MINIBEASTS WITH JESS FRENCH

By zoologist, vet and TV presenter Jess French

MASSES OF MINDBLOWING MINIBEAST FACTS!

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For my dad, Martin, who introduced me to the magical world of minibeasts – and for Fenya, who still has it all to discover.

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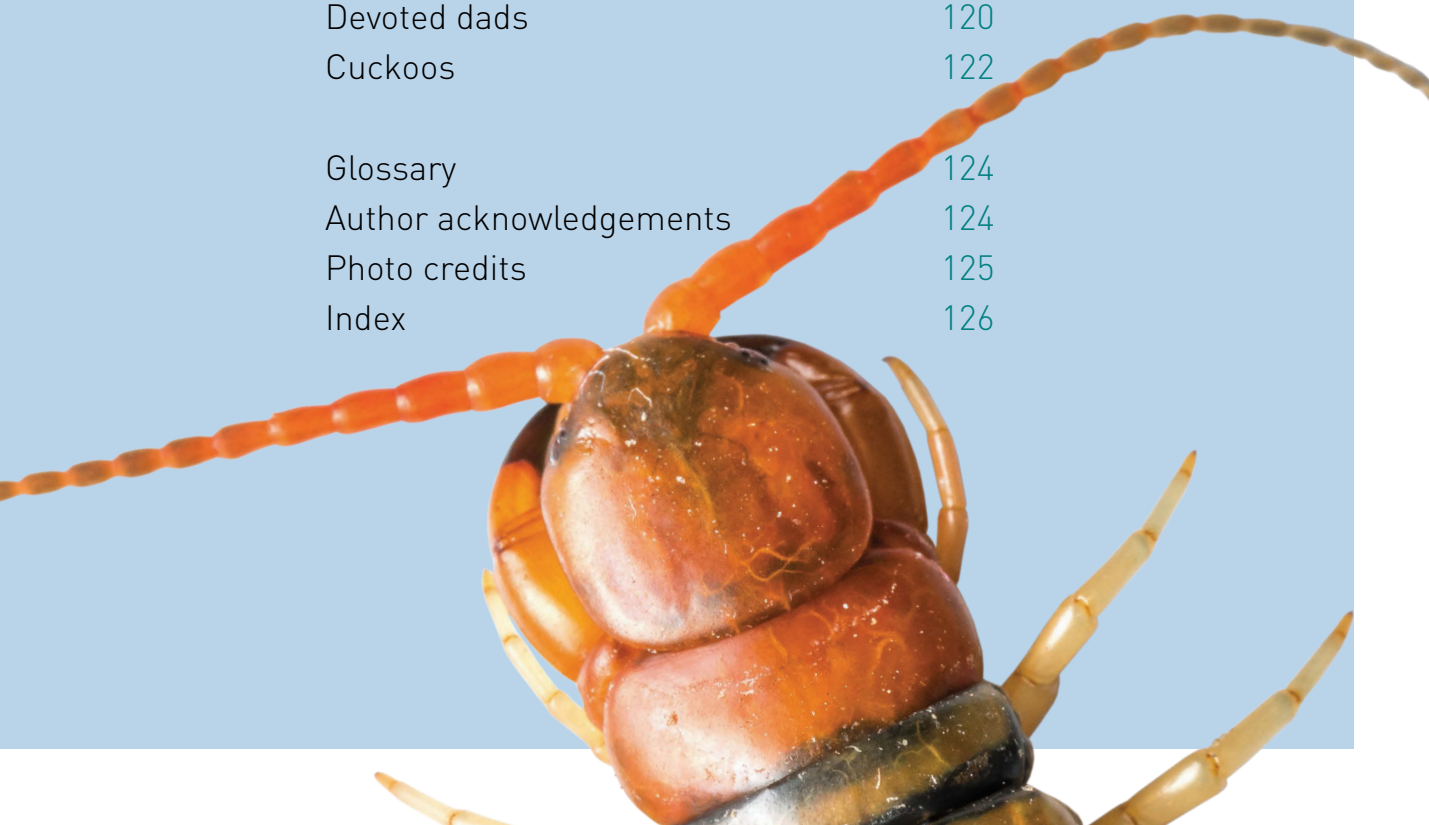
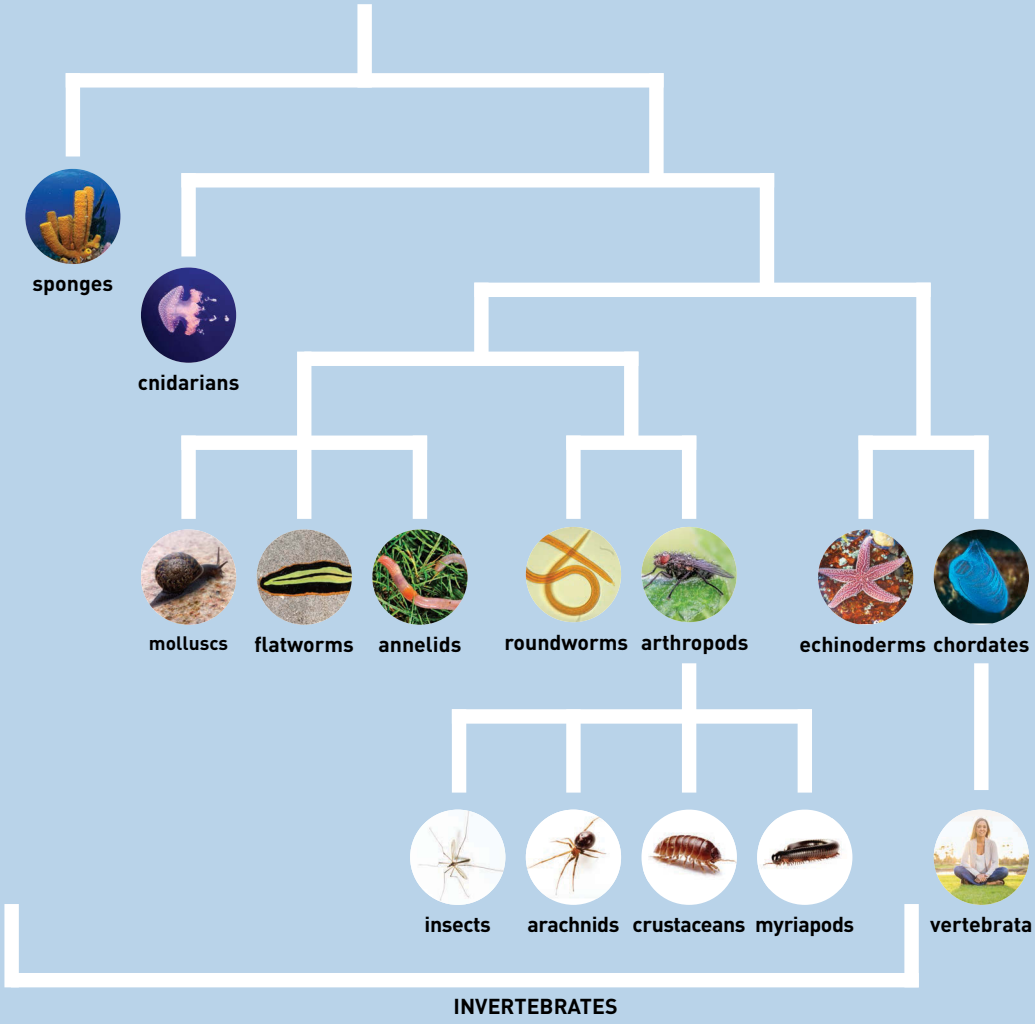
LOVE



