Marvellous MONSTERS

TEACHER INFORMATION & ACTIVITY PACK

LONGLEAT

LEARNING with LONGLEAT

CONTENTS

INTRODUCTION

This year at Longleat we have a surprise of enormous proportions! Have you ever wanted to get up close and personal with some of the smallest and most interesting creatures on the planet? Well from April – October you can - the big bug takeover has begun!

Although we already exhibit numerous invertebrate species, it is often our other species that steal the show. For 2017 we have raised the profile of bugs to show how amazing they are but also how important they are.

In the natural world invertebrates serve many functions including as predators, prey, decomposers and pollinators, as well as being creatures in their own right. These functions benefit humans including use for pest control and soil conditioning, with pollinators enabling our crops to grow. Invertebrates even act as a food source for us too! Humans have used insects throughout history for the substances they produce. Bees have been kept by humans and their honey collected and eaten. Beeswax can be taken from the honeycomb too which has a variety of uses including furniture polish and cosmetics. Silkworm cocoons have been harvested for thousands of years to collect the silk thread for making clothes, thought to have originated 2700 BCE. In fact there was a large trade route between China and Europe which we call The Silk Road which originated about 130 BCE.

This pack will provide you with some suggestions for activities that you can do while visiting Longleat as well as some ideas as to why and how you can help to look after bugs when back in school.

We hope you have a fantastic trip to Longleat and that when you return back to your school or college that you are ready and willing to fight for the survival of wildlife near you.

Relevant Science Curriculum Topics

- Identifying animals
- Body structure
- Habitats and adaptation
- Interdependence – food chains
- Growth/lifecycles
- Compare and contrast with humans and other animals
- Body processes
- Classifying and grouping animals
- Environmental change and human interaction

Greater detail related to curriculum Programmes of study can be found in the appendix.

MARVELLOUS MONSTERS AT LONGLEAT

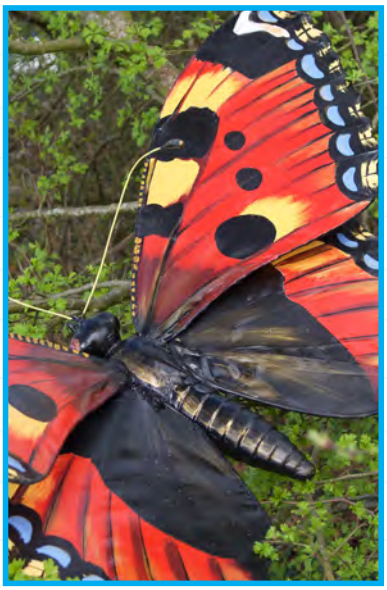
The Marvellous Monsters exhibit runs from 8th April to 29th October 2017.

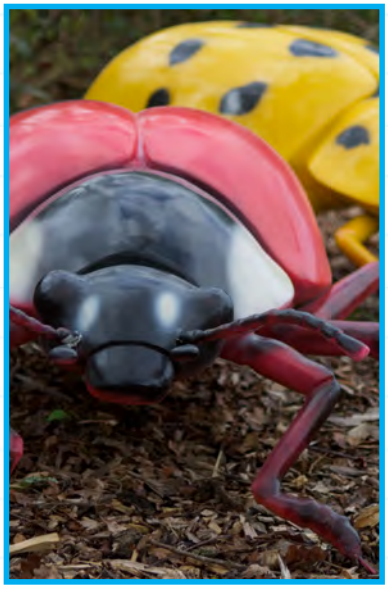
Giant animatronic bug models

The species of bugs chosen for our models are those that we have live exhibits of or are British species. Our giant models were all designed to be anatomically correct. The enlarged features allow children to look at body parts and think about how these creatures are adapted to their habitats. Alongside each bug is an identification sign that gives all the basic details and in addition many have further interpretation panels that focus on topics such as adaptations, lifecycles or conservation.

Our giant bugs are:

- Puss moth caterpillar
- Madagascan hissing cockroach
- Orchid mantis
- Hercules beetle & grubs
- Floridan katydids
- Garden spider
- Emperor scorpion
- Bluebottle tarantula
- Tailess whip scorpion
- Ladybirds
- Common wasp
- Madagascan fire millipede
- Bumblebee
- Dead leaf mantis
- Bluebottle fly
- Peacock butterfly
- Swallowtail butterfly
- Tortoiseshell butterfly
- Large blue butterfly
- Wood ant
- Purple jewel beetle
- Goliath beetle
- Striped love beetle





Mantis Takeover at the Longhouse

The Longhouse is hosting a captivating exhibition focusing on mantises. These incredible insects may be known for their huge eyes and their distinctive posture (which is why they're often referred to as 'praying' mantis) but they're also fearsome predators. Their forearms are able to strike 10 times faster than you can blink! So, alongside some exquisite live mantis exhibits, we'll be showing a stunning film called 'The Pray' which will plunge you into the midst of a dead leaf mantis hunt. Our younger explorers will also be able to take part in some fun-filled activities and challenges; testing their reactions against the incredible reflexes of a mantis.

