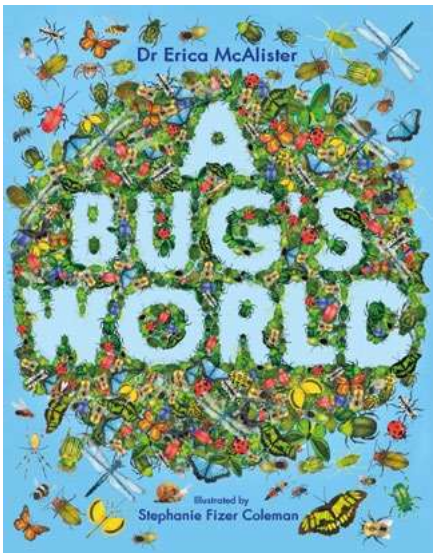
A BUG'S WORLD

Pupil activity sheet

CENTRE for INDUSTRY EDUCATION COLLABORATION

This is one of a series of six activity sheets to use alongside the books which have been shortlisted for the Royal Society Young People's Book Prize 2023.



"We must remember that Earth isn't just our home, it is home to other animals and insects too. We need to learn how to share it and allow these creatures to thrive."

A Bug's World

Be prepared to be amazed by the huge variety of bugs that we share our world with and learn about how insects and other creatures affect human lives.

What is what?

Do you know your butterfly from your moth? Or your millipede from your centipede? Would you recognise a shield bug or a rosemary beetle if you saw them? To carry out the activities in this activity sheet you will need to identify a wide range of small animals so make sure that you have a good quality identification guide to help you.

Lacewing

Lavender beetle

Lily beetle

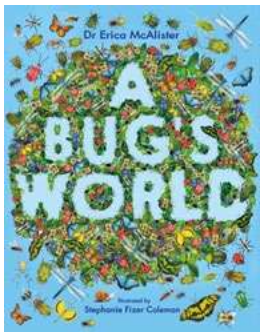
Mathematics challenge

Collecting data

How can you be sure that the new habitats that you are creating for wildlife are working? To start you need to observe how much wildlife is visiting the location before making any changes. For example, you might watch the space for a set length of time and make a note of what you see. Once your new habitat is set up (and once animals have had a chance to find it) you need to watch it again for the same length of time and at the same time of day.

If you notice any changes you will need to think of a way to show what you have noticed, perhaps with a table or graph. What would be the best way to present your evidence to convince others of the value of what you are doing and to persuade them to do something similar?

Images: Lacewing © iStock.com / xxmmxx; Lavender Beetle © iStock / marjorie anastacio; Lily Beetle © iStock / Ian_Redding.



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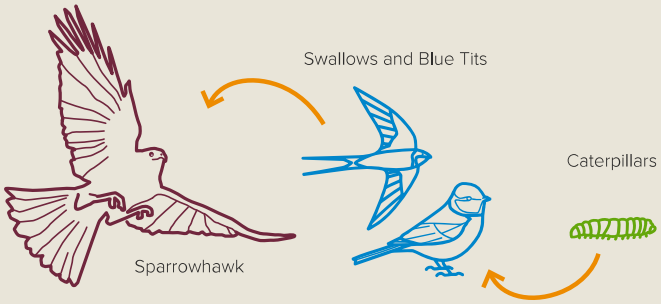
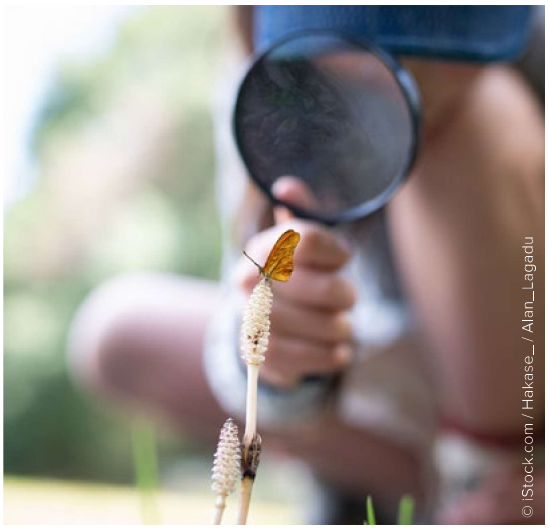
Pupil activity sheet (continued)

Food chains

Did you know that lots of animals depend upon insects and other invertebrates (such as worms and spiders) for their food. If there are not enough caterpillars in the spring, blue tits and other birds cannot find enough food for their families and many of their chicks will die! The swallows and swifts flying over our heads in summer catch flying insects, such as flies and ants, to eat and feed their young. Even insects eat other insects; wasps spend most of their life collecting caterpillars and greenfly to take back to their nest and feed to their larvae.



Even animals that don't eat insects depend upon them for their survival. Sparrowhawks eat small birds such as swallows and blue tits. If these small birds starved because there were no insects to eat, the sparrowhawks would starve too. We call the way that animals are linked to each other by what they eat a 'food chain'. Can you research to find out some other food chains that have got insects in them?



