Pack contents

- **Minibeast wallchart and Minibeast fact file**
- **Classification cards:**

1. Mollusca
2. Annelida
3. Arthropoda (Arachnida)
4. Arthropoda (Crustacea)
5. Arthropoda (Insecta)
6. Arthropoda (Myriapoda)

- **Discovery booklet containing:**

Discovery Card 1
- Catch your own minibeast

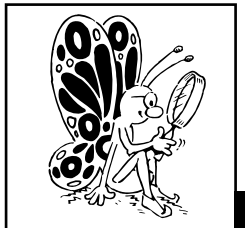
Discovery Card 2
- "There's no place like home!"

Discovery Card 3
- Classification

Discovery Card 4
- My insect

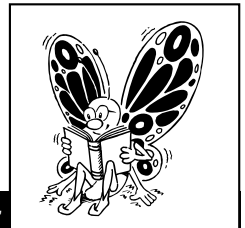
Discovery Card 5
- Food chains and webs

Discovery Card 6
- Looking at life cycles



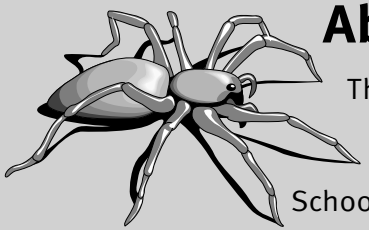
ICON GUIDE

Children's Worksheets



Teacher Information

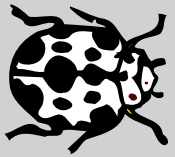
minibeast discovery pack



About this pack

This pack has been created by the Biotechnology and Biological Sciences Research Council with advice from the BBSRC Primary School Consultant and BBSRC supported scientists.

Through the activities suggested in this pack, children can be introduced to the world of invertebrates. Invertebrates are often referred to by primary school teachers as **minibeasts**. The Discovery cards in this pack reflect this trend. It is up to the teacher whether they use the correct term - **invertebrate** from the outset or whether they introduce the correct terminology as teaching progresses.



Yes you can photocopy this pack!

Acknowledgements

BBSRC would like to thank all those who contributed to this pack, particularly: Mrs Trish Fenton - Science Coordinator for Wanborough Primary School, Wanborough, Wiltshire; Mr Kieren Pitts - AES Bug Club President; Mr Gordon Ramel - IGER North Wyke and Dr John Bater - IACR Rothamsted. Many of the photographs used in this pack were kindly supplied by Dr Roger Key - English Nature. Photographs were also supplied by Dr Ian Henderson - IACR Rothamsted and Ms Lorraine Lin - Oxford University.

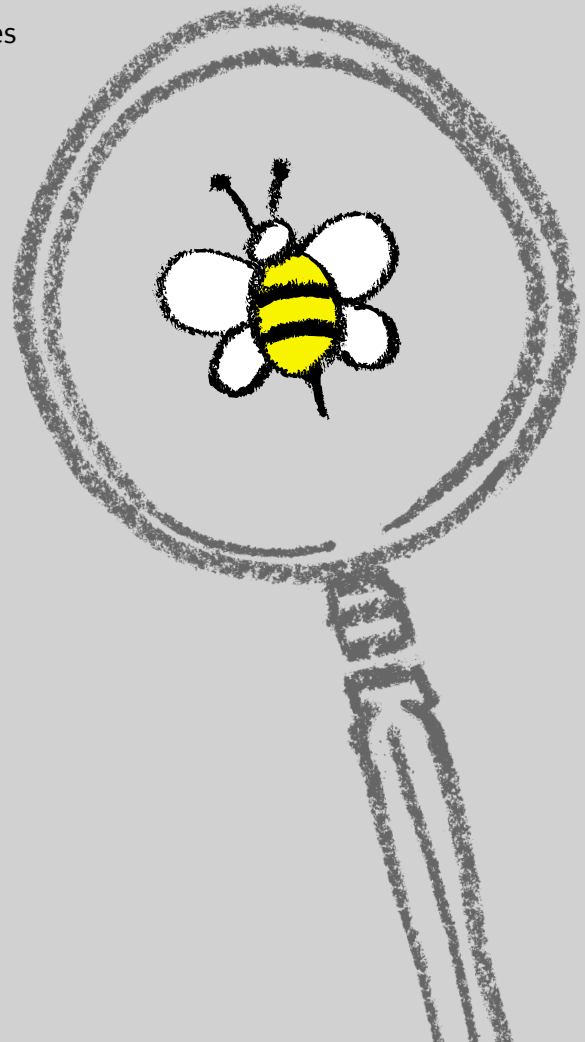
curriculum links

Science activities

- catching minibeasts
- habitat preference investigation using bug boxes
- classification activities
- anatomy of a butterfly (butterfly dot-to-dot)
- life cycles and metamorphosis
- food chains and food webs
- concept mapping

English activities

- speaking and listening - using the large colour wallchart to talk about minibeasts and their environment
- role play
- story telling



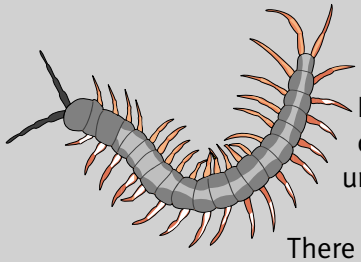
Design and technology activities

- designing/making an insect
- constructing a mobile to show the elements in food chains

Cross curricular themes

- ladybird maths puzzle
- designing and making a bug box
- observational drawing and painting
- thematic study of the school's environment or local area
- orienteering/woodland walks
- minibeast welfare/appreciation of the environment

assessment opportunities



It is possible to select any Discovery Card from the pack and use your own teacher assessment to determine how much the children have obtained from doing the activity. Children can be encouraged to write down three things they know from undertaking the task and younger children can draw a picture to summarise their conclusions.

There are also many ways of introducing the topic of minibeasts to the children. Floor-books can also provide opportunities to discuss and share thoughts and ideas in small groups. They can also serve to provide a record of achievements or ideas suggested by each child and can be referred to throughout the topic.

In this pack there are three specific tasks which provide assessment opportunities.

1. Discovery Card 2, 'There's no place like home!' Teachers can assess children's science process and investigative skills as they; i) devise a fair test to determine the best habitats for their chosen minibeast, ii) make suitable predictions and iii) record and interpret the results they obtain.

2. Discovery Card 4, 'My insect'. This design and technology task requires children to analyse specific characteristics of four given insects and make use of this information to design and make their own insect. Teachers may find it helpful to give children a suitable paper or plastic model or toy insect to study and possibly disassemble.

3. Minibeasts concept map. Concept maps are useful tools for children to express a number of key ideas. They can provide a valuable assessment tool at the beginning, middle or end of the topic. They can also be adapted to suit specific ages and abilities. Children can be presented with a collection of key words associated with their science theme or area of study - they then try to link these words together using their own ideas (for example: 'woodlouse' and 'damp, shady places', the connection might be, 'woodlice make their homes in damp, shady places'). The children can then develop their own ideas and write them on to their map.

Younger children might draw a series of pictures in the style of a flow diagram. This approach is very useful for children who find it difficult to write down all their ideas. Alternatively, they might like to set their concept map out like a brainstorm and either draw or write their ideas.

Concept mapping

1. Draw lines between words that link.
2. Write along the line what the link is.

Soft body

Hard shell

Legs

A centipede has lots of legs

Number of body parts

Butterflies undergo metamorphosis

Metamorphosis

Centipede

Butterfly

Wings

Snail

Aphid

Minibeasts

Feeding

Woodlouse

Worm

Spiders

Worms live in the soil

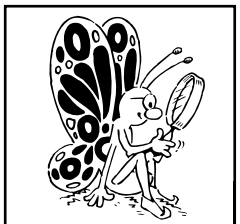
Damp, shady places

Eats small animals including insects

Flowers

Soil

Leaves



Name _____

what is safe to collect?

Almost every UK invertebrate is 'safe' to collect - if it is collected in the correct way. There are however a number of organisms which are capable of biting, stinging or causing irritation and these are listed below:

- Bees and wasps
- Ants
- Dragon flies and dragonfly larvae
- Caterpillars which have long hairs can cause irritation e.g. Garden tiger moth.
- Greater water boatmen
- Locusts
- Ladybirds (which have small poison glands on their knees)
- Some species of spider
- Some species of centipede

Advice

The best solution is, where possible, to study the invertebrate in situ (in its natural environment). This also has benefits for the invertebrates many of which are fragile and may become stressed with prolonged handling. If invertebrates are collected and removed from their natural environment for short periods of study, it is important that children understand that the animals must be returned to their place of origin as soon as possible and that the animals habitat should be left as it was found (stones should be put back after being overturned and so on).

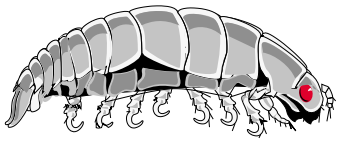
If invertebrates are kept overnight (which is the absolute maximum amount of time they should be kept) it is important that they are held in a secure, moist, (but not wet) environment and that food is provided if available.

The ASE 'Be Safe!' booklet which covers aspects of safety in school science and technology for key stages 1 and 2 lists the following invertebrates as being **suitable** for study:

- Earthworms
- Slugs and snails
- Woodlice
- Land crabs
- Indian stick insects, Pink winged stick insects, Australian spiny stick insects
- Meal worm beetles
- Chafer beetles
- Brine shrimps
- Some butterfly and moth larvae where their food is available (but not those which are hairy)

The safety booklet also gives the following advice:

- Before keeping any animal, consult a reliable reference book such as those produced by the RSPCA.
- Obtain animals from reputable suppliers.
- Teach children to wash their hands before and after handling animals.
- Consider the safety and the well-being of the animals and teach the children to handle them with due care.
- Keep housing clean and disinfect cages at regular intervals.
- Do not allow animals to wander freely on floors or tables unless these are cleaned immediately afterwards.



For further information on insects, advice on suitable species to study, study activities and so on contact:
The AES Bug Club, PO Box 8774, London SW7 5ZG.

1

Discovery Card

Catch your own minibeast

Time: Set traps on day one - 1 hour. Examine the finds on day two - 1 hour

Teacher Information

Catch your own minibeast (suitable for 7 - 12 year olds)

This activity gives children an opportunity to examine a selection of minibeasts and to investigate habitats. It can be adapted for younger children by setting up a tank in the classroom.

To set your "traps" outdoors you will need:

- a selection of empty yoghurt pots
- sufficient pieces of thick card to rest on top of each pot
- some large stones (to support the card)
- food to bait each trap. Suggested baits are cat food to tempt carnivorous invertebrates and pieces of apple or sweet things to attract herbivorous invertebrates.

Note: It is useful to experiment with different kinds of bait. Put meat baits and vegetarian baits in different pots to try to keep carnivores and herbivores apart. However as i) many invertibrates are omnivores (eating both plant and animal material) and ii) carnivores may crawl into the "vegetarian" pots, attracted by trapped herbivores - you may find a mixture of plant and meat eaters in any one pot.

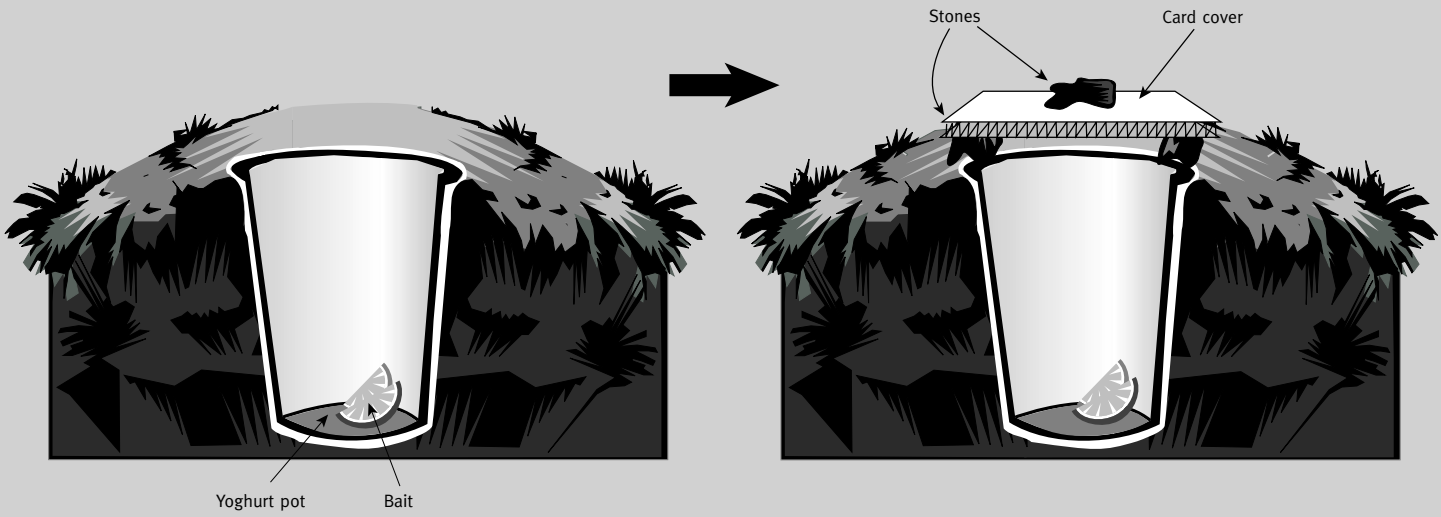
Try to choose contrasting locations around the school grounds for each trap.

