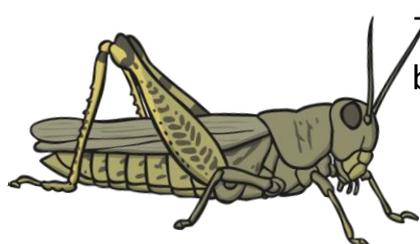We are now going to look at classifying invertebrates. Invertebrates are animals without a backbone or a skeleton made of bones. Many have a hard shell outside their bodies to protect them. Others have soft, flexible bodies. More than 80% of the living things on the planet are invertebrates.
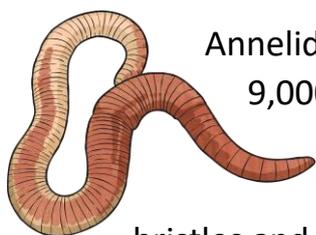
There are several different types of invertebrates.

Insects

There are over 800,000 different types of insects. They have an **exoskeleton** covering their body. The body consists of 3 parts: the head, thorax and abdomen. They must shed their exoskeleton in order to grow and have a pair of antennae on their head.

Annelids

Annelids have existed for over 120 million years. There are over 9,000 species including worms and leeches. Their bodies are divided into segments and they don't have any limbs. Some annelids have long bristles, other have shorter bristles and appear smooth.

Protozoa

Protozoa eat tiny algae and bacteria and can only be seen under a microscope. They are a source of food for fish and other animals.
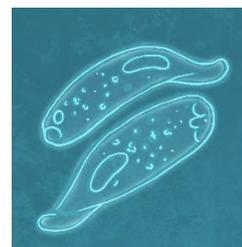
Crustaceans
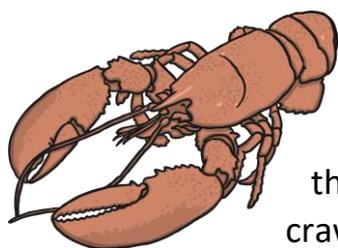
Most common crustaceans are crabs and lobsters however woodlice are also crustaceans. They have a head and an abdomen. A hard, external shell protects their body and they may have claws that help with crawling and eating.

Molluscs

Molluscs were among the first inhabitants of the Earth and live on land or in water. Most have a soft, skin-like organ covered with a hard outside shell. Ocean molluscs attach themselves to rocks or to other surfaces and can't move whereas land molluscs move slowly on a flat sole called a foot.

Arachnids
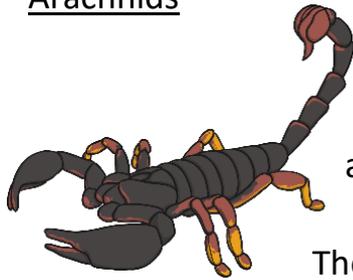
Most arachnids have 4 pairs of legs. The first pair may be used for holding their prey and feeding. Common arachnids are spiders, scorpions, ticks and mites. They have a hard exoskeleton and jointed legs for walking. They do not have antennae.

Echinoderms

Echinoderms are marine animals that live in the ocean. Common echinoderms include the sea star, sea urchin, sand dollar and sea cucumber. They have arms or spines that radiate from the centre of their body. The central body contains their organs, and their mouth for feeding which is underneath so they can eat other sea life.
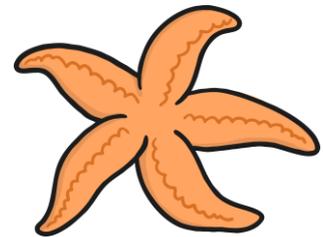
What invertebrates might you expect to find in your garden?

Are there any which you wouldn't find in your garden? Why?

Invertebrates often inhabit small environments called **microhabitats** such as:

Under stones and rocks

In short grass

Inside or under rotting wood

Under fallen leaves

In or on soil

In tall flowers and grasses

Can you think of any other microhabitats?