Marvellous Mini-beasts – animal encounter session

At Longleat there are opportunities to get close to bugs and other animals in our Handling Hall but you can also book a dedicated session for your class. This interactive workshop focuses on the anatomy and behaviour of all sorts of mini-beasts, and children will get a first-hand opportunity to get up close and personal with some extraordinary creatures such as hissing cockroaches, giant African land snails and even a Chilean rose tarantula. Your keeper will teach your class all about these wonderful bugs' characteristics and shine a light on their significance within the eco-system as well as directly, in our lives. This session can easily be tailored to specific topics and across Key stages to meet your requirements.

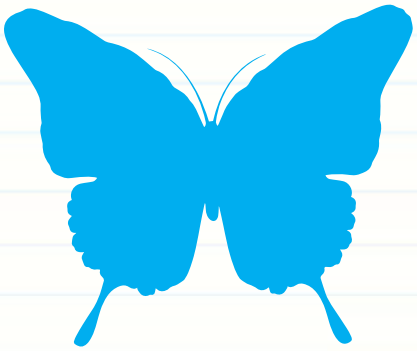
We strongly encourage you to come on a recce visit ahead of bringing your class so you can plan the best use of your time to fit with your topic or area of study. A member of our education team can help advise you on this as well. For information about booking your visit go to www.longleat.co.uk/education

ARTHROPOD CLASSIFICATION

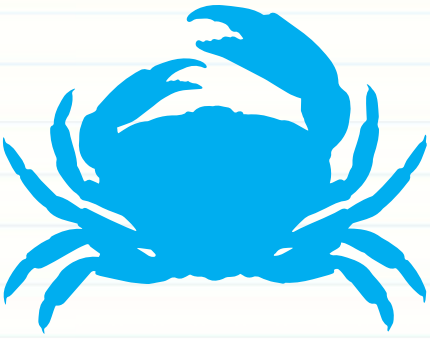
All of our giant bugs are part of a group of animals know as arthropods. Arthropods, which includes insects, arachnids and millipedes play a wide variety of roles across the planet. They occupy almost every ecological niche with the exception of the oceans, where their relatives, the crustacea, are dominant.

ARTHROPODS

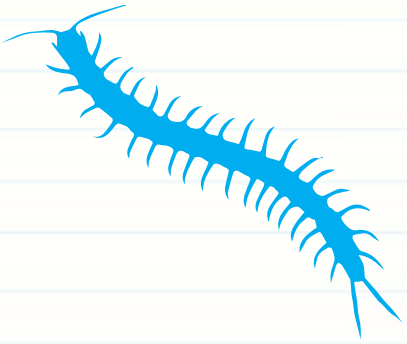
ARACHNIDA
(spiders and scorpions)



INSECTA
(butterflies, flies, beetles, wasps etc.)



CRUSTACEA
(crabs and shrimps)



MYRIAPODA
(centipedes and millipedes)

We have created a fact file which contains some information on all of the big bugs featured in our Marvellous Monsters event. This is available to download from the resources area of our education web pages. It can be used for you to gather more information or older students can use it themselves as part of their own research. A blank template is included at the back so they can select a bug and write their own sheet on it.

AT SCHOOL

Insect stories

For younger children there are a number of books you could read with / to them to get them interested and discussing the features and lifecycles of insects.

Some suggestions;

- **The Giant Jam Sandwich** by John Vernon Lord. Millions of wasps arrive at a village and the villagers decide they must do something to get rid of them!

- **James and the Giant Peach** by Roald Dahl. This is a story about James who accidently grows a huge peach in which he escapes from his mean aunts. He makes friends with a variety of insects who have made their home inside the peach; a grasshopper, earthworm, glow worm, centipede, spider and ladybird.

- **The Very Busy Spider** by Eric Carle – In which a spider is trying to build her web and tries to ignore the farm animals who are trying to interrupt her.

- **Superworm** by Julia Donaldson – A story about a superworm and how he is captured by the evil wizard lizard and is subsequently rescued by his friends.

- **The Very Quiet Cricket** by Eric Carle - A story about a cricket that makes no sound and can't answer the other insects he sees, until he meets another cricket.