Just watching

Have you ever considered what insects do all day? Find some time to sit and watch what an insect does. You might see a bee fall asleep in a flower, watch a butterfly escape from a wasp or a fly cleaning its face. The more you watch the more that you will find out. Perhaps you will even notice something that no other entomologist has ever noticed before. You could keep a record of your observations including written notes and drawings and photographs. Don't forget to include other details such as the time of year, the time of day and the weather.

Scientist profile

Professor David Goulson is mad about insects! One of his earliest memories is finding some yellow and black caterpillars and looking after them until he saw them transform into beautiful black and magenta moths. Now he is an adult he specialises in bees and has travelled around the world, including Borneo, Thailand, Fiordland, and Patagonia finding out about different kinds of bumble bee and what they need to survive. He also encourages a range of wildlife including grasshoppers, earwigs and ants into his own garden and loves to spend time just watching them.

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Teacher activity sheet

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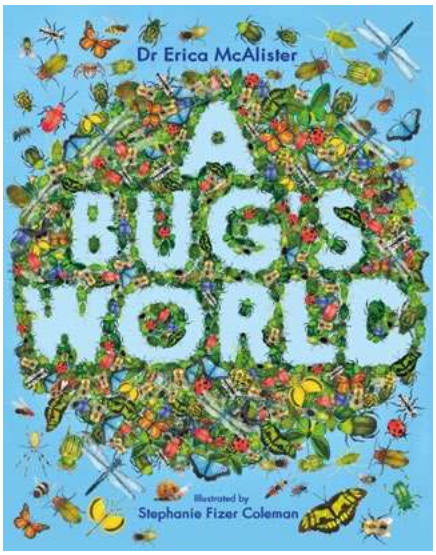


Each activity sheet contains ideas for experiments to do with your pupils, provides information relating to careers, and has a maths focus to help pupils understand the importance of mathematics education across the curriculum.

These investigations can be done as standalone activities or carried out as an in-depth sequence to develop pupils' disciplinary and substantive knowledge. The pupils' deeper learning and their science capital development would be more memorable if they were able to collaborate with a scientist such as an entomologist or ecologist. If you work with a scientist in this way you could also consider applying for a Royal Society Partnership Grant of up to £3,000. For more information and to apply, visit: **royalsociety.org/partnership**

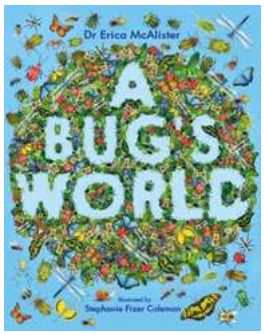
The importance of words

Mini-beasts, creepy crawlies, arthropods, invertebrates, insects ... we need to think very carefully about the words that we choose to use with pupils. In science we only use the word insect to refer to invertebrates which have six legs. If we wanted to include spiders and millipedes the correct terminology would be 'arthropod' (animals with a hard exoskeleton). To include animals such as worms and snails we would use the word 'invertebrate' which means animals without a backbone.

Children often cope well with what we think of as difficult scientific terms. However, if you do need to simplify your vocabulary make sure to avoid using the wrong words, such as 'insect' to refer to spider.

Supporting pupils

This short video from the Royal Society is useful for teachers as it highlights the significant decline in biodiversity and the consequent negative impacts. However, we must be aware of burdening pupils with too much negative information as they can feel despair and give up trying to make a difference. Instead, it is better to help young people to focus on what they can do to make a positive difference in the world.



A BUG'S WORLD

Teacher activity sheet (continued)

Creating habitats

One of the positive aspects of studying insects is how quickly some of them respond to our attempts to help them. If you make a pond, however small, it won't be long before a bee stops by to take a drink, or a water beetle moves in. If you keep a small patch of grass unmown you will not only quickly notice how many flowers appear but also how many insects turn up including flies, bees and maybe even grasshoppers. A pile of old wood, bricks or broken pots will similarly quickly be made use of by insects and other invertebrates.

Encourage pupils to think about their own school grounds and what changes they could make to encourage biodiversity. However unpromising it might seem, there will be something that they can change which will benefit wildlife. How about creating a pond in a bowl or a meadow in a plant pot? This links well with the maths activity in the pupil sheet.

Pond dipping

Every child should have the chance to go pond dipping at least once before they leave primary school; there is nothing quite like the excitement of discovering a whole new world of alien looking creatures. If you don't already have (or are unable to create) a pond in the school grounds, a local park or nature reserve may have a suitable location. Full guidance, including safety information, can be found in CLEAPSS, although many locations will have an expert on hand to lead a pond dipping expedition. Make sure that you have a good identification guide to the creatures that you might find. However, if there are some animals that you cannot identify do not be afraid to admit this to your class:
'I don't know what it is; I wonder how we can find out' is a great way to motivate pupils to investigate for themselves.

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Career links

Entomologists study insects. Some of them specialise in a particular type of insect such as butterflies, beetles or wasps.

- **Arthropodologists** study arthropods including spiders, millipedes and woodlice.
- **Forensic entomologists** use their expertise about insect life cycles to find out about murder victims. For example, if it takes 3 days before the eggs of a certain fly hatch out and the maggots of that fly are found on a body the forensic entomologist can prove that a person died more than 3 days ago.
- **Museum curators** look after the exhibits in a museum. Erica McAlister, the author of this book, is senior curator at the Natural History Museum and specialises in flies.