Which microhabitats might you find in your garden?

What invertebrates or other creatures might you find in a garden?

Classification Keys

Classification keys are a great way to sort living things.

You can use them to identify living things. Here is an example. It is a series of questions which are answered 'yes' or 'no'. You follow the chain until you identify the creature.

Has the mini-beast got legs?

Yes
Has it got wings?

No
Has it got a shell?

No
Has it got more than eight legs?

Yes
Is it active at night?

No

Yes

Worm

Snail

Yes

No

Yes

No

Centipede

Spider

Moth

Butterfly
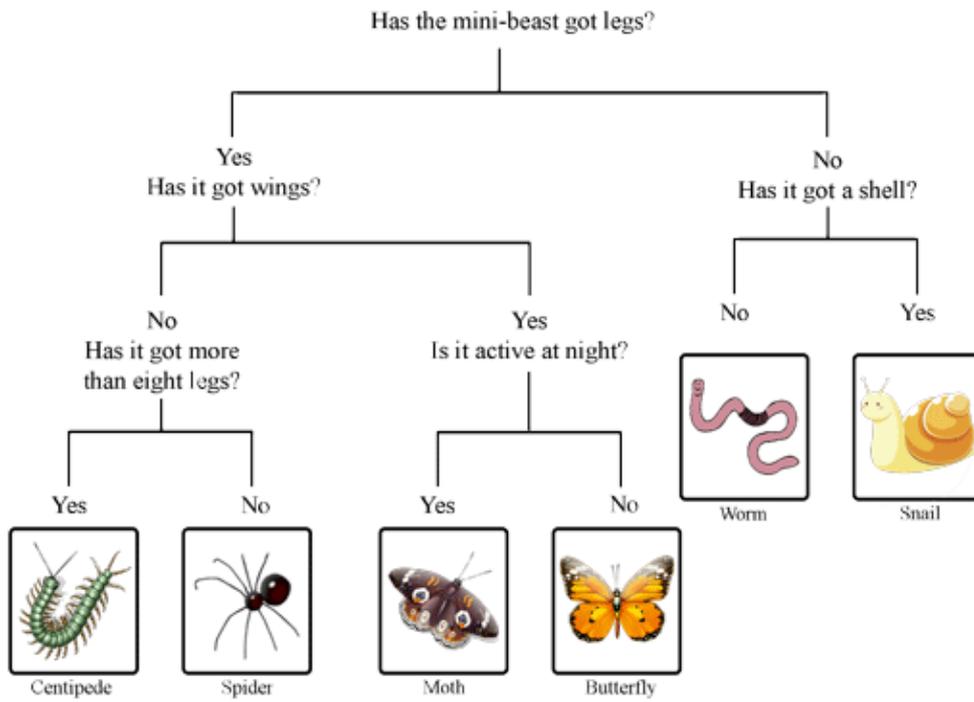
Can you fill in the invertebrates for this classification key?

Does it have legs?

Yes

No

Does it have antennae?

Does it have a shell?

Yes

No

No

Yes

Does it have a 3 part body?