Preferably set your traps the day before you intend to examine your find and leave overnight.

Discovery card 3 - Classification provides useful teacher information about the different invertebrate groups

The traps

1. Make two or three small holes in the base of each yoghurt pot so that if it rains, the rainwater is able to drain away and the animals you have trapped do not drown.
2. Dig a hole big enough for each pot to fit in and put your bait inside the pot.
3. Place four large stones around each pot and rest a piece of card on top to keep out "unwanted guests".
4. Secure with a large stone on top.



All animals taken from their natural environment for study should be returned as soon as possible.

1

Discovery Card (cont)

Catch your own minibeast

Time: Set traps on day one - 1 hour. Examine the finds on day two - 1 hour

Teacher Information

To set up this activity indoors you will need:

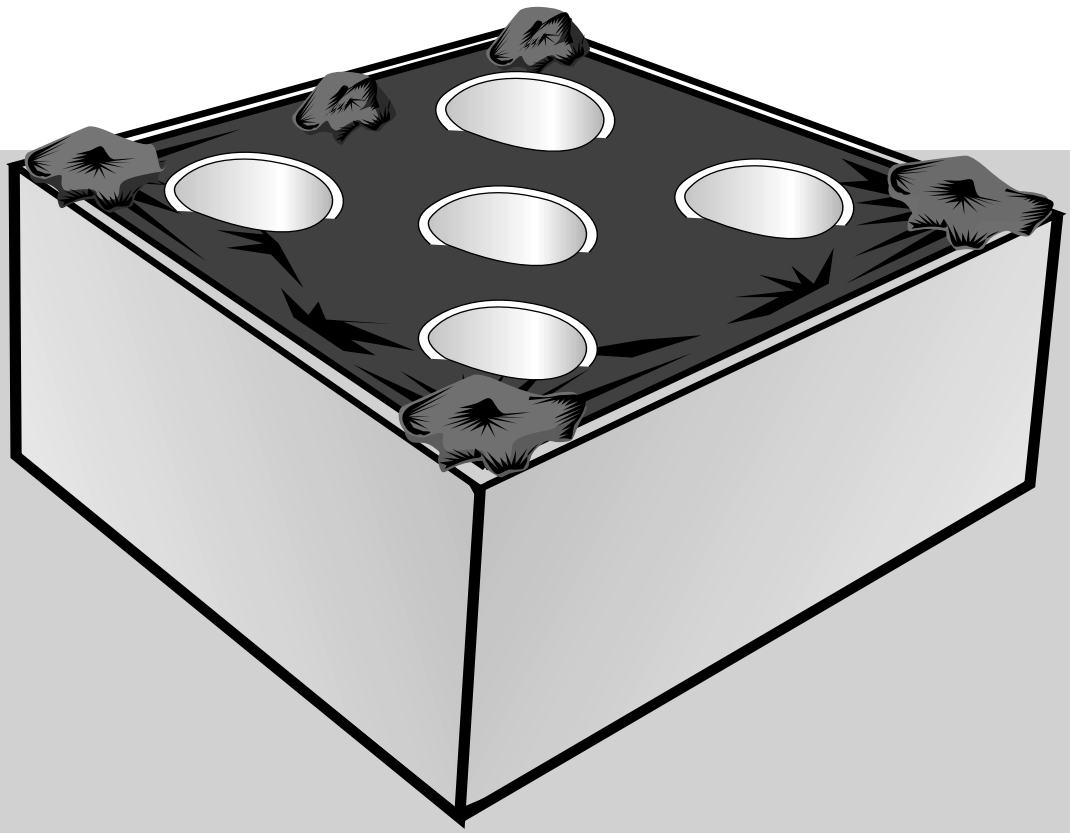
- A glass or clear plastic tank or aquarium filled with soil from a chosen location.
- 2 - 4 yoghurt pots
- 5 - 10 large stones
- 2 - 4 pieces of card
- bait

1. Fill the tank three quarters full of soil and add 1 to 3 cms of leaf litter.
2. Place the pots in the tank so that the soil comes up to the rim of each pot.
3. Bait the pots ensuring at least one contains meat only.
4. Place four large stones around each pot and cover with card.
5. Secure with large stones on top.

Remember to set up your tank in a cool area of the classroom. Cover the top of the tank with a fine mesh or a piece of punctured card to allow air into the tank and leave overnight.

How to use the minibeasts you catch

- You might ask the children to observe and draw individual minibeasts and use their observations as a basis for discussion **(suitable for 5 - 7 year olds)**.
- Children might sort the minibeasts they find into groups using simple features e.g. number of legs, body shape, wings **(suitable for 5 - 7 year olds)**.
- You might ask the children to group and classify their catches using the **BBSRC Bug Dials** included in this pack and **Classification Cards** as a source of information **(suitable for 7 - 12 year olds)**.
- You might ask the children to think about the places where certain invertebrates were trapped and link this to preferred habitats. A table indicating the preferred habitat of a number of common invertebrates on **Discovery card 2** may help and the **Minibeast Wallchart** can be used to reinforce findings **(suitable for 7 - 12 year olds)**
- The children might use some of the minibeasts which they catch to complete the **"There's no place like home!"** activity of **Discovery card 2 (suitable for 7 - 12 year olds).**



2

Discovery Card

"There's no place like home!"

Time: 2.5 hours (split into two sessions)

Teacher Information

"There's no place like home!" (suitable for 7 - 12 year olds)

This is an opportunity for children to make their own bug boxes and test the habitat preference of selected minibeasts.

Timing - based on a class of 30 working in pairs or in small groups

Session 1: 1-2 hours discussion and bug box construction.

Session 2: 15-20 minutes collecting habitats and placing minibeasts.
15-20 observation.

- The bug box instructions have been designed for the children to follow, but can be adapted for a teacher-guided approach.
- **It is better to construct the boxes a day in advance to allow glues to dry out and to ensure that the boxes are fixed securely.**
- Habitat material should be collected at the start of Session 2 to ensure that they are fresh.
  One choice of habitat should be a handful of **pebbles or small stones,** another should be a **handful of fresh leaf litter and bark** with two more habitats of the children's own choice.

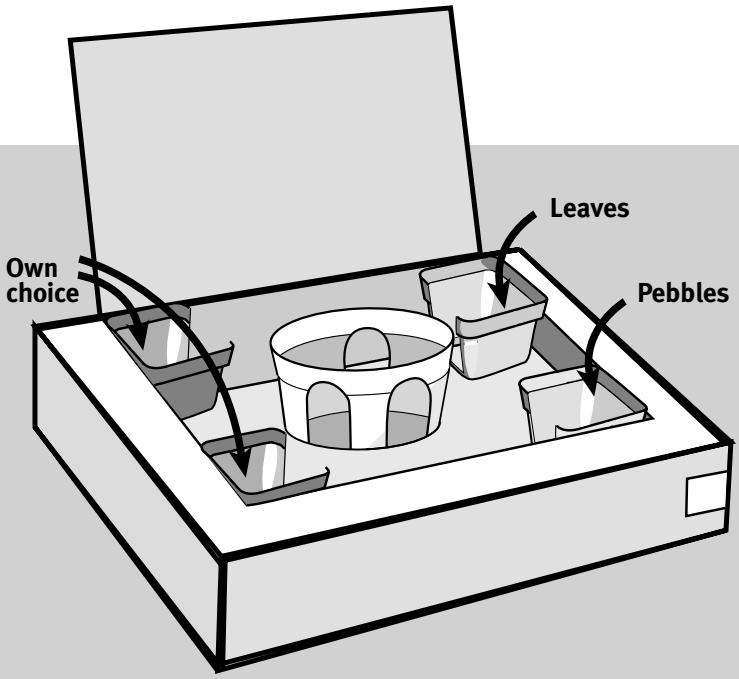
Session 1

To make one bug box each small group will need:

- **"There's no place like home!"** Discovery sheets 2a and 2b.
- 1 medium sized cereal box. A 750 g box is ideal but smaller 500 g boxes can be used effectively.
- 1 large round plastic tub
- 5 small square plastic tubs - all the same size. Square tubs fit neatly into the corners of the bug box but round tubs may also be used, so long as they are all of the same size to maintain fairness.
- A suitable 'child-safe' glue
- Sticky tape
- Scissors. (A craft knife may also be useful - but children should always be supervised when using the knife).
- Hand lenses (optional) to help the children to draw their minibeast.
- Perforated polythene or fine wire gauze to cover bug boxes if they are to be left unattended. Generally it is recommended that observation and recording are carried out in one continuous session.

Planning the investigation

While the boxes are under construction and /or drying, the children should make their predictions using the **"There's no place like home!"** Discovery sheet 2c.



"There's no place like home!"

Time: 2.5 hours (split into two sessions)

Session 2

The minibeast

Children can either collect their own minibeast for the bug box activity using the **Discovery card 1- Catch your own minibeast**, or you can supply the minibeasts in a suitable container (a tub of soil for woodlice, beetles and worms; a tub of fresh leaves for snails etc).

One minibeast per bug box should be sufficient and will enable the children to focus on the animal and observe it carefully. However, it is advised that you have a pot of additional minibeasts to hand so that the activity can be repeated if necessary.

The best kinds of invertebrates for this activity are those which are easily collected all year round and which do not fly, jump or generally move too quickly! Woodlice are ideal. Other possible choices include; snails, worms and for the more adventurous, beetles.

Minibeast observation

Once all the habitats are in place and predictions have been made, the children can test their bug boxes. They will need to observe the minibeast carefully and monitor which habitat(s) it moves towards.

The minibeast may visit more that one habitat, however a habitat preference usually emerges.

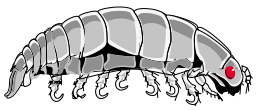
The following table is a basic guide and the **Minibeast Wallchart** may be used to look at habitat and adaptation in more detail.

Recording results

Children can record their results at the bottom of **Discovery sheet 2c** and on **Discovery sheet 2d**. **Discovery sheet 2d** allows the children to track the routes taken by the minibeast(s) to and from one or more habitats by colouring in the appropriate footsteps. They might also use arrows to indicate the direction of movement. They should draw or write about their findings inside the four habitat circles. When the children have completed **Discovery sheet 2d**, it can be attached to the inside of the bug box lid. This provides an attractive and informative inlay.

After observation

It is useful to remind the children that animals taken from their natural habitat for study should be returned to the place where they were collected as soon as possible.



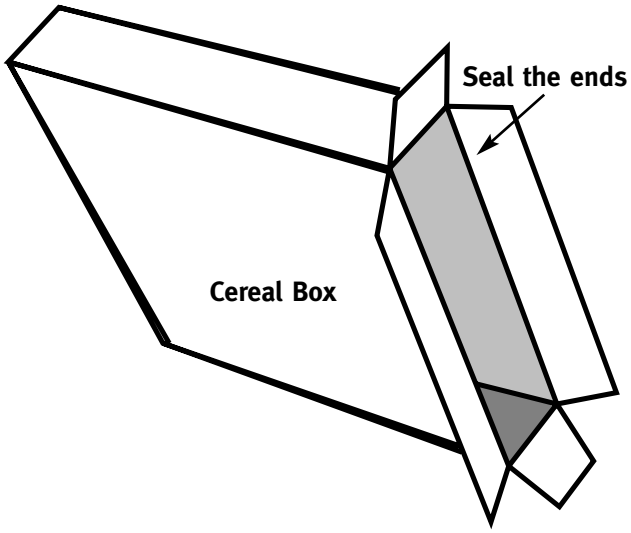
Invertebrate	Natural habitat	Box choice
Woodlice	Woodlice prefer moist (but not wet) sheltered habitats. These include; damp bark and leaf litter (also a source of food for many woodlice) and on occasion, damp cracks in soil.	Damp bark fragments or damp, decaying leaves.
Snails	Land snails prefer moist (but not wet) habitats. They live and feed amongst leaves and other foliage. Many species hibernate during the winter months, choosing dry sheltered places.	Fresh leaves and other foliage.
Beetles	There are many different species of beetle. Some species are carnivores (meat eating predators) some are herbivores (plant eaters). Because their hard exoskeleton affords protection from desiccation (drying out of the body) they can live in dry areas as well as damp areas. Generally they will seek a habitat that provides a source of food and protection/shelter.	Varied.
Earthworms	Earthworms prefer moist soil. They feed on leaf litter and plant fragments in the soil itself.	Soil or sand.

“There’s no place like home!”