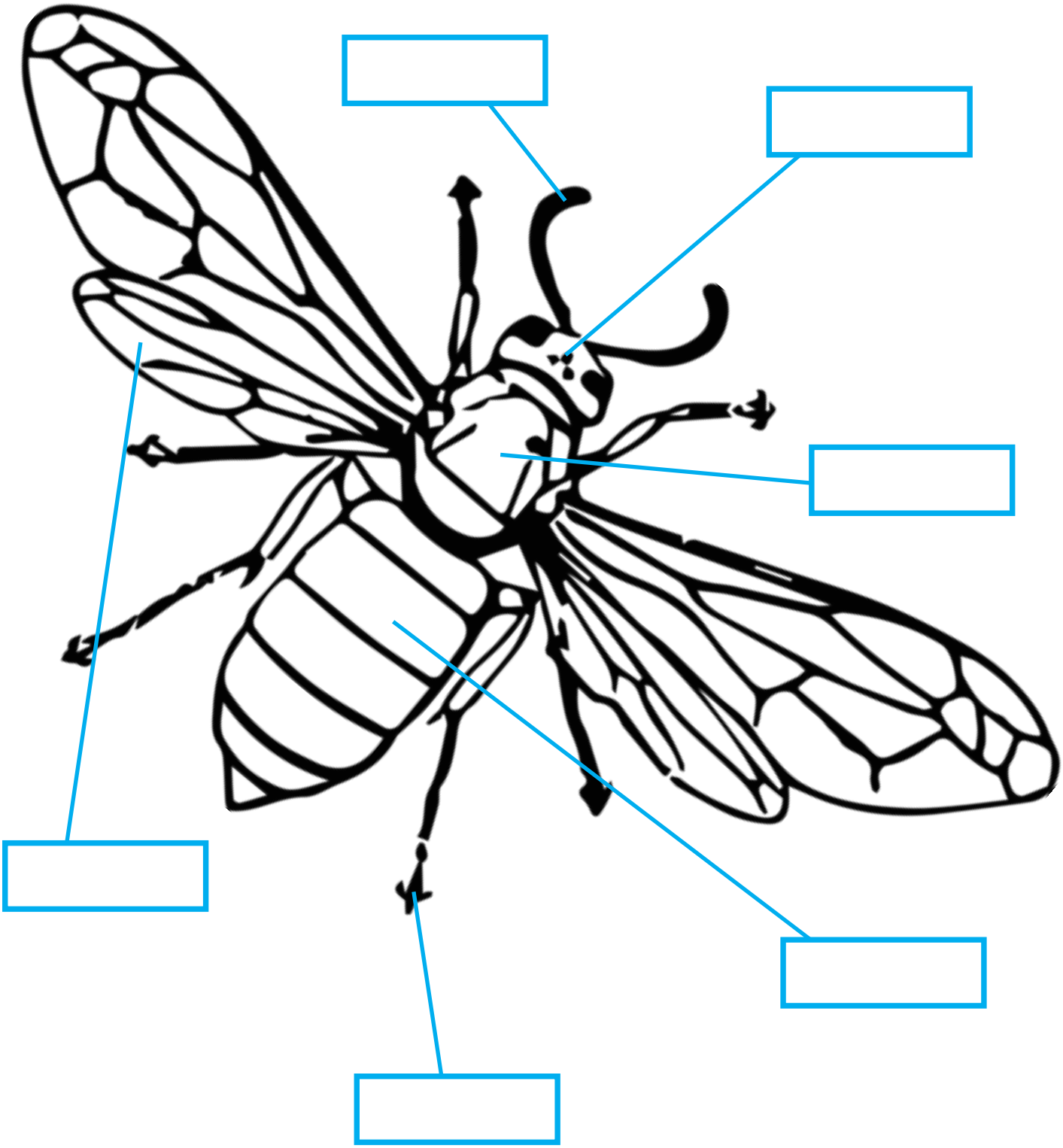
- **The Very Hungry Caterpillar** by Eric Carle - Perhaps one of his most well-known books which shows the lifecycle of the butterfly.

There are many books about bugs for students ranging from more story books to activity books and spotters guides. This range of options is useful for reluctant readers. Insects can capture the imagination of children and if you can go and explore around your school it gives you an opportunity to get outside more often with your groups.

Before you visit Longleat it would be an ideal opportunity to start looking at topics such as adaptation, camouflage and for the younger ones ensuring they are familiar with different body parts. Included in this pack are 2 diagrams you can use to teach the body parts of insects and spiders more specially. These can be used as they are or reproduced and cut up so students can build up the creatures themselves.