Yes

No
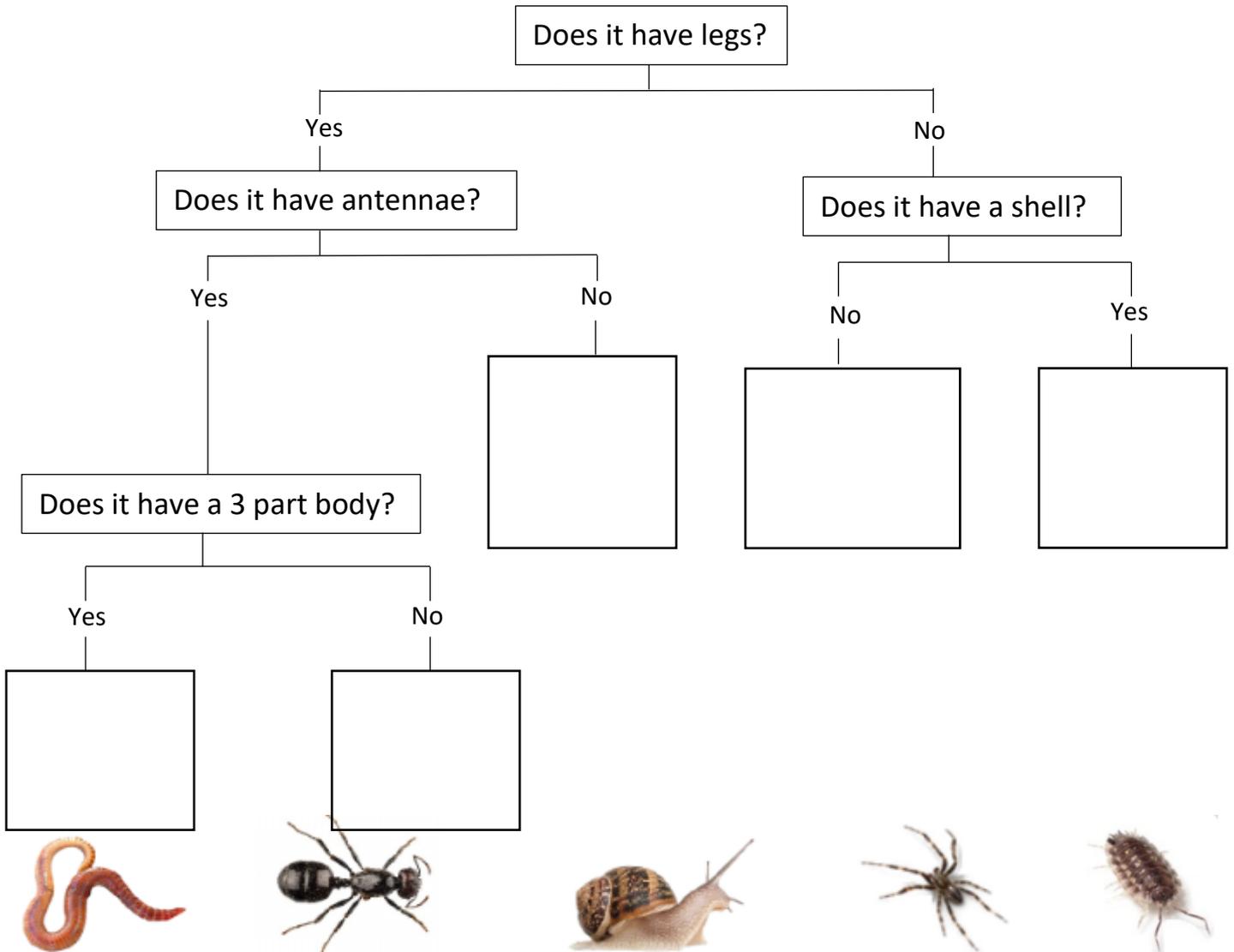
You are now going to try to create your own classification key.

First you need to complete the fact files for each invertebrate. Write what type of invertebrate it is and its name and then two features of each creature (eg. how many legs, has it got antennae, how many parts does it have) as this will help you to think of some questions for your classification key.

Type of invertebrate: Name:

Features

-
-

Type of invertebrate: Name:

Features

-
-

Type of invertebrate: Name:

Features

-
-

Type of invertebrate: Name:

Features

-
-

Type of invertebrate: Name:

