebble, then paint on the colourful red shell and black spots (acrylic paint is best)



## BUG IDENTIFICATION GUIDE

Use this handy guide to figure out who's who in the bug world.

**INSECTS** have six legs, a body in three parts and usually wings (beetles, ants, bees and butterflies are all insects)

**ARACHNIDS** have eight legs and a body in one or two parts (spiders and scorpions)

**MYRIAPODS** have a head, segmented bodies and lots and lots of legs (centipedes and millipedes)

**ANNELIDS** have long wriggly bodies in lots of segments, but no legs (the gardener's friend, the earthworm)

**GASTROPODS** have squashy bodies in one part and some have a coiled shell (snails and slugs)