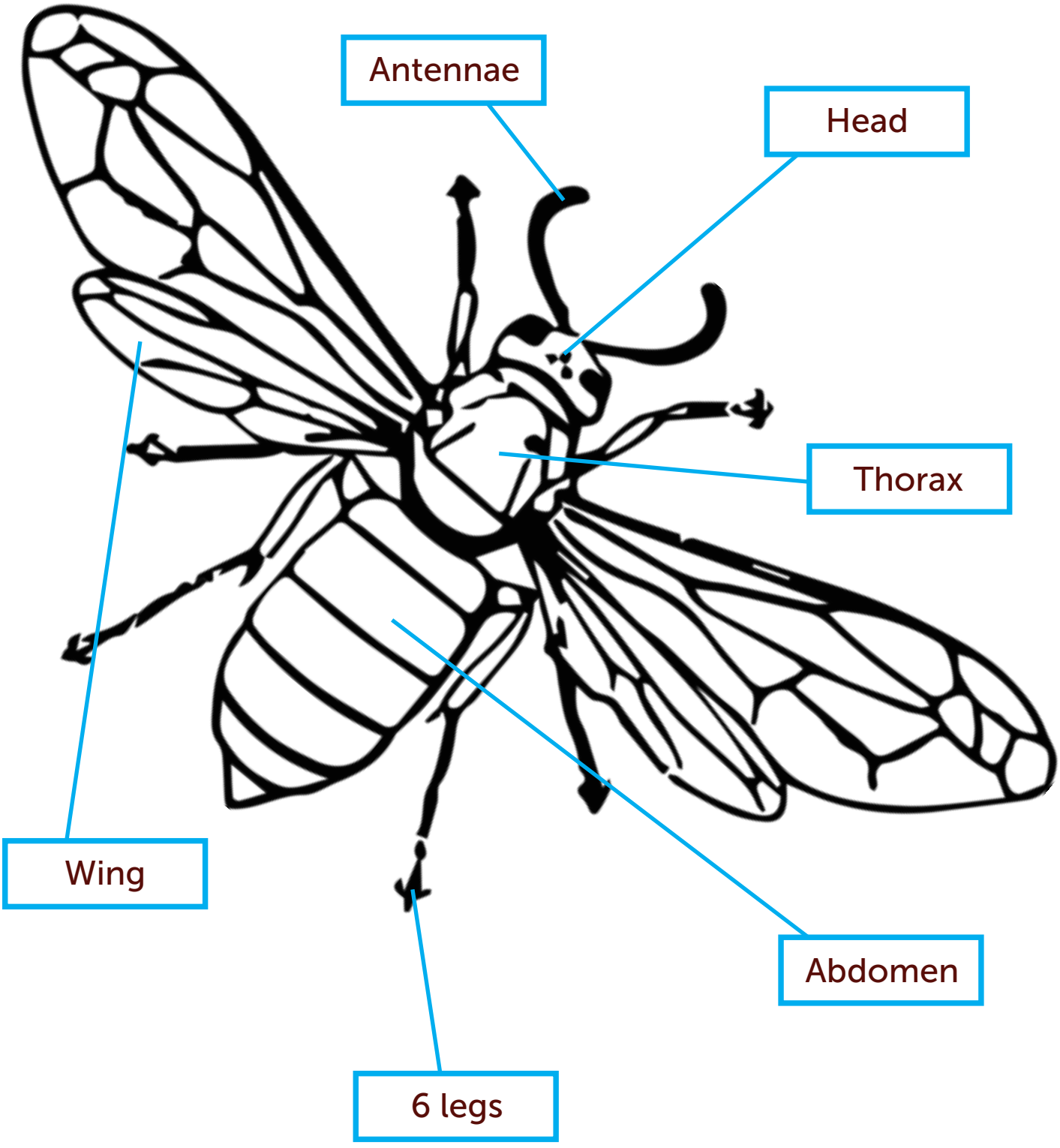
LEARNING with LONGLEAT

Label the parts of the insect



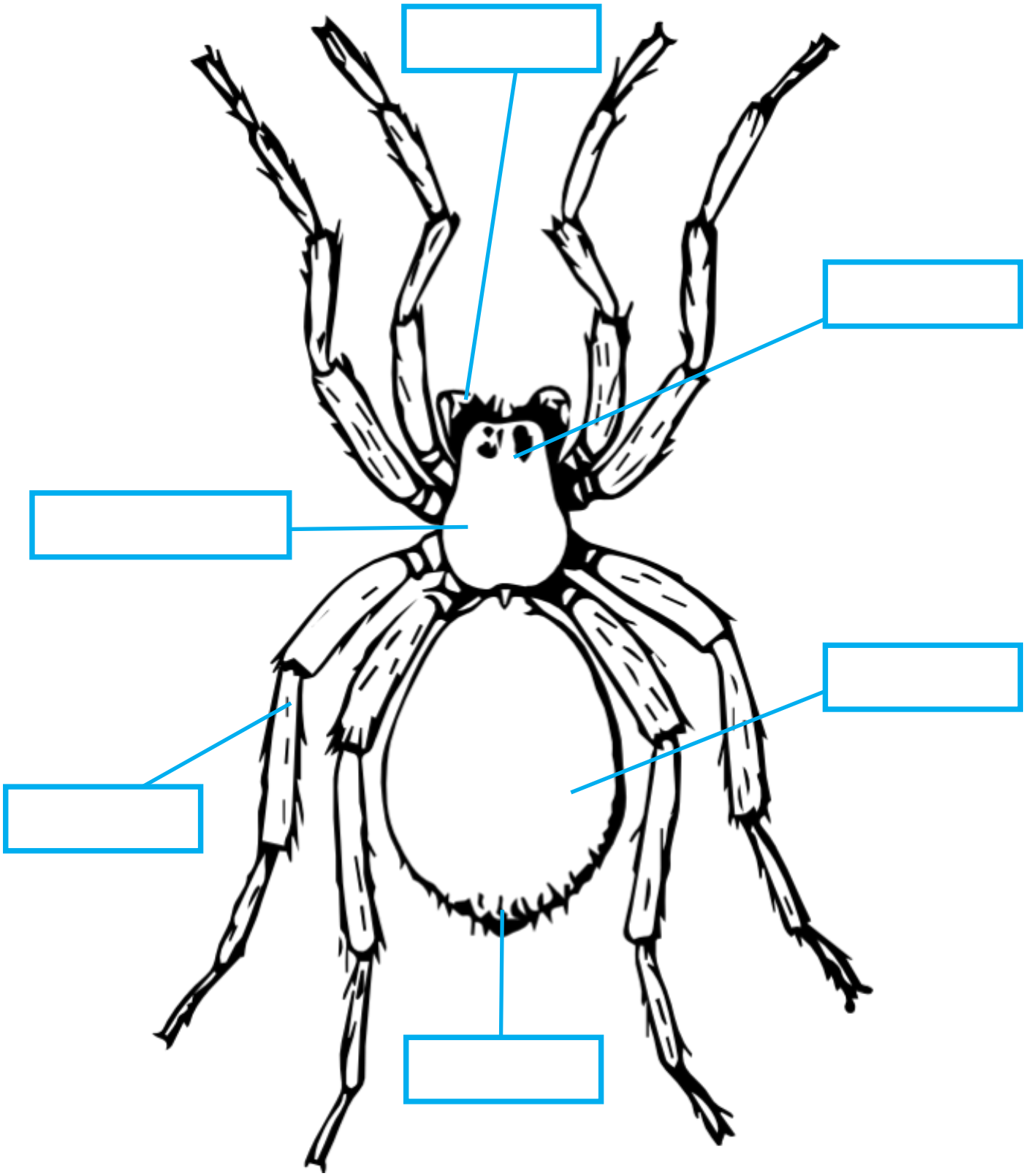
LEARNING with LONGLEAT

Insect body parts



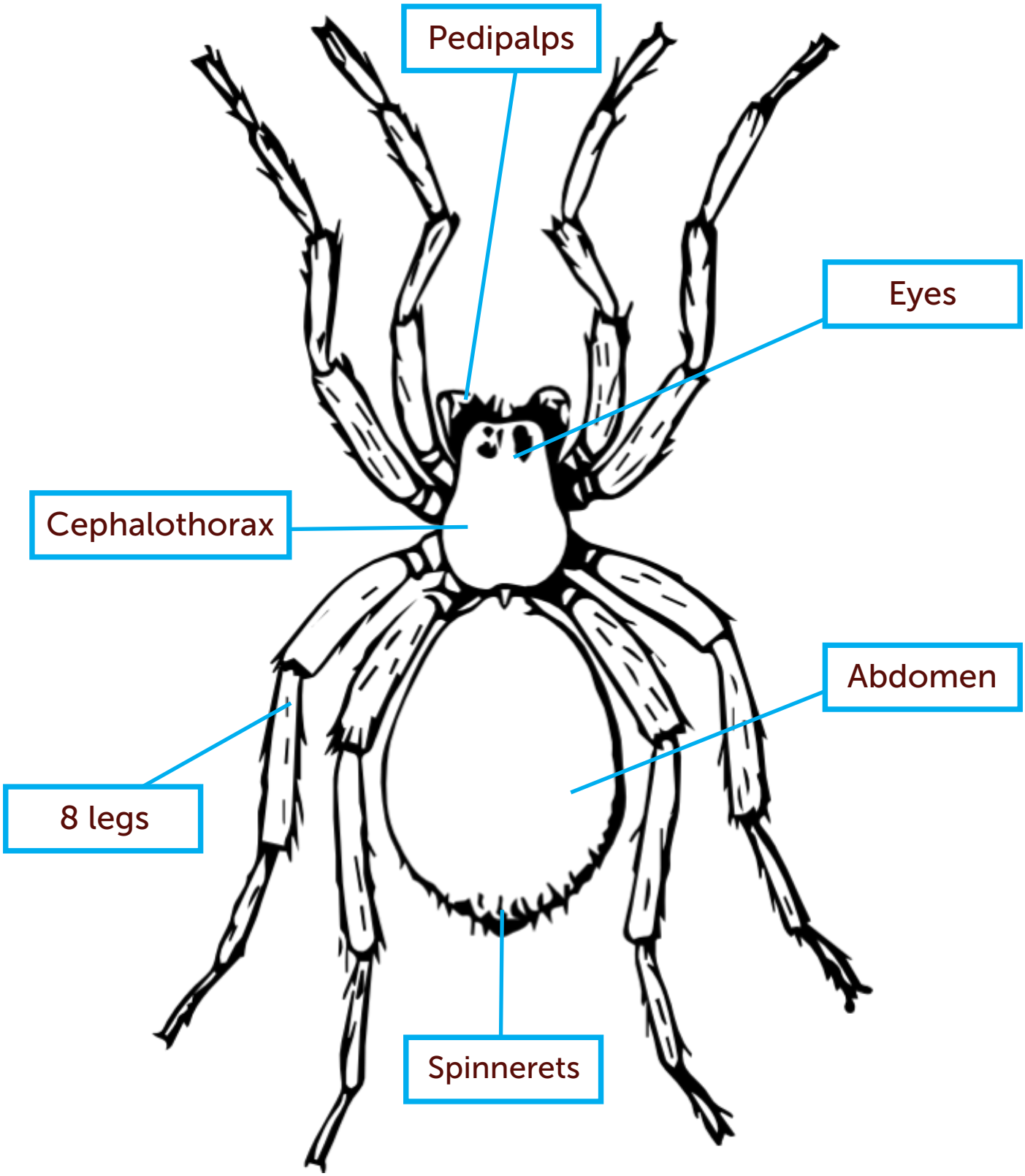
LEARNING with LONGLEAT

Label the parts of the spider



LEARNING with LONGLEAT

Spider body parts



IDENTIFYING INSECTS

What makes an insect an insect? Test the children's knowledge with some of these quiz questions.