Features

-
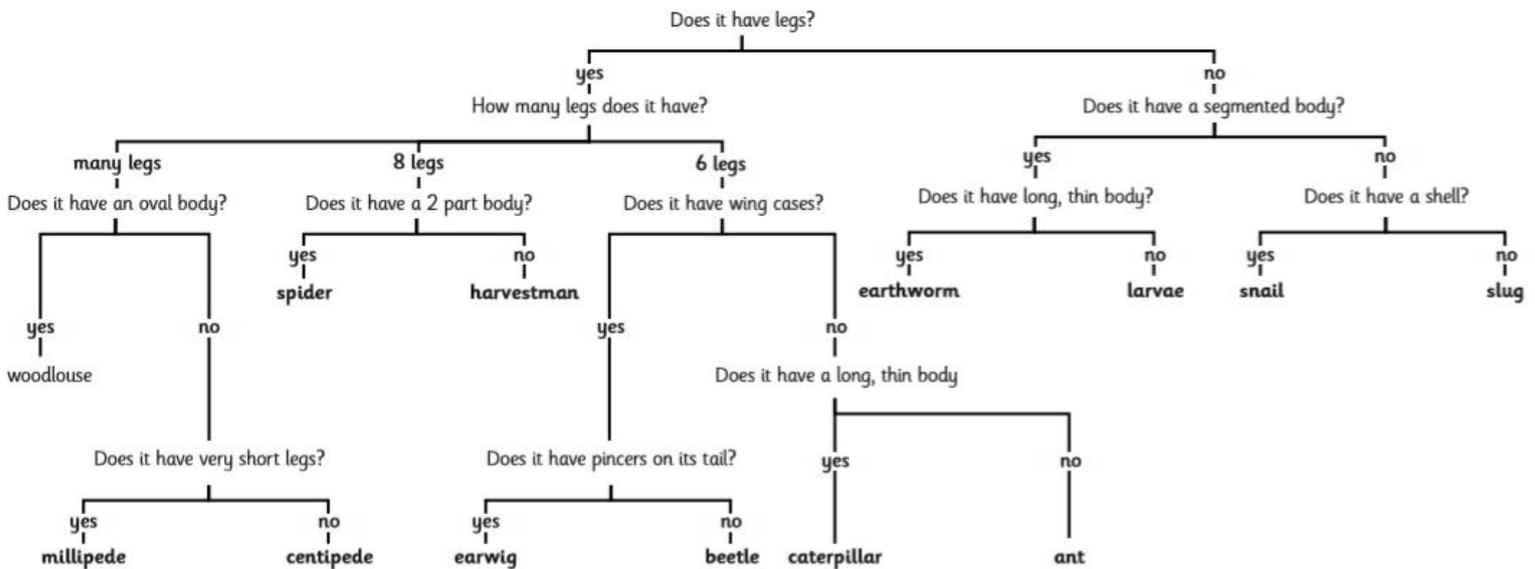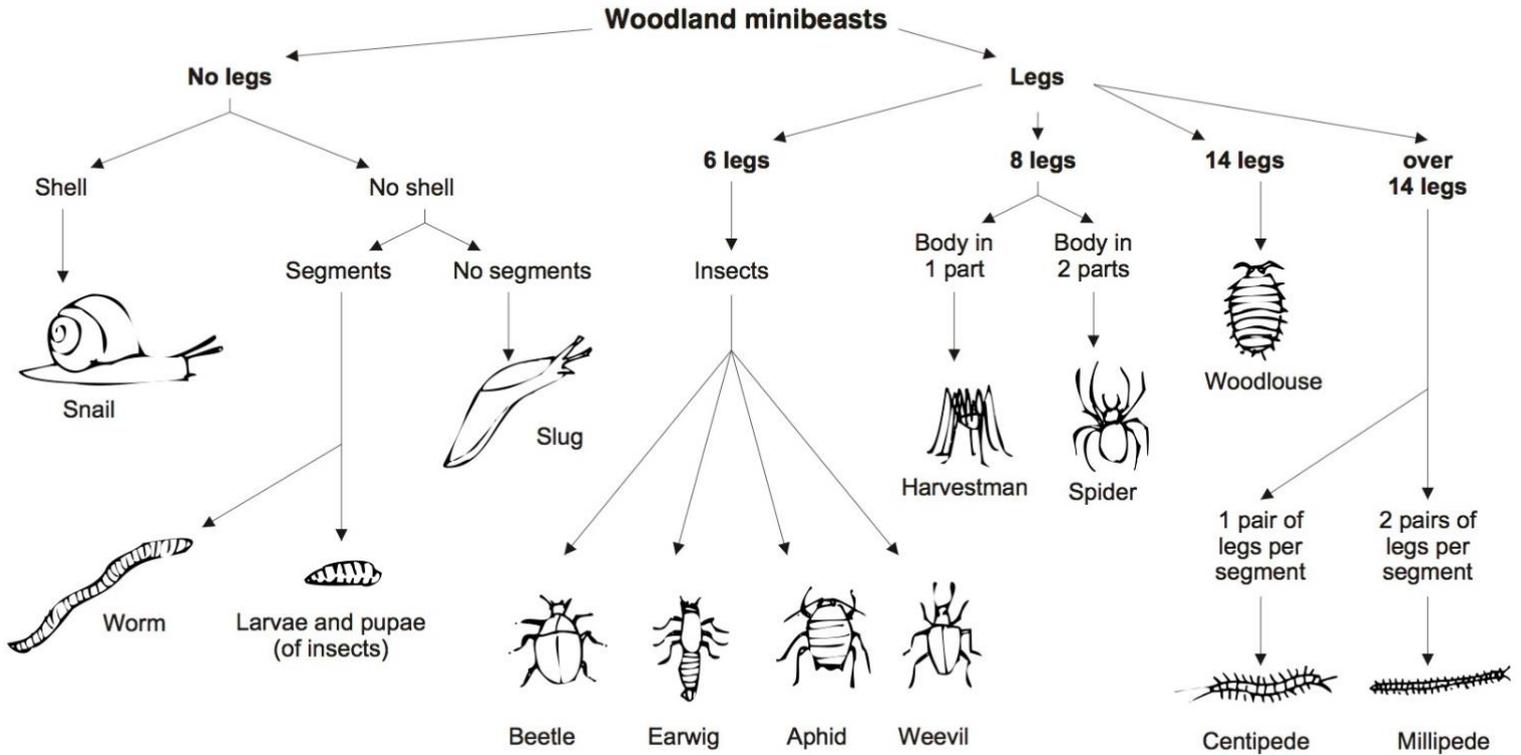-