Instruction sheet

To make your bug box you will need:

- 1 medium sized cereal box
- 1 large round plastic tub
- 5 small square plastic tubs -they must all be the same size
- Glue
- Sticky tape
- Scissors
- One ‘minibeast’
- Discovery sheets 2c and 2d



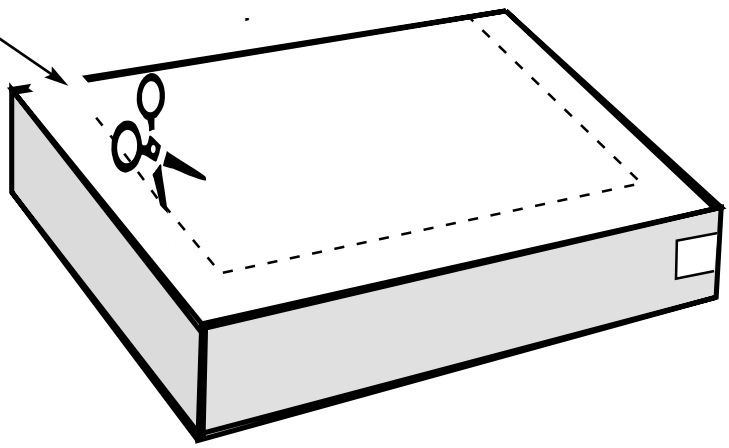
Habitats

- A handful of pebbles or small stones
- A handful of fresh (damp) leaves and bark
- Two more habitats of your own choice

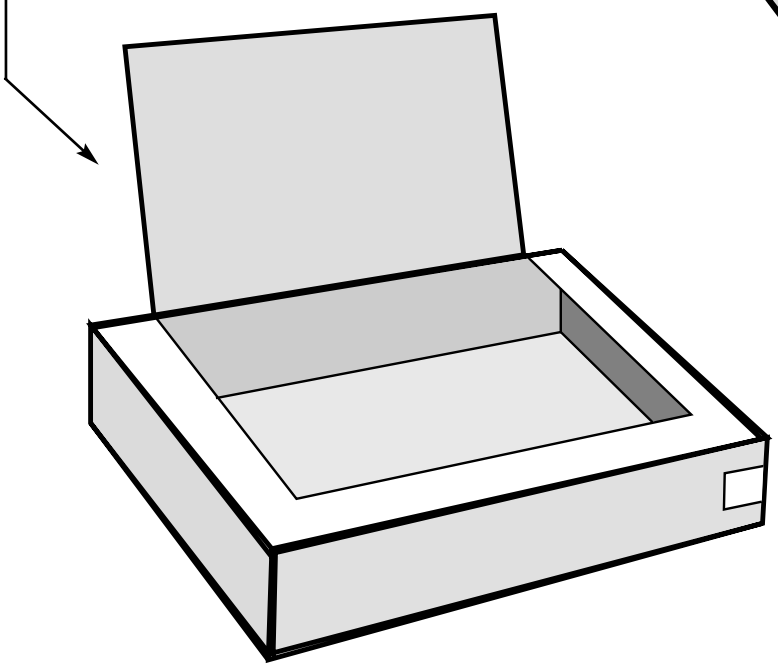
How to make your bug box

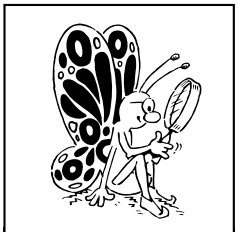
Use some sticky tape to stick the open ends of your empty cereal box together.

Cut a flap from the box as shown.
If you are using a craft knife, ask an adult to help you.



You should now have a lid like this which is still attached to your box on one side. Now you are ready to make your home.





"There's no place like home!"

Instruction sheet

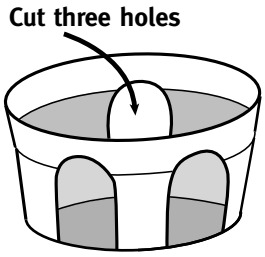
Take the large round plastic tub (e.g. a margarine tub) and cut three holes as shown.
Then cut away one quarter of each of the four small plastic tubs and throw away this portion. **Don't cut the fifth tub**. You will use this as a scoop to measure your leaves, or pebbles, or your own choice of habitat.

When you have finished cutting your tubs, glue one small tub into each corner of your box and glue the large tub into the middle of the box. **Leave the box to dry.**

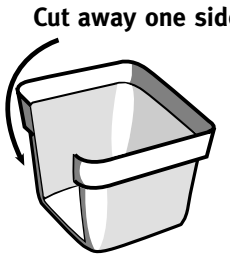
When you are ready to use your bug box, put a different kind of habitat in each of the corner tubs, using your fifth tub as a measuring scoop.

Collect one minibeast from your teacher and place it in the large tub in the centre of your bug box and watch carefully. Use Discovery sheet 2d to record what happens.

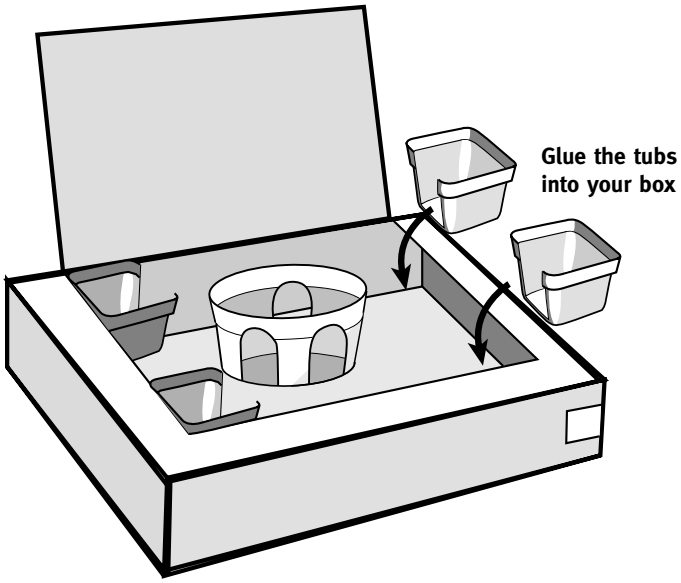
Remember you should always return your minibeasts to the place where you found them when you have finished your observations.

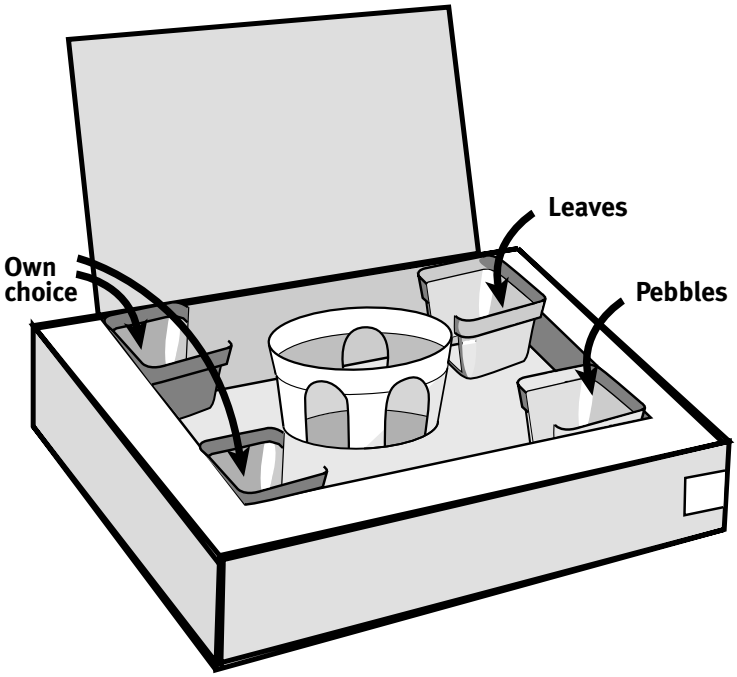


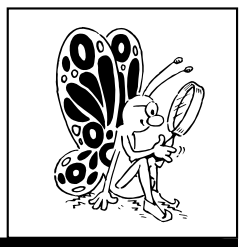
Large round tub



Small plastic tub x4







"There's no place like home!"

Recording Sheet 1

The minibeast(s) we will use: _____

The habitats we will use:

Habitat 1 _____ because _____

Habitat 2 _____ because _____

Habitat 3 _____ because _____

Habitat 4 _____ because _____

How we will keep our experiment fair:

This is our prediction: We think that the _____

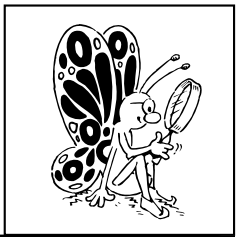
will choose habitat(s) _____

for their home because _____

Our Results

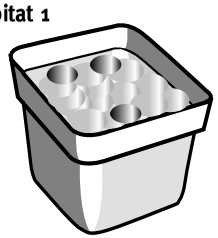
We found out:

We think this happened because:



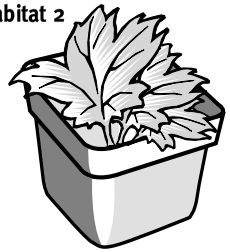
“There’s no place like home!”

Habitat 1



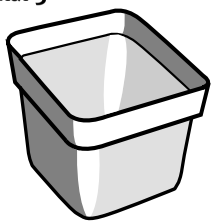
Stones

Habitat 2



Leaves

Habitat 3



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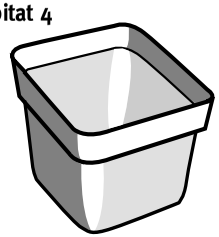
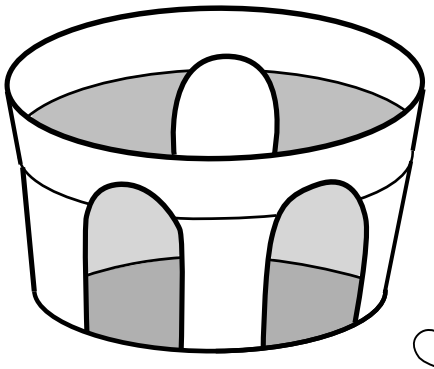
Own choice

Habitat 4



_____

Own choice

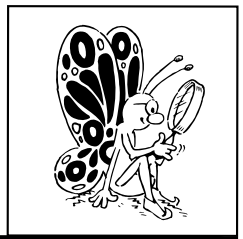


Habitat 1

Habitat 2

Habitat 3

Habitat 4



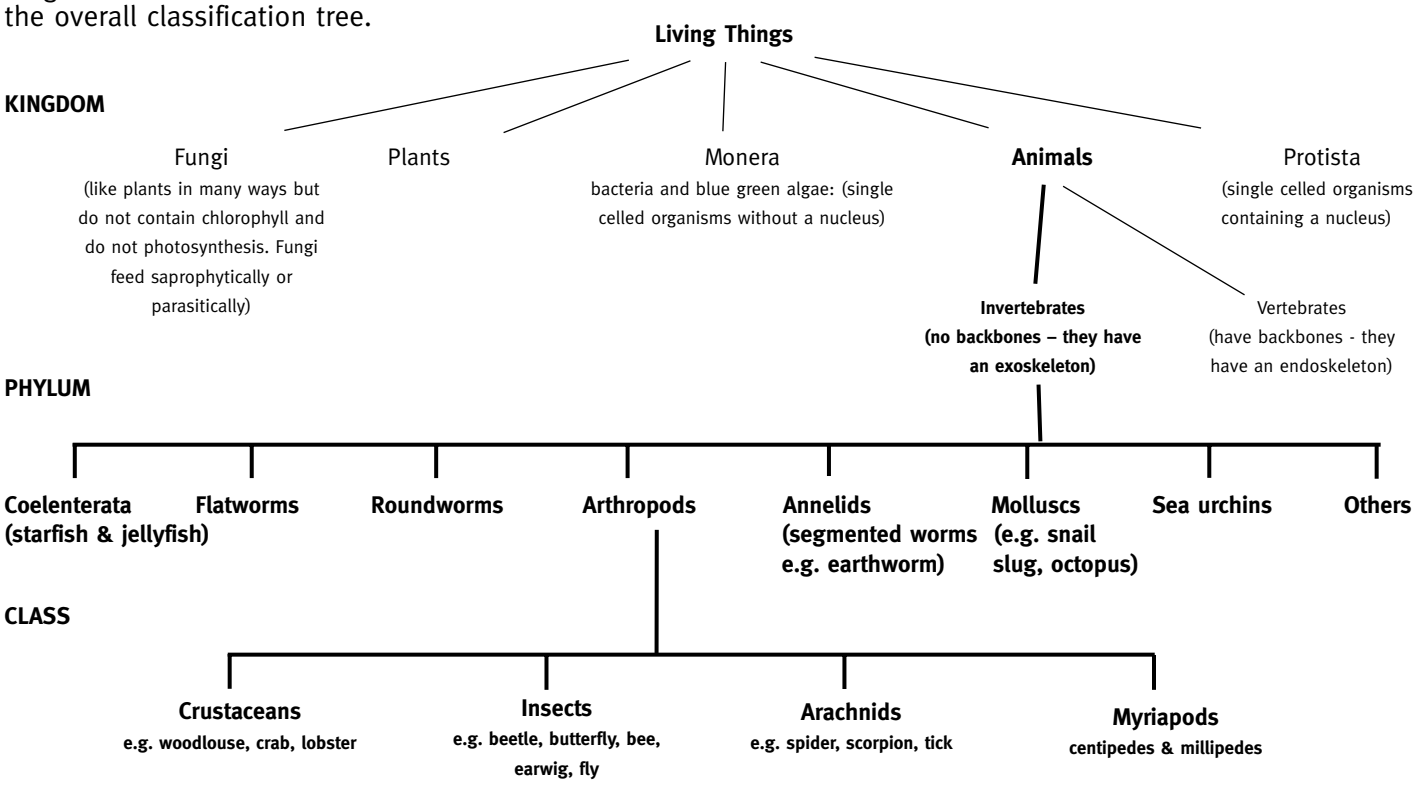
3

Discovery Card

Classification

Teacher Information

There are millions of different kinds of plants and animals in the world. Each different kind of plant and animal is called a **species**. We can group species together according to certain characteristics. The diagram below shows how the invertebrates fit into the overall classification tree.