1. Insects don't have a backbone they have a hard shell on the outside called an?
   Exoskeleton

2. An animal without a backbone is called an?
   Invertebrate

3. How many legs does an insect have?
   6

4. How many body sections does an insect have?
   3

5. Can you name all three parts?
   Head, thorax, abdomen

6. Is a spider an insect?
   No – why? It has 8 legs not 6 – it is an arachnid.

7. Can you name an insect that undergoes a metamorphosis?
   Butterfly / moth / dragonfly

8. Which is the largest group of insects; flies, beetles, butterflies or wasps, bees and ants?
   Beetles - at least 400,000 species known!

THE IMPORTANCE OF INVERTEBRATES

'If we and the rest of the back-boned animals were to disappear overnight, the rest of the world would get on pretty well. But if the invertebrates were to disappear, the world's ecosystems would collapse.'

Sir David Attenborough

Looking after invertebrates is very important! There are several reasons why we should be actively involved in the conservation of invertebrates:

1. Our own survival as a species may depend upon them. Many insects act as pollinators. This is important not only naturally but also many crops that we grow rely on pollinators. They provide ecosystem services. (*www.ecosystemservices.org.uk*)
2. Some people rely on invertebrates as a source of food, they are full of protein and low in sugar.
3. We have a responsibility to act as stewards for nature, to ensure that species are available for future generations.
4. They can give us great pleasure and can provide a sense of awe and wonder.
5. They provide food for many different species across the planet as part of a complex food web.

Many insects are omnivorous, meaning that they can eat a variety of foods including plants, fungi, dead animals, decaying organic matter, and nearly anything they encounter in their environment. Others are specialists, which means they may rely only on one plant or even one specific part of one particular plant to survive.

Many species of insect are predatory or parasitic, either on plants or on other insects or animals, including people. Such insects are important in nature to help keep pest populations (insects or weeds) down. Insects are very important as primary or secondary decomposers. Without insects to help break down and dispose of wastes, dead animals and plants would remain in the environment and the nutrients would not be recycled and end up back in the soil.

Insects plays a massive role in food webs as mentioned by Sir David Attenborough in the quote above. They are the sole food source for many amphibians, reptiles, birds, and mammals

Many invertebrate numbers are decreasing. Bees in particular have lower numbers with some species worse than others. Reasons for this include the use of chemical insecticides and a decline in flower rich spaces such as wildflower meadows and developing new housing on green spaces or roads.

INVASIVE SPECIES

Not all invertebrates are helpful to us, in fact many are classed as pests. Most of these pests have appeared due to the actions of humans. We have grown plants / crops that they like, we have transported them across the world either on purpose or by accident and so they have colonised new continents. These species that have newly moved into an area are known as invasive species. Invasive species can have a devastating effect on native species.

Harlequin ladybird

In the U.K. we have a number of invasive species that are causing a problem for our local ones. One of these is the harlequin ladybird which is one of the most invasive species of insects in the world. It was introduced to North America from India. Ladybirds eat aphids, which eat crops. Thus, by having more ladybirds the crops were protected. However, the ladybirds spread from North America, most likely by winds or in crops being transported.

They are much bigger than our native species of ladybird and are outcompeting them for food. Not only that but there has been recent evidence that the harlequins have also been eating their smaller cousins, particularly the 2-spot and 10-spot ladybird, as a result of all of this you are far less likely to see a 2-spot ladybird these days. The harlequin ladybirds also swarm in huge numbers when trying to find places to hibernate and when they emerge in the spring. There is a BBC news story from October 2016 covering the swarms of ladybird. You can also see how the ladybirds have spread since their arrival in 2004.

Ladybird spotting activity - Has the invasive Harlequin ladybird taken over your area?

Create a guide to the different types of ladybird found in Britain. The website *www.ladybird-survey.org* has downloadable sheets and also an interactive tool for ladybird identification. Your students can record any ladybirds they see at home or at school over a period of time. This data can then be presented as charts and used to find out what the most common ladybird is in your area. Use the background information in the Invasive Species section to talk about the harlequin ladybird invasion. You can also submit your data to the ladybird survey.

Great White butterfly

In New Zealand the caterpillar of the great white butterfly has been causing massive damage to crops and other local plants. As a result the New Zealand government decided that they needed to try and remove this pest species before it caused the loss of other insects and plants who could not compete with this new species.

They carried out over 250,000 searches for the caterpillar and butterfly in the area in which they were first discovered, near the busy port in Nelson SW New Zealand. As a result they think they have managed to stop the spread of the butterfly. However only time will tell if they managed to catch them all and stopped the march of the caterpillars!

HELPING INVERTEBRATES -What can you do?

Plant some wild flowers - any space you have will do.

You can buy seeds from local suppliers, or even ask for donations! The Grow Wild project has got seed and information packs that can be sent out to schools to get you started on your own wild adventure. As a way of distributing your wild flower seeds you could create seed bombs. A quick internet search will reveal a number of different ways to make them from different types of materials.