Type of invertebrate: Name:

Features

-
-

Now on a separate piece of paper try and create a classification key to identify each of the invertebrates above. Use the examples above to help you.

You are going to use classification keys to see if you can identify the invertebrates that you can find in your garden.

Woodland minibeasts

No legs
- **Shell** → Snail
- **No shell**
  - **Segments** → Worm, Larvae and pupae (of insects)
  - **No segments** → Slug

Legs
- **6 legs** → Insects → Beetle, Earwig, Aphid, Weevil
- **8 legs**
  - **Body in 1 part** → Harvestman
  - **Body in 2 parts** → Spider
- **14 legs** → Woodlouse
- **over 14 legs**
  - **1 pair of legs per segment** → Centipede
  - **2 pairs of legs per segment** → Millipede

Does it have legs?

yes → How many legs does it have?

- **many legs** → Does it have an oval body?
  - **yes** → woodlouse
  - **no** → Does it have very short legs?
    - **yes** → millipede
    - **no** → centipede

- **8 legs** → Does it have a 2 part body?
  - **yes** → spider
  - **no** → harvestman

- **6 legs** → Does it have wing cases?
  - **yes** → Does it have pincers on its tail?
    - **yes** → earwig
    - **no** → beetle
  - **no** → Does it have a long, thin body
    - **yes** → caterpillar
    - **no** → ant

no → Does it have a segmented body?

- **yes** → Does it have long, thin body?
  - **yes** → earthworm
  - **no** → larvae

- **no** → Does it have a shell?
  - **yes** → snail
  - **no** → slug

First you need to think of some questions you have about the living things in your garden.