Classification terms

The largest groups are known as **phyla**. The organisms in each phylum have a body structure which is radically different from organisms in any other phylum. Organisms in each phylum can be subdivided into **classes**. Organisms in the same class share several common features.

A class can be further subdivided into **orders**, orders into **families**, families into **genera** and finally genera into **species**.

A general rule of thumb is that organisms of the same species can interbreed successfully whereas organisms from the same genus but of different species, like the Brown Bear and the Polar Bear cannot interbreed.

Naming a species

Every organism is given a scientific name according to an internationally agreed system. The name is always in Latin and is either underlined or written in italics. It is in two parts. The first name indicates the genus and starts with a capital letter, the second is the species and starts with a lower case letter. An example of classification is given below.

The large white butterfly -
scientific name: **Pieris brassicae**
Kingdom: Animal
Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Pieridae
Genus: **Pieris**
Species: **brassicae**

Classification

- **Using the Classification Cards (suitable for 5 - 12 year olds)**

There are six **Classification Cards** in this pack which can be used as a source of information and/or as the basis for different types of displays. You may want to cover these cards with sticky back plastic to extend their shelf life.

- **Using the Bug Dials (suitable for 7 - 12 year olds)**

There are two Bug Dial templates. The **More about me** Bug Dial can be used to find out more about several common invertebrates. The **What group?** Bug Dial can be used as an aid to classification of specific invertebrates and to explore the characteristics common to each phylum or class.
Both Bug Dials are assembled in the same way. The templates should be photocopied **preferably to A3 size** and given to the children who then cut out the dials using the dotted lines as a guide. In each case dial B fits on top of dial A and needs to be fixed in place with a paper fastener. Both dials may be backed onto card and could be fixed together - the **More about me** dial on one side and the **What group?** dial on the other.

The Alive or has never been alive? activity (suitable for 5 - 7 year olds)

You may like to introduce younger children to classification using the simple grouping exercise **Alive or has never been alive?** with the help of Discovery sheets 3a and 3b. These sheets can be used in a variety of ways:

- Using the **Alive or has never been alive?** Discovery sheet 3c as a basis for their work, each child can colour, cut out and stick the pictures into either the 'Alive' or 'Has never been alive' boxes on Discovery sheet 3a. As an extension to this activity, the children might draw in some of their own choices.
- For a more guided approach, Discovery sheet 3b can be used as the basis for a cut, paste and record activity.
- The diagrams on Discovery sheet 3c can be cut out and used like playing cards during a group discussion.

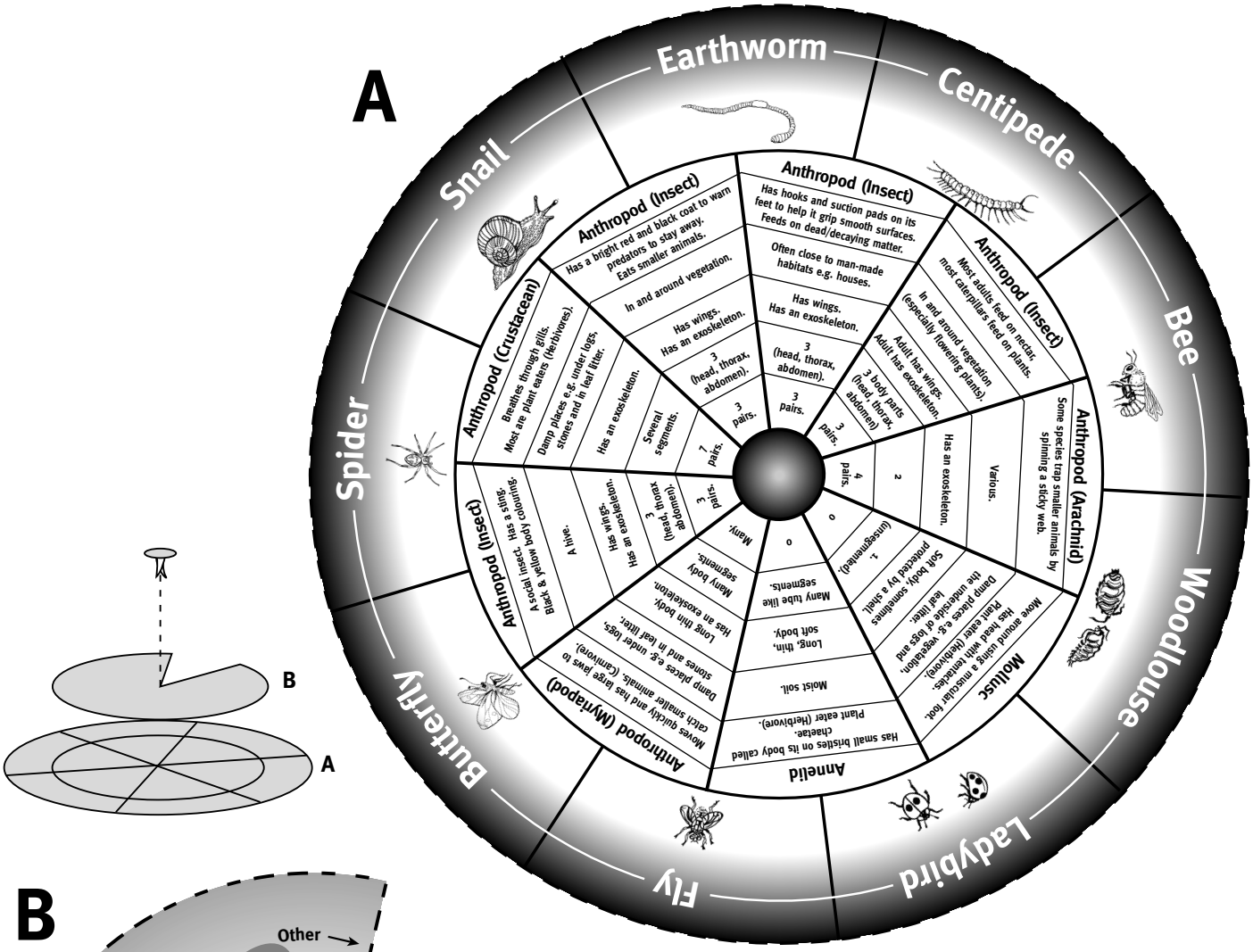
Whichever approach is used, you should ask the children to consider the following criteria when making their choices:

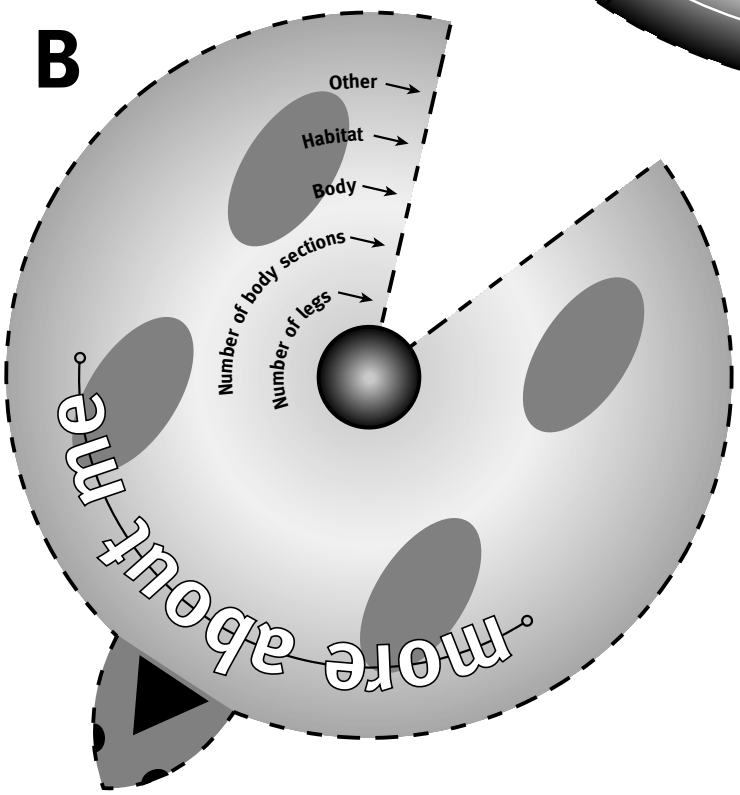
Does it move?
Can it be a parent?
Does it breathe?
Can it grow?
Does it need food?
Can it be eaten by another living thing?
Can it feel things?

Extension (suitable for 5 - 7 year olds)

As an extension activity, children might be encouraged to collect their own examples of things which are 'alive' or 'have never been alive', during a nature walk or scavenger hunt and use their findings to create a display.

More about me, bug dial



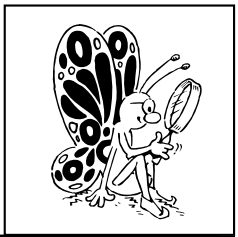


What to do

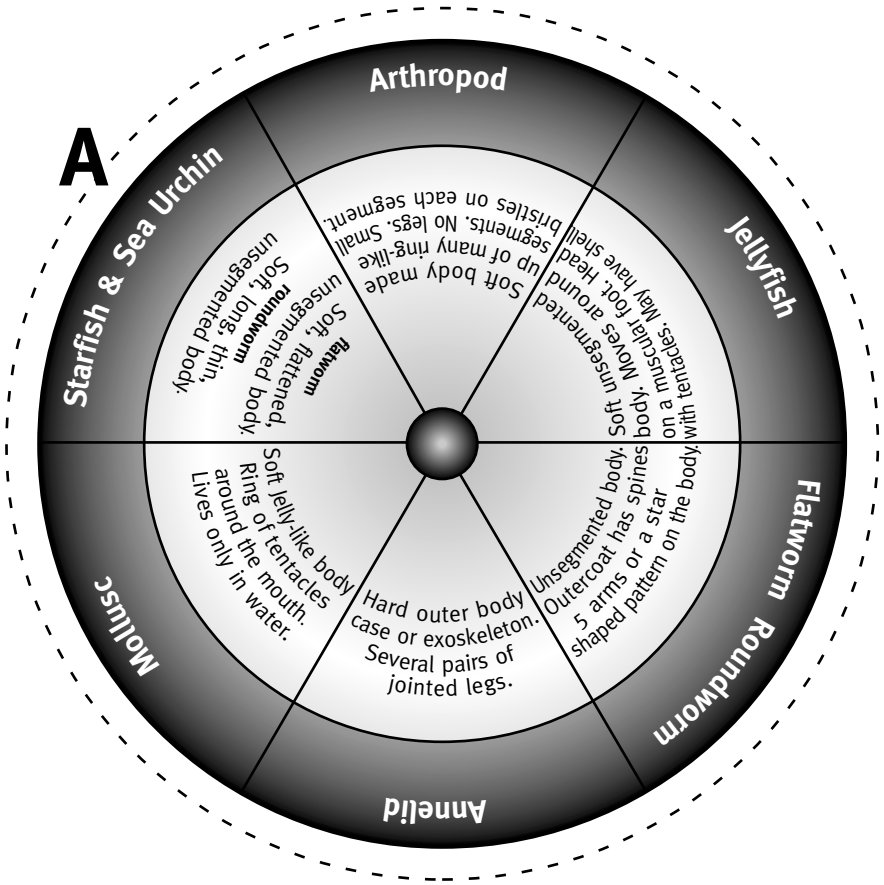
- Carefully cut around each dotted line
- Put circle B on top of circle A
- Fix it into place with a paper fastener

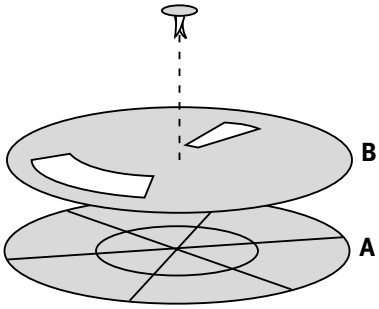
To use this bug dial

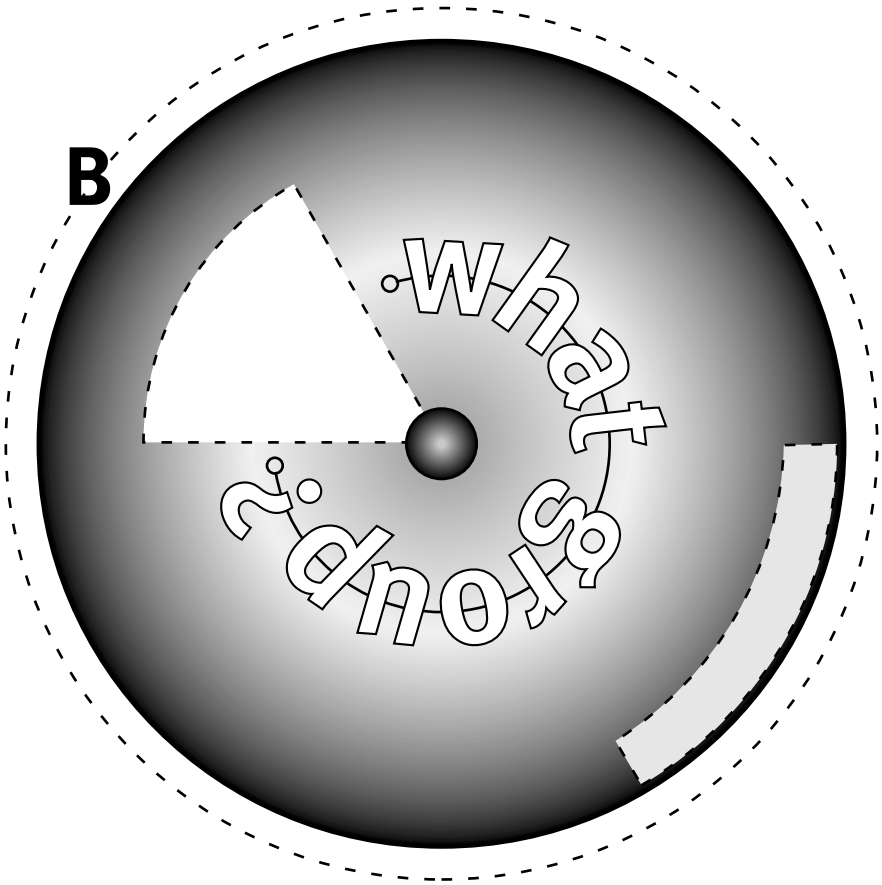
Line up the arrow on the ladybird's head with the picture of minibeast that you want to find out more about and read off information in the triangle.