A scientific study – how good are your school grounds for bugs?

Carry out a survey of your school grounds with your students this can be broken down into several stages:

- What flowers do you already have?
- Are there any suitable spaces for planting more? (students can consider what plants need to grow)
- What different types of invertebrate can they find? (students can consider how they survey the areas and how they will record their findings, will it be easy to repeat?)

When you have identified areas where wild flowers could be planted get the students involved in planting the seeds and watering them. They could create a video / photo diary of the wildflower area and how the plants are growing.

They can then carry out observations and look at what is visiting the plants once they have grown. This can be compared to what they have seen previously.

Identify and record wildlife

Part of conserving wildlife is knowing what is where so identifying and recording are great scientific skills to develop in your students. You could run an event with parents as well as children. You could host your own Bioblitz event. The Bioblitz website has links to nationwide surveying projects you can become a part of.

Create a place for bugs to live

All animals need food but they also need somewhere to live. Students can help by creating some inviting habitats for bugs at home or in school. The images below show examples of bug homes. Image A represents a 'hotel' based on a bird house. Image B represents a pallet style bug hotel, and image C provides a simpler example with some holes in wood, pieces of bamboo and straw.

A

B

C

You can get reclaimed wood and palettes locally, ask a local builders merchant if they have any you can have. A bug hotel can help to attract a large variety of invertebrates to your wild area. Don't forget to carry out some surveys. How many different species can you identify?

Simple activities such as building wood piles can also attract invertebrates and if you are lucky enough, perhaps even some of the vertebrates that feed on them such as toads!

Creating a wood pile is as easy as doing nothing for nature. Leave areas to become overgrown and wild then add wood to your area and let it rot! Decaying wood can support fungi and beetle larvae. It would be amazing if you end up with stag beetle whose larvae can stay in rotting wood for years before they emerge.

Marvellous MONSTERS

APPENDIX

LONGLEAT

Primary Science National Curriculum - Programme of study, areas of relevance.

Year 1

- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- identify and name a variety of common animals that are carnivores, herbivores and omnivores
- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)

If planting flowers for bugs...

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- identify and describe the basic structure of a variety of common flowering plants, including trees
- Children should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).

Year 2

- identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- identify and name a variety of plants and animals in their habitats, including microhabitats
- describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food
- notice that animals, including humans, have offspring which grow into adults
- find out about and describe the basic needs of animals, including humans, for survival (water, food and air)

Year 3

- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement

If planting flowers for bugs...

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

Year 4

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things
- construct and interpret a variety of food chains, identifying producers, predators

Year 5

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals

Year 6

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Secondary Science National Curriculum - Programme of study, areas of relevance

Key stage 3

- the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops
- the importance of plant reproduction through insect pollination in human food security
- how organisms affect, and are affected by, their environment, including the accumulation of toxic materials

Key stage 4

- levels of organisation within an ecosystem
- some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community
- how materials cycle through abiotic and biotic components of ecosystems
- the role of microorganisms (decomposers) in the cycling of materials through an ecosystem
- organisms are interdependent and are adapted to their environment
- the importance of biodiversity
- methods of identifying species and measuring distribution, frequency and abundance of species within a habitat
- positive and negative human interactions with ecosystems

USEFUL WEBSITES

RSPB - Give nature a home - rspb.org.uk/get-involved/activities/give-nature-a-home-in-your-garden/

Woodland trust - woodlandtrust.org.uk

Nature detectives - woodlandtrust.org.uk/naturedectectives/

UK ladybird survey - ladybird-survey.org/default.aspx

Wild About Gardens (Royal Horticulture Society) - wildaboutgardens.org.uk/index.aspx

Wildlife Trusts - wildlifetrusts.org

Project Wildthing (Engaging children with nature) - thewildnetwork.com

Butterfly Conservation - butterfly-conservation.org

BWARS (Bees, Wasps and Ant Recording Society) - bwars.com

Buglife - buglife.org.uk

BBC Earth -bbc.com/earth/uk

The Big Butterfly count (14th July – 6th August) - bigbutterflycount.org/

CAN YOU HEAR THE BUGS?

Get up close to our giant bugs and listen.