For example: Which microhabitat contains the most living things?

Which area of the garden contains the most ………?

What living things are in my garden?

How many ………….. can I find in 15 minutes?

Does the time of day / weather effect what you find………..

-

-

-

Your survey area = your garden

You are now going to look in your survey area and collect data about the living things that can be found there. Choose one of your questions as a focus and use the results table provided to collect your data. You may need to use some classification keys to identify any living things you find.

You can do this multiple times at different times of the day and compare results to see if this makes any difference.

You might want to take pictures as a way of recording anything that you find.

Make sure you are sensible and handle any living thing with care and follow the following rules.

You may not have each of the search areas in your garden so just do the ones you have!

Search carefully, disturbing the surroundings as little as possible.

Handle only a few, but look at many living things.

Replace overturned logs and stones.

Carefully return the living things to their natural habitat after your study.

Do not pick wild flowers; draw them or photograph instead.

1. Date of survey _____   **2.** Time of survey _____

3. How would you describe the weather today? ☐ ☀ ☐ ⛅ ☐ ☁ ☐ 🌧

Which of these micro-habitats can you see within your survey area? (tick all those that apply)

(a) Soft ground surfaces	**(b) Human-made hard surfaces**	**(c) Plants**
☐ Soil (e.g. flower bed, vegetable patch)	☐ Building (brick, wood, glass)	☐ Long grass (taller than 12cm)
☐ Short grass (shorter than 12cm)	☐ Brick or stone wall (e.g. garden wall)	☐ Planted flower bed, pot or windowbox
☐ Fallen or rotting leaves (leaf litter) or woodchip	☐ Wooden fence	☐ Wild flowers or weeds (a wild patch)
☐ Plant pots, large stones or rocks standing on soft ground surfaces	☐ Paving	☐ Hedges
☐ Dead branches or logs on the ground	☐ Wooden decking	☐ Shrubs
☐ Open compost heap	☐ Tarmac or concrete (e.g. pavement, playground)	☐ Trees
	☐ Plant pots standing on hard surfaces	☐ Climbing plants (e.g. Ivy)
	☐ Play equipment	

Search for 15 minutes (a) on soft ground surfaces, (b) on hard ground surfaces and (c) on plants
Use the Invertebrate Identification Guide to help you.
Record the number of each type of bug you find in the table below.

Number of legs	Type of bug	How many did you see?		
		on soft ground surfaces	on hard ground surfaces	on plants
0	Snails			
0	Slugs			
0	Earthworms			
6	Beetles			
6	True bugs			
6	True flies			
6	Bees / wasps			
6	Ants			
6	Butterflies / moths			
6	Crickets / grasshoppers			
6	Earwigs			
6	Unidentified Flying Insects	╳	╳	
8	Spiders / harvestmen			
> 8	Woodlice			
> 8	Centipedes			
> 8	Millipedes			
Hard to see	Insect larvae			
n/a	Other invertebrates			
Total number of bugs found				
How many spider webs did you see?		╳		
Did you use a dustpan and brush?		╳	╳	

	on soft ground surfaces	on hard ground surfaces	on plants
Did you see any of the Species Quest bugs? Use the Species Quest Identification Guide to help you identify them Please take a photo if you see any of the Species Quest bugs.	[how many] 2-spot Ladybird [how many] Devil's Coach Horse [how many] Small Tortoiseshell [how many] Green shieldbug [how many] Leopard Slug [how many] Tree Bumblebee	[how many] 2-spot Ladybird [how many] Devil's Coach Horse [how many] Small Tortoiseshell [how many] Green shieldbug [how many] Leopard Slug [how many] Tree Bumblebee	[how many] 2-spot Ladybird [how many] Devil's Coach Horse [how many] Small Tortoiseshell [how many] Green shieldbug [how many] Leopard Slug [how many] Tree Bumblebee