What group? bug dial







What to do

Carefully cut around each dotted line.
Put circle B on top of circle A.
Fix it into place with a paper fastener.

To use this bug dial

- Look at the minibeast you are studying carefully and write down its main features. For instance:
  How many legs does it have?
  Does it have a hard or soft body?
  Has it got wings?
- When you have made a list, turn the dial until you find the triangle of information which is **most like the list you have made**. Now look at the box opposite which will tell you which group your minibeast belongs to.

Alive or has never been alive?

Name: _____

Decide which pictures on sheet 3c show things that are **alive** and which show things that **have never been alive**. Cut out each picture and stick it into the correct box on this page.

Alive

I think these things are **alive** because:

Has never been alive

I think these things **have never been alive because:**

Alive or has never been alive?

Name: _____

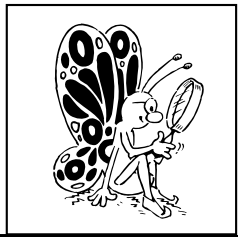
Decide which pictures on sheet 3c show things that are **alive** and which show things that **have never been alive.** Cut out each picture and stick it into the correct box on this page.

Alive

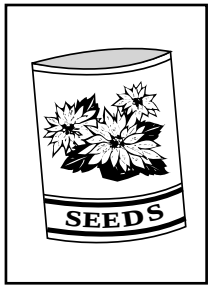
I think these things are **alive** because:

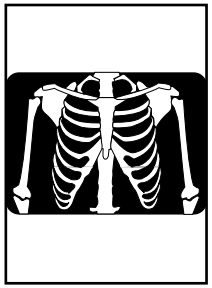
Has never been alive

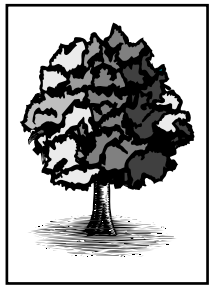
I think these things **have never been alive** because:

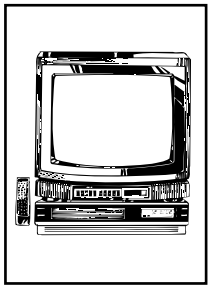


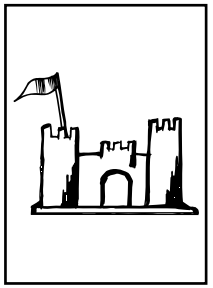
Alive or has never been alive?

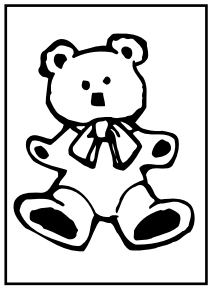


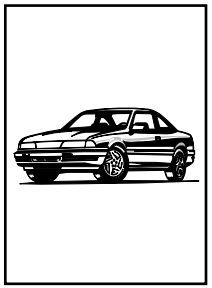


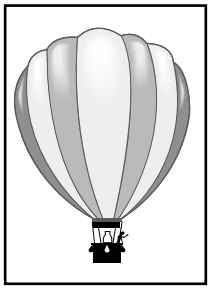


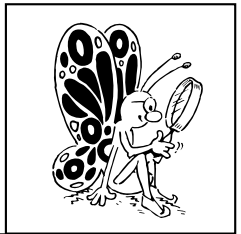










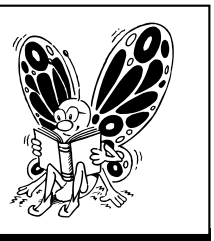


4

Discovery Card

My insect

Time: 2 hours



Teacher Information

My insect
(suitable for 5 - 7 and 7 - 12 year olds)

Children use information gathered from a variety of sources to design and make their own insect. This discovery exercise also enables children to investigate insect structure and reinforces classification points.

Ask the children to bring in a selection of suitable materials from home. These should include:

- Pieces of sponge
- Cardboard tubes or cones
- Thin card
- Paper scraps
- Polystyrene
- Tissue paper
- Straws
- Pipe cleaners

To get the most out of this activity children need to be aware of the main characteristics of an insect.

Insects belong to the phylum **Arthropoda.**

All adult insects have:
- an exoskeleton
- three clearly defined parts to their body: the head, thorax and abdomen
- three pairs of jointed legs
- trachea (strengthened tubes through which air passes to and from the insect's muscles).

Most insects have:
- one pair of antennae
- compound eyes
- one or two pairs of wings. Sometimes, when an insect has two pairs of wings, one of the pairs is small and highly adapted.
- many adult insects have jaws which move from side to side - unlike the human jaw which moves up and down.

5 - 7 years
After discussing the main characteristics of insects using the classification information above (and Classification Card 5), children should be encouraged to design their own insect (real or imaginary) using a selection of materials and comment on the outcome of their work. Discovery sheet 4b could be used as a design sheet.

7 -12 years
Children should look for close up photographs, drawings or diagrams of insects. They might use Classification Card 5 and they should also be encouraged to search for information in the school library. **Note:** some species of butterfly appear to have only two pairs of legs because their first pair is greatly reduced.

Before the children design their own insect, ask them to write down the features which are important to insects. They might complete and refer to Discovery sheet 4a - the **Insect analysis table** or construct a table of their own. This activity will reinforce the teaching focus that:

i) all adult insects have certain characteristics in common (three parts to their body; three pairs of jointed legs etc) and;

ii) all insects have special adaptions (such as a body colouring which acts as a camouflage) to help them live succesfully in their particular habitat.

It will also act as a useful guide for the children when they are considering their own design features and completing their design proposal (Discovery sheet 4b or 4c).

When Discovery sheets 4a and 4b or 4c have been completed, the children can make their insect.

Other activities (suitable for 5 - 7 year olds)

The dot-to-dot butterfly
For a short introductory or reinforcement activity you might ask the children to complete Discovery sheet 4d - the dot-to-dot butterfly, labelling the main parts of the insect by selecting from the words given at the bottom of the page. As an extension to this activity, the children could draw patterns on the wings of their butterfly picture.

The ladybird puzzle
This extension exercise (Discovery sheet 4e) includes some maths work. Children decide which colour to use by following the guidelines below:

All answers which total:	**Colour in:**
8 (e.g. 4 + 4 or 10 - 2)	Red
6	Black
5	Green

Insect analysis

Name: _____

	Butterfly	Ladybird	Housefly	Aphid
Body				
Legs				
Wings				
Colourings and markings				
Feeding (how the insect feeds and what it feeds on)				
Other information				

My Insect

Name _____

My insect is called: _____

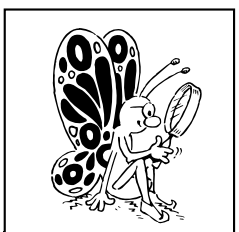
Facts about my insect:

Its body:

Its legs:

My insect's special feature is:

How this helps my insect:



My Insect

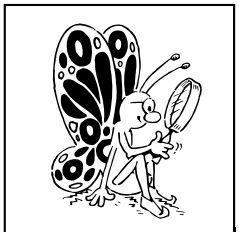
Name _____

My insect is called: _____

My insect has a _____ body

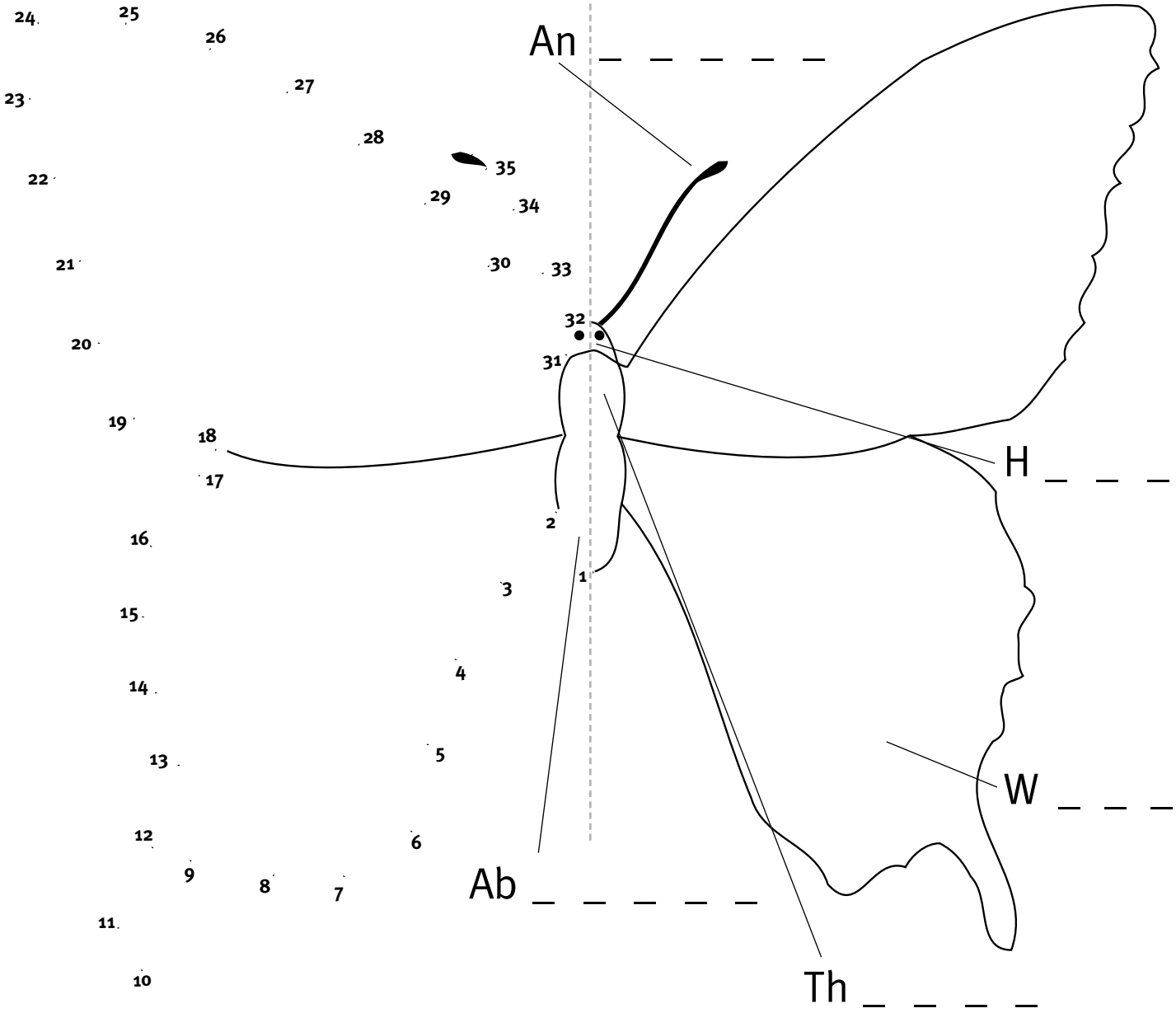
My insect has _____ pairs of legs

My insect has _____ pairs of wings



The dot-to-dot butterfly

Name _____



Join the dots to complete the butterfly, then label your butterfly choosing from the words below.