Tick the boxes when you hear these bugs

DRAGONFLY ☐ MILLIPEDE ☐ COCKROACH ☐ BLUEBOTTLE FLY ☐ KATYDID ☐

FIND THE HERCULES BEETLE GRUBS

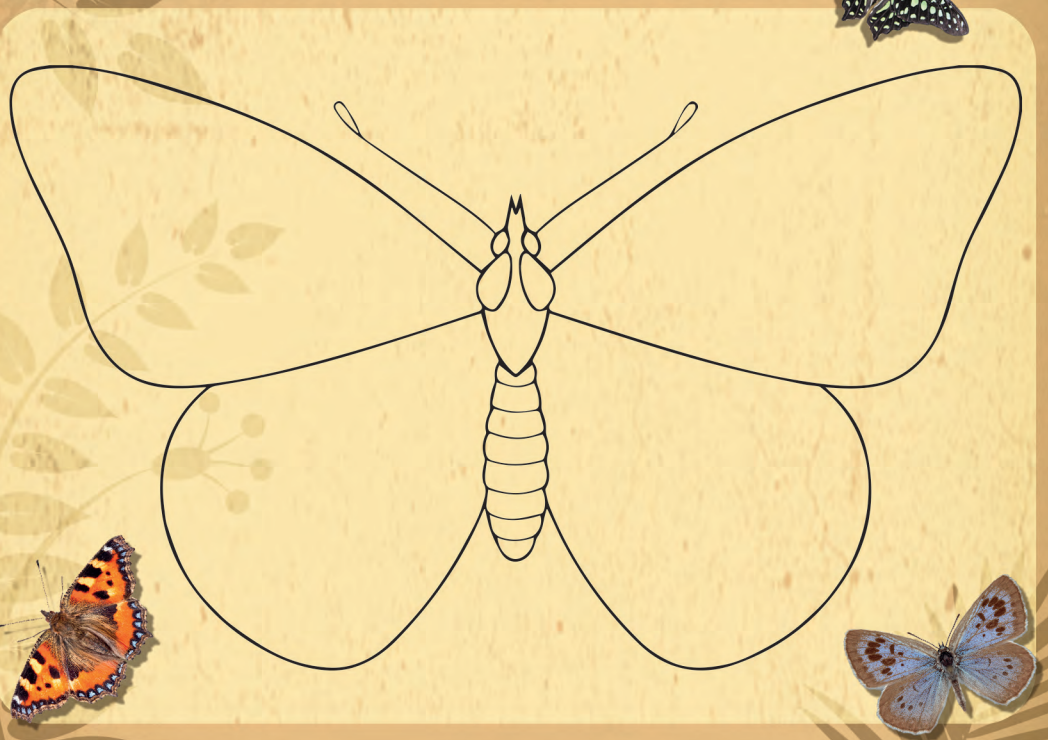
Can you count how many grubs are inside the log?

Can you **wiggle** like a grub?

DESIGN YOUR OWN BUTTERFLY

Look for all the colourful butterflies in the Secret Garden. If you look closely, you'll notice that all butterfly wing patterns are symmetrical!

Can you design your own butterfly with symmetrical wings?



Marvellous MONSTERS

ACTIVITY SHEET

SPOT THE SPOTS

Ladybirds have flown in and taken residence in Longleat Hedge Maze. **Can you find all 12 and count their spots?**

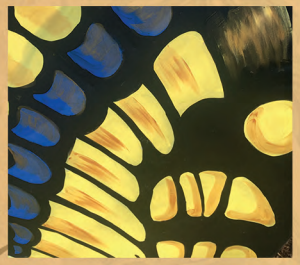
How many spots are there?

Complete the Hedge Maze Ladybird Challenge to win a **limited edition Marvellous Monsters Pop Badge!***

**Contact a staff member at maze centre to collect.*

WHO'S WHO?

Can you match the pictures below with the bugs around the park?



HELP OUR HUNGRY BUGS!

Some of our hungry bugs have got lost and can't find their food.
See if you can follow the trails and match the bug to its food.

CAN YOU COMPLETE THE BUG CROSSWORD?

Across

4. This land species secretes mucus to help their movement and reduce friction against the ground.
5. This insect makes silk which they use to create webs and capture prey.
6. Some have no spots and others have up to 20 spots.

Down

1. A caterpillar eats and eats before turning into a chrysalis and then a .....
2. Their wings have the patterns of leaf veins on them.
3. This flying insect is black and yellow like a bee, however it does not make honey.
4. All are venomous but only about 25 species are known to have venom capable of killing a human.

WORDSEARCH

Hidden in our wordsearch are some of our insects favourite treats, **can you find them all?**

S	W	N	E	F	N	F	E	F	V
H	E	S	E	E	P	S	L	U	K
N	O	V	T	C	E	X	B	N	L
R	A	T	O	I	T	I	M	G	E
L	L	E	P	L	D	A	A	U	Z
E	O	P	H	J	G	U	R	S	A
P	O	L	L	E	N	X	B	D	H
P	Y	E	N	O	H	F	O	A	K
V	U	F	B	H	W	C	H	F	G
B	I	M	E	B	H	Y	F	E	T

BRAMBLE
FOXGLOVES
FUNGUS
HAZEL
HONEY
NECTAR
NETTLE
OAK
POLLEN
POPPIES

YOU CAN HELP!

Help the bugs in your garden. Let the grass grow long to create homes for bugs, don't use insecticides or pesticides and plant species of flowers that produce high quantities of pollen and nectar such as lavender, marjoram, rosemary and honeysuckle.

Tick the plant you plan to grow and watch your bug-friendly garden thrive!


LAVENDER


MARJORAM


ROSEMARY


HONEYSUCKLE

LOOK OUT FOR OUR MARVELLOUS MONSTERS

Tick off the bugs as you find them!

SAFARI BUS STOP

COACH & CAR PARK P

CAR PARK

LONGLEAT

MARVELLOUS MONSTERS ACTIVITIES

- Mantis Takeover at the Longhouse
- Bee-Zone *(from May half term)*
- Ladybird Labyrinth
- Flight of the Butterfly *(from May half term)*
- Bug Locations