INTRODUCING MINIBEASTS

Before we begin our adventure into the fascinating world of minibeasts, here's a quick note about the slightly more boring science of taxonomy. To make sense of our amazing world, scientists have devised excellent ways of classifying how all our different creatures fit together by sorting them into separate groups. Invertebrates – which are animals lacking a backbone – are broadly classified into the categories below, according to how complicated their tissues and body systems are.



The word 'minibeast' has no place in science – it's a non-taxonomic term, so there are no strict rules about what it does and doesn't include, and scientists seem to dislike it. However, I think it's the perfect word to describe the fascinating and bizarre species that populate the minute invertebrate world. It depicts these animals precisely as they are: tiny, enchanting monsters with huge characters and incredible superpowers.

My definition of minibeast can be stretched to cover any of the invertebrates that fit into this taxonomic tree on the left, but I have spent vastly more time studying arthropods, annelids, flatworms and molluscs than any of the other, more obscure groups. That's quite simply because those are the easiest minibeasts to observe (I don't often come across sponges, jellyfish and single-celled organisms in my day-to-day minibeast interactions!). If you're interested to learn more about the other phyla on the taxonomic tree, I've included short definitions for them within the glossary on page 124, where you'll also find definitions for other specialist minibeasts terms I use throughout this book.

The four invertebrate groups I'm going to focus on in this book are:

Arthropods are invertebrates with exoskeletons. This external skeleton allows them to have jointed appendages and survive in dry areas, but it also means that they must periodically moult their skin in order to grow. Arthropods are further divided into groups depending on the number of legs they have:

Insects (6 legs)

Arachnids (8 legs)

Crustaceans (10–14 legs)

Myriapods (more than 20 legs)

Annelids are segmented worms, such as earthworms, ragworms and leeches. They don't have legs or a hard skeleton, and their bodies are split into many small segments. They are excellent swimmers and burrowers, which means they can live in freshwater, marine and terrestrial environments. They are extremely sensitive to drying out, so they cannot survive in areas with little moisture.

Flatworms are ribbon-shaped, flat-bodied worms. They have a very basic body plan, with no respiratory or circulatory systems and a crude nervous system. Many flatworms are parasites that live in or on other animals.

Molluscs are soft-bodied invertebrates that sometimes have calcium carbonate shells. They generally don't have any segments and often have a tongue mounted with hundreds of tiny teeth, called a radula. Some molluscs, such as slugs and snails, have one big, muscular foot. Other molluscs, such as squids and octopuses, have multiple tentacles.

Minibeasts are a wildly diverse and successful bunch, and are found almost everywhere in the world. Although individually small, the minibeast total population and biomass vastly outnumbers that of their vertebrate counterparts. These are the species that shape the way our planet looks, functions and perpetuates – they pollinate plants, decompose dung, spread seeds, and provide food for birds, fish and mammals. Without invertebrates our world simply would not function.

Not only are minibeasts vital to the running of our planet, but they also demonstrate behaviours that are virtually unbelievable. While I could dedicate this entire book just to the ecological importance of minibeasts, instead I hope to introduce you to some of the weirdest and most fascinating members of the minibeast world, and to expose you to a few of their strangest behaviours through the breathtaking photos, masses of amazing facts and profiles of incredible species in the pages ahead. So let's dive into the mindblowing world of the minibeast!

EAT

Invertebrates can be found almost everywhere on the planet, so it is no surprise that they've adapted to exploit an incredible array of food sources. We commonly associate minibeasts with the destruction of crops, but there are many ingenious invertebrates that feast on much more interesting foodstuffs than lettuces and tomatoes!

There are minibeasts with fantastic mouthparts that help them get their food, yet the most basic of invertebrate digestive systems is little more than a sack and a hole. The hole allows food to enter and leave the body, and the sack is full of enzymes that digest the food. More complex minibeasts have two holes, connected by a tube. The most intricate of invertebrate body systems include sensory palps – cutting, shearing and sucking mouthparts – and the ability to tolerate and recycle toxins.

Acquiring food isn't a simple task for all minibeasts; some invertebrates have to eat constantly to gain enough energy to stay alive. These minibeasts usually rely on foods that are plentiful and easy to find. Others must use more sophisticated techniques to locate and obtain their menu of choice. Some find the food they need in their local environment, while others must travel hundreds of miles in search of their next meal.

Whether acting solo or as a carefully coordinated group, opportunistic minibeasts have managed to squeeze their meals out of just about every habitat on Earth.

MOUTHPARTS

Through our ability to cook, chop, blend and peel, humans are able to consume a vast array of foodstuffs, despite having relatively unspecialised mouthparts. Minibeasts do not have the luxury of eating with cutlery or pulverising their food in a food processor before consuming it. So their diets are generally restricted by their mouthparts, which are often specialised to exploit very specific dietary niches.

STRAIGHT PROBOSCIS

Although the long, thin needle protruding from the face of the bee fly looks formidable, this needle (called a proboscis) is actually used for probing deep inside the nectar tubes of flowering plants. Like a long and pointy drinking straw, the middle of the tube is hollow and allows the bee fly to suck up nectar from inside the plant. In some species, the bee fly's proboscis can be more than four times the length of its head!

CURVED PROBOSCIS

Much like the bee fly's nectar straw, the proboscises of moths and butterflies are also used for sucking up the sweet liquids from deep inside flowers. However, unlike the bee fly, butterflies and moths carry their proboscises curled neatly under their heads.

HOLLOW JAWS

The huge and powerful jaws of the great diving beetle larva allow it to catch prey much bigger than itself. These enormous jaws are hollow, which enables the great diving beetle larva to inject digestive juices into its prey and suck out its victim's insides without ever having to let go.