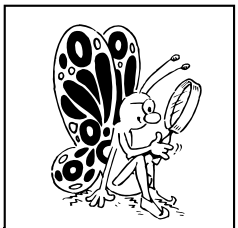
Abdomen

Head

Wing

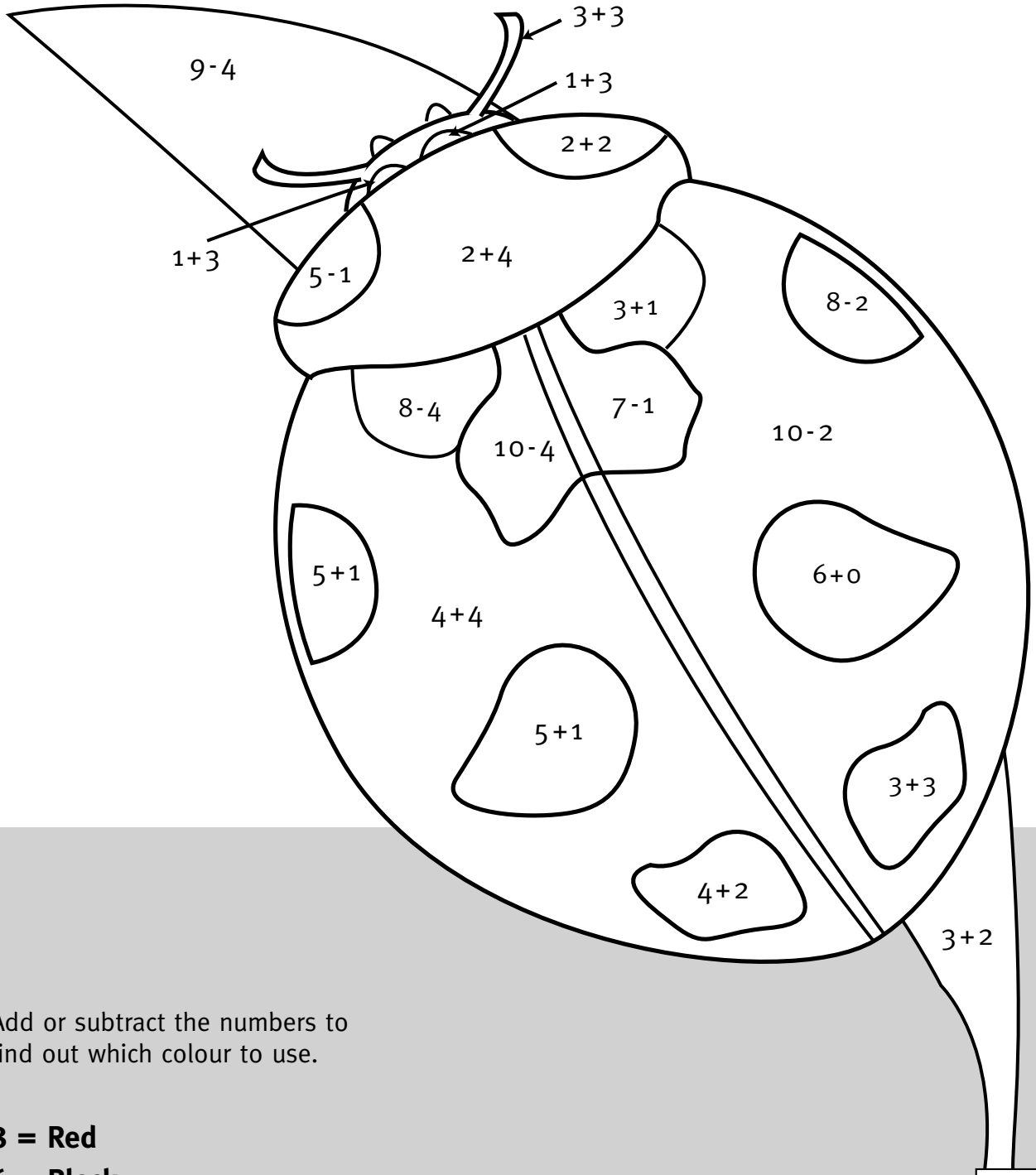
Antenna

Thorax



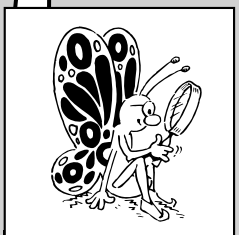
The Ladybird puzzle

Name _____



Add or subtract the numbers to find out which colour to use.

8 = Red
6 = Black
5 = Green
4 = White



5

Discovery Card

Food chains and webs

Teacher Information

Food chains and webs
(suitable for 7 - 12 year olds)

Using this Discovery card, children can learn about feeding relationships.

You might like to begin by exploring the relationships in a simple food chain.

Here are some key points to help you:

- Green plants get their energy from the sun. They can change light energy into chemical energy in food. They are known as the **primary producers**.
- Animals which eat only plants are called **herbivores**.
- Animals which eat only meat are called **carnivores.**
- Some animals eat both meat and plants. They are called **omnivores**.

A food chain indicates **what feeds on what**, it also shows how energy flows from one living thing to another. A chain will always start with a plant (a primary producer).
In any habitat, lots of different food chains will be present and many will be interlinked forming food webs. An example of some of the links in a **woodland habitat** food web is given below.

Using the Discovery sheets

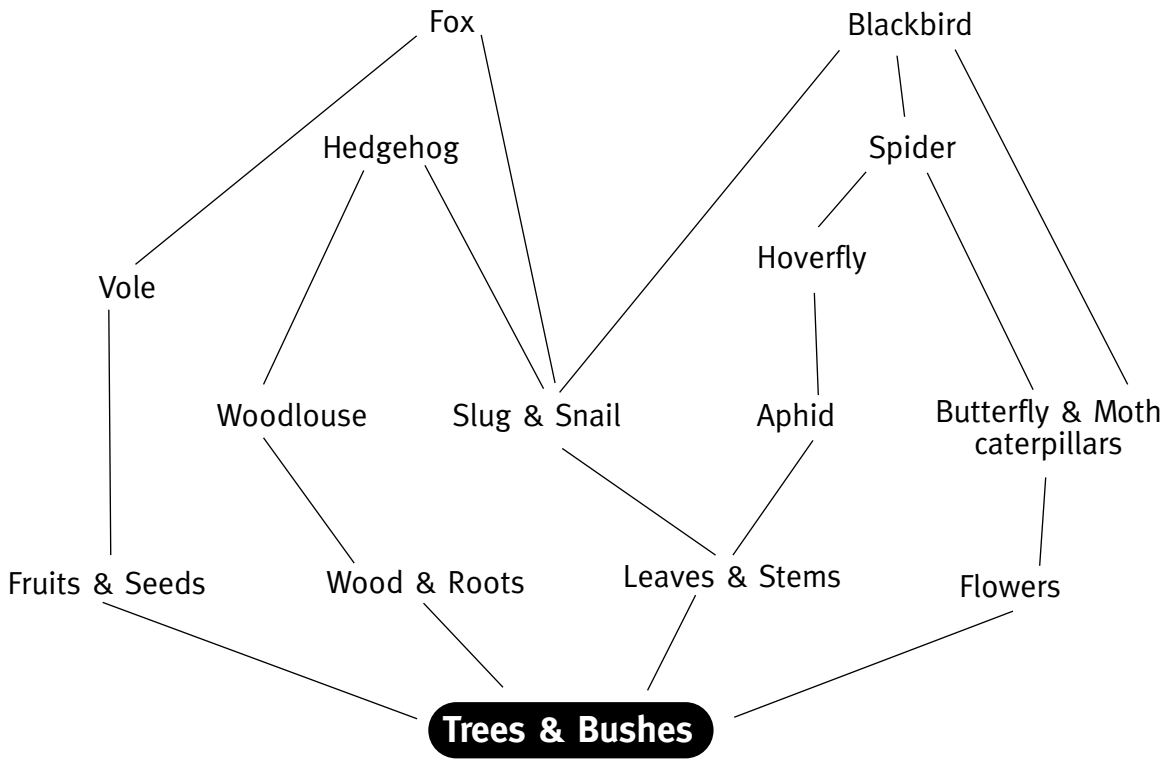
- Discovery sheet 5a **Who eats what?** asks the children to fill in the gaps in two food chains, drawing and labeling their animals. The missing link in chain A could be a snail or a caterpillar.
  The missing link in chain B could be a spider.
- Discovery sheet 5b **Complete the web** asks children to make decisions about what eats what and to draw in the missing lines.
- Alternatively children can colour and cut out some of the illustrations from the Discovery sheet 5c **Making a mobile** and use them to construct their own food chain mobile.

For this activity you will need;

- scissors
- colouring pencils
- sticky tape
- pipe cleaners or straws
- string
- a photocopy of the pictures/boxes on sheet 5c (x2)

As an **extension** to this activity, children may add their own choices to their mobile and/or construct a staggered mobile.

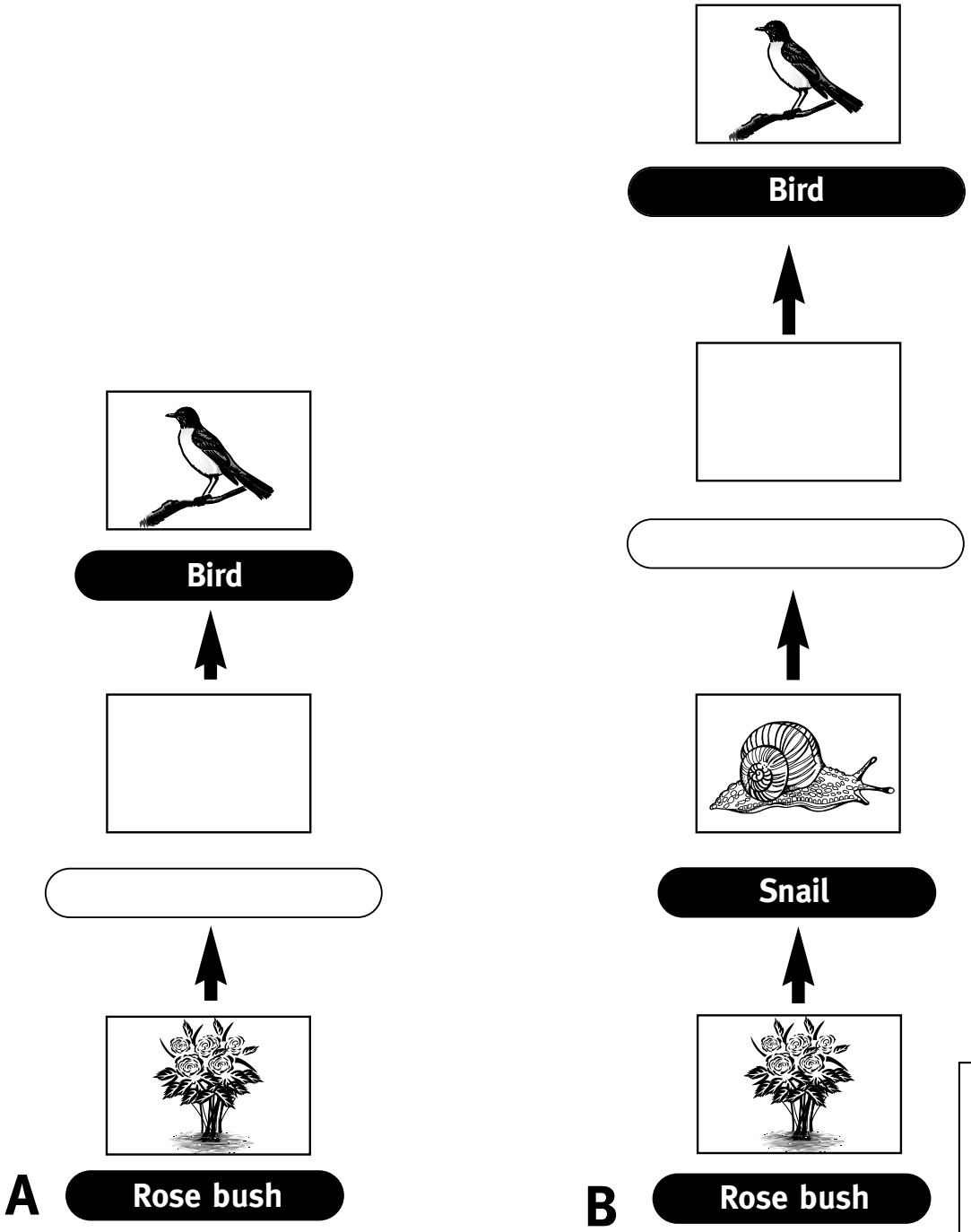
A Woodland Habitat Food Web



Who eats what?

Name: _____

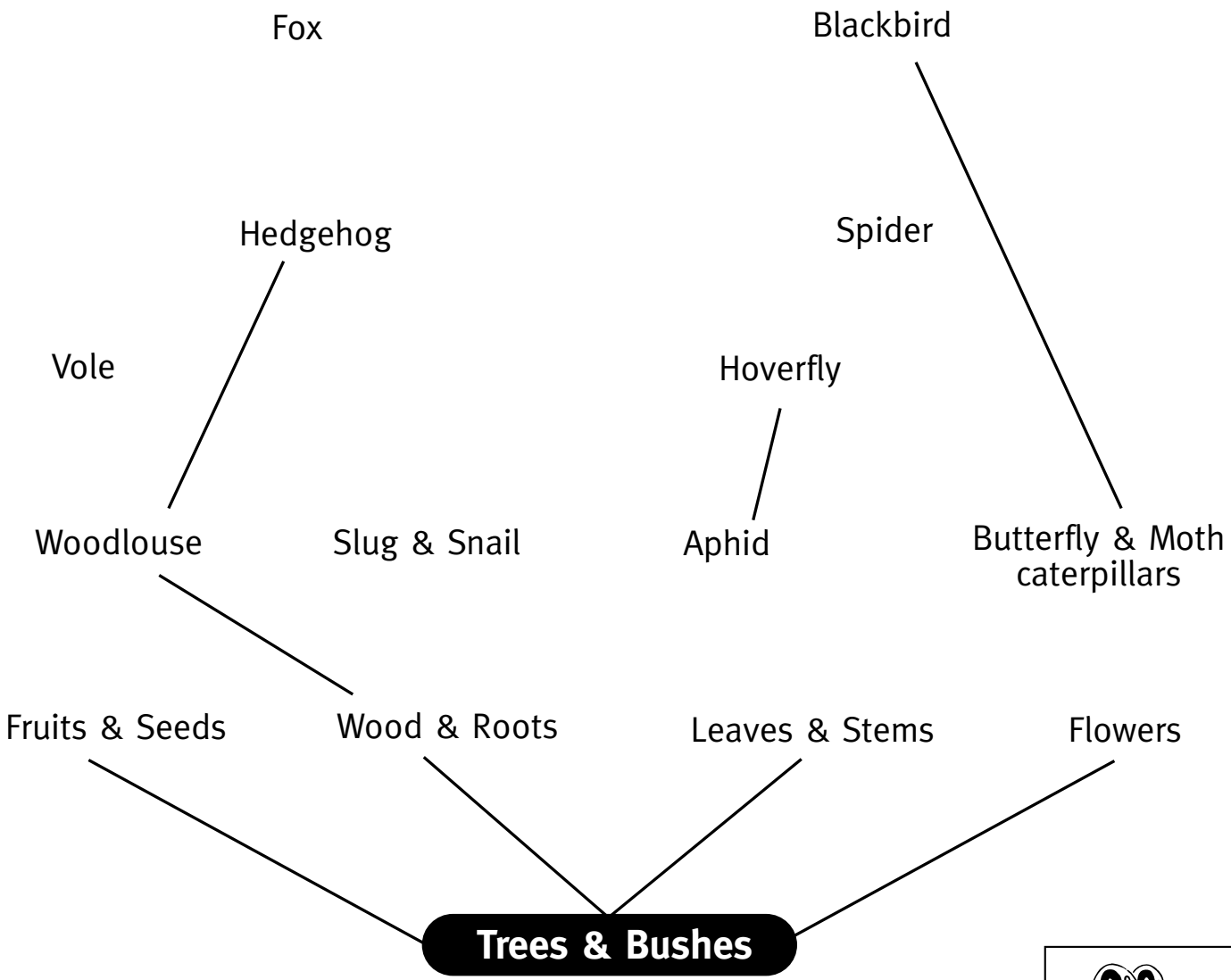
Which animals are missing from these food chains? Draw a picture of the animal in each box and label it.

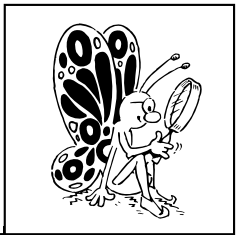


Complete the web

Name: _____

Complete this woodland habitat food web. Some of the links have been drawn in already. Can you add the rest? Try adding some of your own choices and linking them to the rest of the food web.

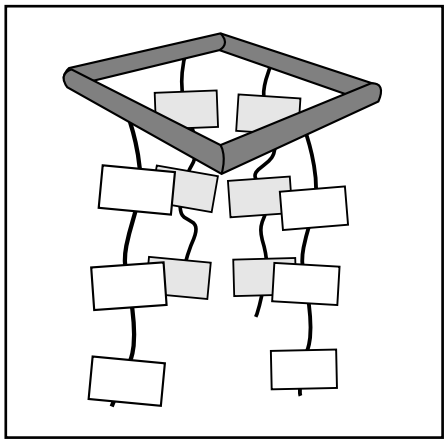




Making a mobile

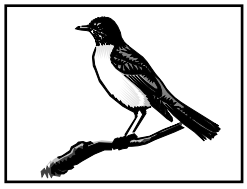
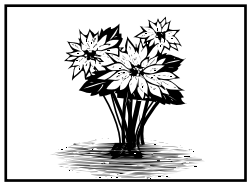
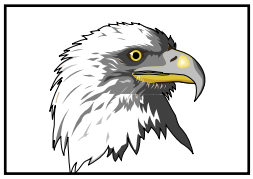
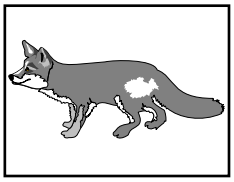
You will need

- scissors
- colouring pencils
- sticky tape
- pipe cleaners or straw
- string
- a photocopy of the pictures/boxes on this sheet (x2) to stick back to back on the strings.

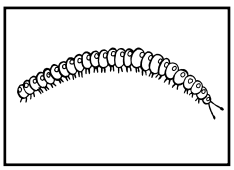
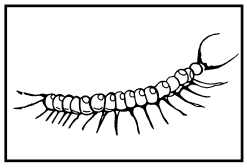
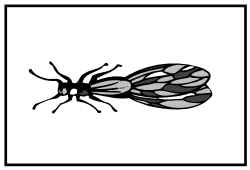
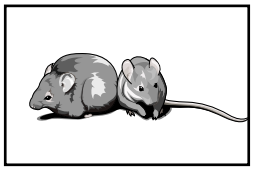
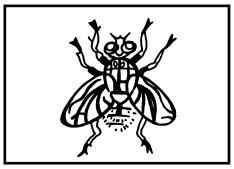
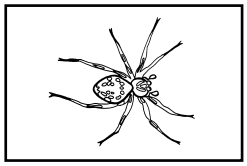
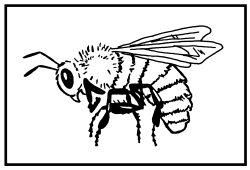
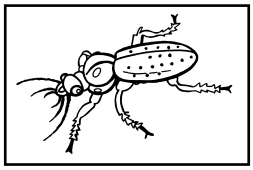
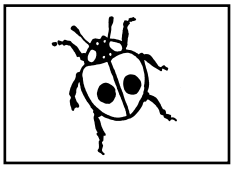
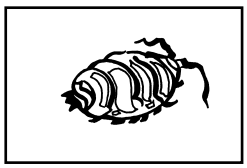
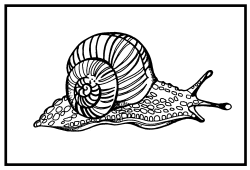
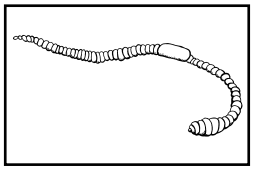
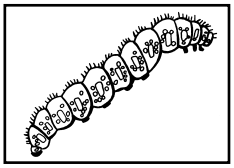


What to do

Look at the pictures on this sheet. Decide who eats what and then cut out a selection of the pictures to make your mobile. You could also draw some animals and plants of your own and add these to your mobile. Stick your pictures back to back on your string to form a food chain. Remember each chain must start with a plant. Plants are primary producers.
When you have made several food chains, hang them from a square frame made of straws or pipe cleaners.



6

Discovery Card

Looking at life cycles

Teacher Information

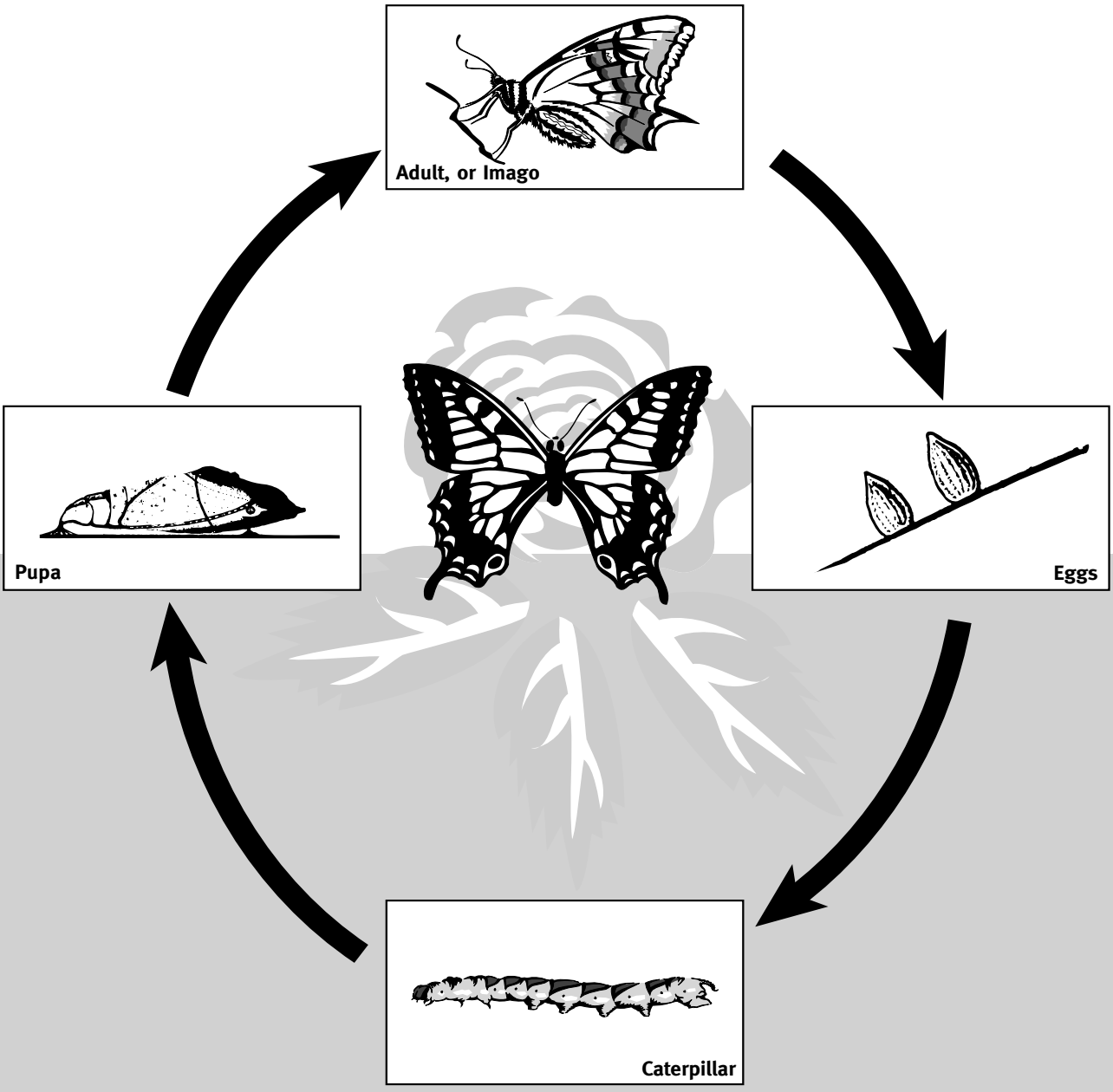
Looking at life cycles

Using a selection of the Discovery cards in this section, children can learn more about insect lifecycles and how to sequence the lifestages of a butterfly correctly. They can also explore metamorphosis.

Butterflies and moths don't begin life as flying insects. They start out as caterpillars, and, as they grow up, their bodies go through a complete change, known as **complete metamorphosis**.

The life cycle of a butterfly has four separate stages:

- First, the adults lay **eggs** on leaves.
- When an egg hatches, a **caterpillar** comes out. The caterpillar feeds on leaves and grows until it is ready to turn into a **pupa**. The pupa of a butterfly is often called a **chrysalis**.
- The body of the butterfly then develops inside the pupa.
- When at last an **adult butterfly** emerges, it flies off to look for a mate, and the cycle starts all over again.



Looking at life cycles

For comparison the life cycle of a locust is shown below. The locust life cycle is an example of **incomplete metamorphosis.**

Possible activities

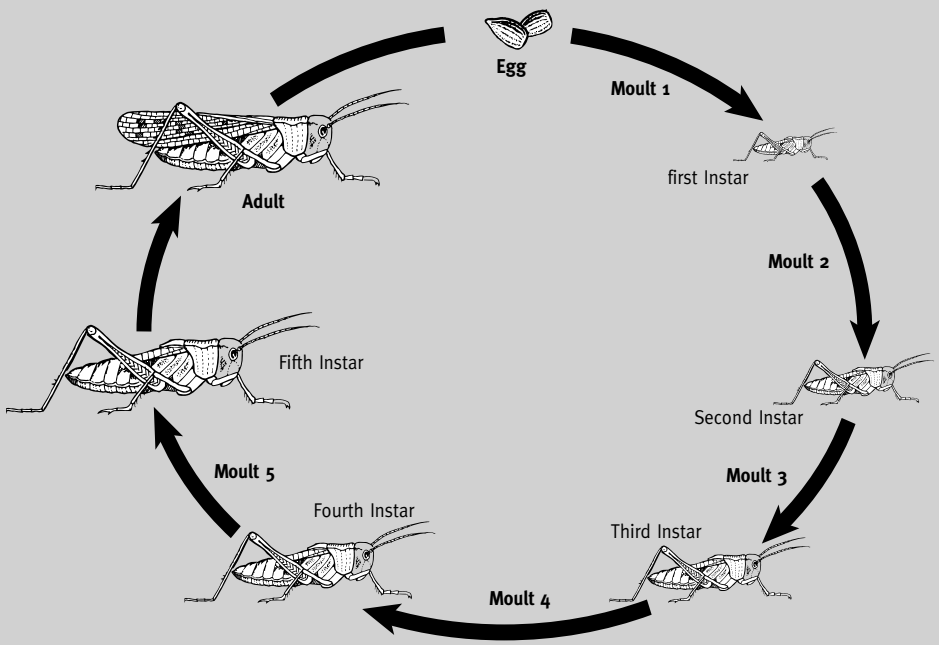
- Using **Discovery sheet 6a** - **the life stages of a butterfly**, children can cut out and sequence the life stage illustrations and stick them into the correct boxes **or** they might draw their own pictures of each life stage in the boxes (**suitable for 5 - 7 year olds**).
- Using **Discovery sheet 6b** - **the lifecycle of a butterfly** children can draw in the butterfly lifecycle and label their diagram (**suitable for 7 - 12 year olds**).
- Using **Discovery sheet 6c** - **lifecycles** children can identify the correct lifecycle sequence and complete two different lifecycles (**suitable for 7 - 12 year olds**).

Extension activities

1. Select two invertebrates and discuss with the children how each is adapted to its habitat and its way of life. You might try brainstorming as a whole class exercise to generate ideas. You might also use the Minibeast Wallchart and fact file as a basis for discussion (**suitable for 5 - 7 year olds**).

2. Give the children an open-ended problem-solving task (**suitable for 11 - 12 year olds**). For example you might set the following scene: a group of explorers have just come back from the Amazon rainforest. They claim that while they were there they discovered a giant leaf-eating beetle. They say that this amazing insect was **100** times bigger than an average beetle. Do you think they are telling the truth? Could a beetle of this size really exist somewhere on earth?
In order to answer this question, children will have to find out all they can about beetles, their body structure, diet and habitat. They will also have to consider size and volume.

Note: The exoskeleton is a very efficient means of support for a small organism. But as arthropods become larger, their volume and body mass increase in proportion to the cube of their linear dimensions. This means that the exoskeleton must become very much heavier and thicker inorder to remain effective. There is no solution to this mechanical problem and it limits the size of **terrestrial** arthropods to around 10 -15 cm in any direction. Aquatic arthropods like the Japanese Spider Crab get support from the water around them and so they can be bigger than terrestrial arthropods. The heaviest insects in the world are goliath beetles. They can weigh up to 100 g and reach the size of a tennis ball.



Locusts develop their adult form gradually, without any sudden change in body shape. This is called incomplete metamorphosis.

Locusts lay eggs in damp, warm soil or sand. After around 10 days young locusts, called nymphs, emerge. These nymphs have large heads. They do not have wings, only wing buds but otherwise they look like smaller versions of the adult.

As the nymphs grow, they shed their skins or moult. After the fifth moult they are mature adults with fully formed wings and sexual organs.

6

Discovery Card

The life stages of a butterfly

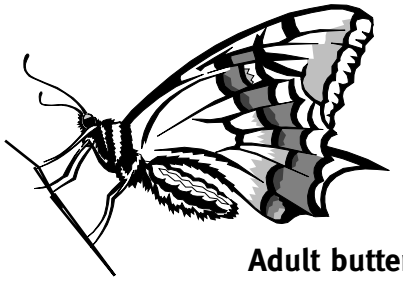
Teacher Information

Name: _____

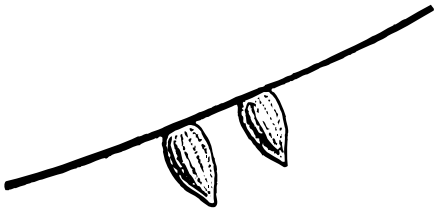
Put the pictures below in the correct order

Caterpillar

Pupa



Adult butterfly



Egg

The correct order of the life stages of a butterfly is:

1

2

3

4

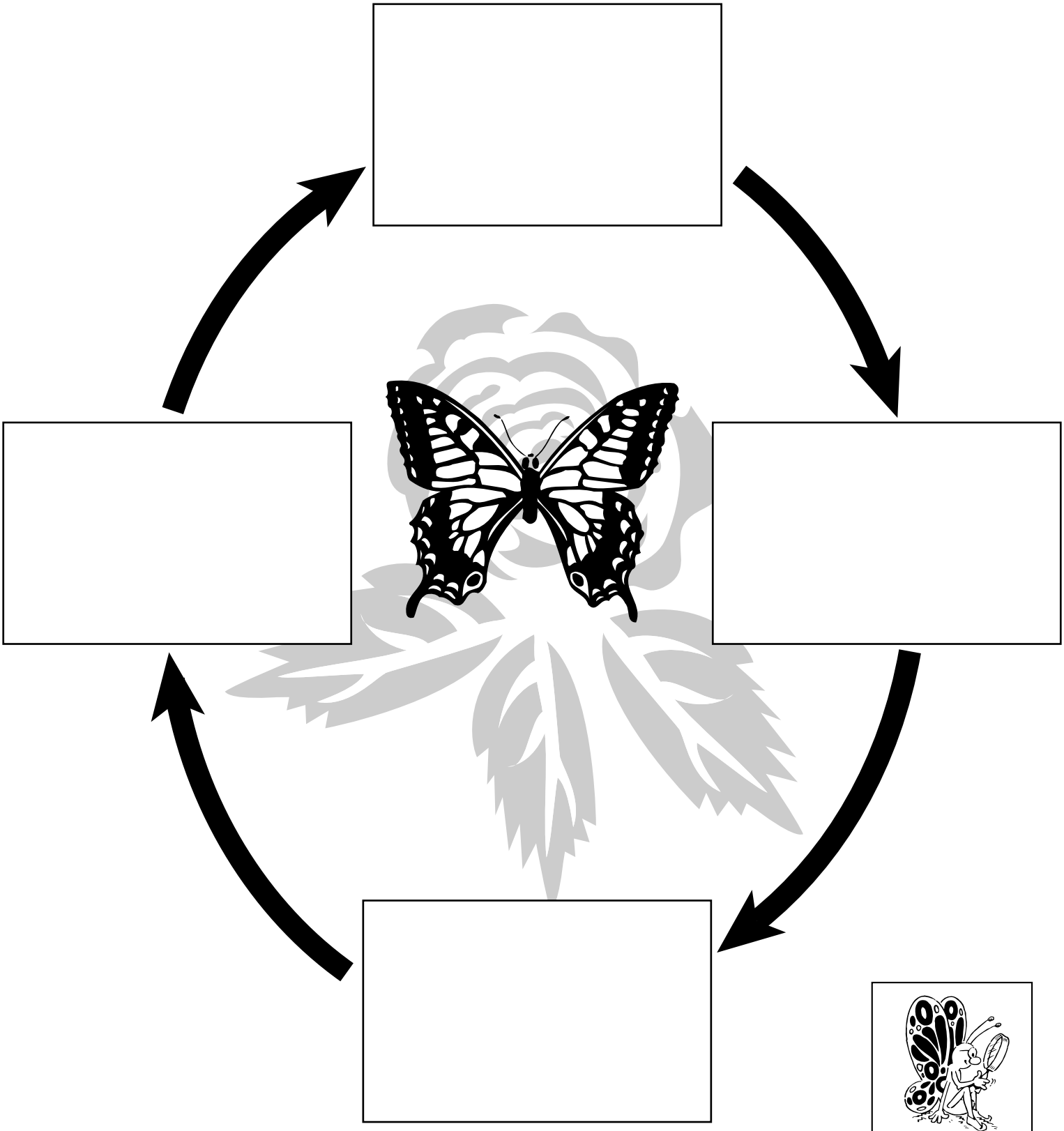
6

Discovery Card

The life cycle of a butterfly

Teacher Information

Name: _____



Life cycles

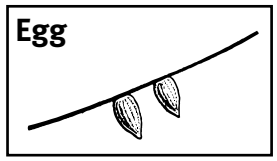
Name: _____

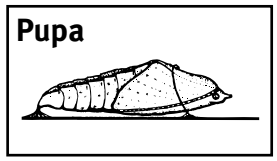
The butterfly changes through <u>complete metamorphosis.</u>
Which sentence is correct?

	Yes	No
butterfly → egg → caterpillar → pupa		
egg → caterpillar → pupa → butterfly		
caterpillar → egg → butterfly → pupa		
pupa → butterfly → caterpillar → egg		

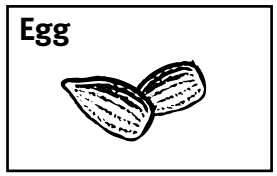
Complete the life cycles below:

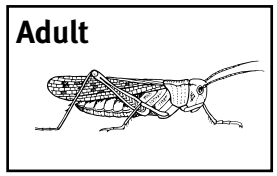
The butterfly





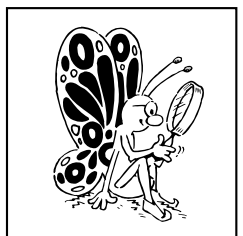
The locust





glossary

Abdomen	The rear section of an insect's body. It contains the heart, the stomach and the reproductive organs.
Antennae	An insect's two feelers, used mainly for smelling and touching. They are attached to the insect's head.
Carnivore	A meat eating animal.
Entomologist	A scientist who has a special interest in insects.
Exoskeleton	The insect's skeleton, which is on the outside of the body (unlike a human skeleton, which is underneath the skin and muscle). The exoskeleton gives the insect extra protection, just like a suit of armour.
Habitat	An insect's natural home. An insect's habitat may be under stones, on certain leaves, or inside the bark of trees.
Herbivore	A plant eating animal.
Incomplete metamorphosis	As some insects grow and develop, their bodies change gradually during several moulting sessions until the fully formed adult emerges.
Metamorphosis	As some insects grow and develop, their bodies change shape dramatically. These changes are the insect's metamorphosis.
Mandibles	The jaws of an insect, used for biting, grinding and crushing food.
Omnivore	An animal which eats both plants and other animals.
Proboscis	A hollow feeding tube which some insects use to suck up liquid foods.
Pupa	A central stage in the metamorphosis of an insect. The pupa looks like a small sack, and the adult insect develops inside it. The pupa is sometimes referred to as a chrysalis.
Radula	A rasping mouth organ used by Molluscs such as snails.
Social insects	Insects such as wasps, bees and ants that live together in colonies. They share jobs such as rearing the young and obtaining food.
Species	Every different kind of animal is a different species. Over one million species of insect have been recorded by entomologists.
Thorax	The middle section of an insect's body. The insect's legs and wings are joined to the thorax.
Tracheae	Air tubes allowing air to pass to an from an insect's body.



Childrens worksheet

useful addresses

The Amateur Entomologists' Society Bug Club
P.O. Box 8774
London SW7 5ZG

The Natural History Museum
Cromwell Road, South Kensington,
London SW7 5BD

Wildlife Trusts (Junior Branch = Wildlife Watch)
The Green, Witham Park,
Waterside South,
Lincoln LN5 7JR

The WATCH Trust for Environmental Conservation
The Green, Nettleham,
Lincoln LN2 2NR

Phasmid Study Group (stick insects)
c/o Paul Brock, 40 Thorndike Road, Slough,
Berks SL2 1SR

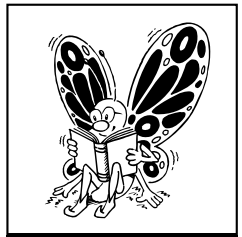
The British Butterfly Conservation Society
Tudor House,
Quorn, near Loughborough,
Leicestershire LE12 8AD

The British Arachnological Society
c/o S.H. Hexter, BAS Membership Treasurer,
71 Havant Road,
London E17 3JE

British Tarantula Society
c/o Mrs Ann Webb, 81 Phillimore Place,
Radlett,
Hertfordshire WD7 8NJ

Mantis Study Group (Praying Mantis)
c/o Paul Taylor, 24 Forge Road,
Shustoke, Coleshill,
Birmingham B46 2AU

Blattodea Culture Group (Cockroaches)
c/o Adrian Durkin, 8 Foley Road, Pedmore,
Stourbridge,
West Midlands DY9 0RT



Teacher information

Reference Books

Collins Pocket Guide to Insects of Britain and Western Europe.
M Chinery.

Collins Field Guide to Spiders of Britain and Northern Europe.
M J Roberts.

The Butterflies of Britain and Ireland. (Dorling Kindersley).
J Thomas & R Lewington.

Collins Field Guide to Caterpillars and Moths in Britain and Northern Europe.
D J Carter & B Hargreaves.

The Encyclopedia of Land Invertebrate Behaviour (Blandford Press).
R & K Preston-Mafham.

Animal Diversity (Chapman and Hall).
D R Kershaw.

Biological Supplies

Blades Biological provide both living and preserved or dried invertebrate specimens and accessories. For their latest catalogue contact:
Mr P Blades or Ms H King
Blades Biological, Cowden, Edenbridge,
Kent TN8 7DXa

Visits

It is worthwhile contacting you local zoo or wildlife centre, many have special invertebrate houses and school visits can sometimes be arranged.
For instance: The Invertebrate House, London Zoo, Regents Park London NW1.