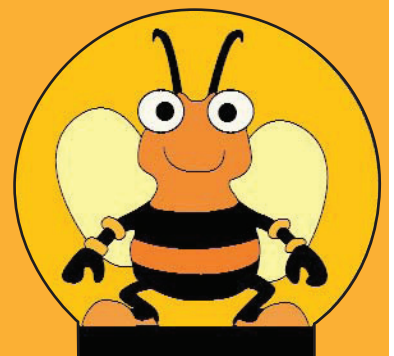


Let's get ready to

Bumble!

A simple, activity-packed
wildlife survey for Key Stage 2 teachers





**This pack was created by Caerphilly County Borough Council's
Countryside and Landscape Services.**



**With thanks to the Bumblebee Conservation Trust
and Cathy Edmunds, Cwmfelinfach School.**



'Let's get ready to Bumble' Pack

The aim of the pack is to give children an exciting, opportunity to help ecologists find out what bumblebees are living in the County Borough in order to help stop the recent decline in their numbers.

Contents

Survey

1 hour simple observing and recording bumblebees found around your school and local area

Bumblebee facts

Activities

Build a Bumblebee
Bumblebee drive
Body part functions
Life cycle role-play
Flower attraction experiment
Bees in my shopping bag
Make a home and garden for bumblebees

Resources

The bumblebee pack has 7 simple and fun activities to help key stage 2 teachers deliver the science curriculum, covering anatomy, life-cycles, and interrelations.

The activities are there for you to use as you choose.

We would really like you to help by carrying out the simple survey (page 6 and 7) and send your survey results to the CCBC ecologists at the address below.

Margaret Iles, Ecologist, Countryside & Landscape Services, Caerphilly County Borough Council Offices, Pontllanfraith NP12 2YW

Background

Bumblebees are gentle, fascinating creatures being quintessential to our summers as they busy themselves pollinating garden flowers. Bumblebees help pollinate our wild flowers too, many of which would be lost without them. Bumblebees are also important

to our food production being vital in the pollination of beans and soft fruit. Over the last 70 years 2 species have become extinct and the numbers of bumblebees has plummeted with another 6 species facing extinction. They need are help!

Bumblebee Facts

1. Bumblebees are furry, as they need to be warm to function. This fur keeps them warm and therefore active on dull days.
2. Bumblebees need to reach 30 degrees centigrade before they can fly. They do this by shivering their flight muscles, which creates heat, until they reach this temperature. It can take up to 15 minutes on cold days.
3. There are three types of bumble bee in a colony, the queen (big, egg layer), the workers (females who collect pollen and nectar, protect the colony, manage the nest, feed the young larvae (babies) and look after the queen. Finally, there are drones (small, males who breed with new queens).
4. Bumblebees only create a tiny amount of honey, just enough to feed their young, so they are not commercially viable like honey bees
5. Bumblebees are not aggressive, don't want to sting and very rarely do. Also, they do not swarm like honey bees
6. Hairs on the back legs create 'pollen baskets' to carry collected pollen. These can be easily seen when observing bumblebees
7. When the drones appear in the late summer the colony tends to fall apart and all the bumblebees disperse.
8. All the workers and drones die before the end of the year and only fertilised queens survive and hibernate.
9. Hibernating queens will produce an antifreeze to stop them freezing up in winter.
10. The biggest threat to bumblebees comes from humans and the use of pesticides.

For more information visit

Bumblebee Conservation Trust

Bumblebee Information

www.bumblebeeconservation.org.uk

www.bumblebee.org

BUMBLEBEE SURVEY



Bumblebees are in declining in numbers in Wales mainly due to the loss of their habitat. So we are asking you to help us find out which type are to be found at school or near to school.

Choose a warm sunny day to do your survey.

Equipment

- Coloured pencils
 - Survey sheets
 - Clipboard
 - Pencils
1. Give each child a survey sheet (page 6 and 7). Ask the children to carefully colour in the 6 different bumblebees following the number code. This will be their identification sheet. Go over the key identification features of each species with the children (shown on the sheet) before heading out.
 2. Go for a walk around the school grounds and local area, looking at flowers (blackberry is a good one to look out for). Look out for any bumblebees visiting the flowers. Bumblebees are very placid and are easy to observe, as they are much too busy collecting pollen to be bothered by people.
 3. When you find one look closely to see which of your six pictures it is. Number of stripes and tail colour will help.
 4. Make a tick for each one you see in the box next to its picture.
 5. If you can, note the flowers that the bumblebee is visiting.
 6. Return to the classroom and gather all the records
7. Fill out one survey sheet with your class results and send it to

Margaret Iles, Ecologist, Countryside and Landscape Services, Caerphilly
County Borough Council Office, Pontllanfraith NP12 2YW.

BUMBLEBEE IDENTIFICATION SHEET

Colour in these 6 bumblebee using this code

1 - red

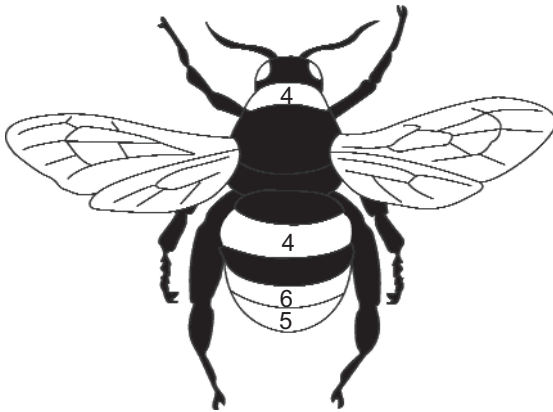
2 - orange

3 - lemon yellow

4 - dirty yellow

5 - white

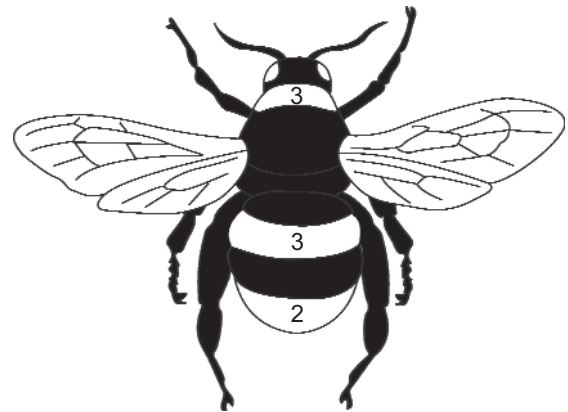
6 - light brown



BUFFTAILED

- 2 dirty yellow bands
- Tail dirty white with brown edge

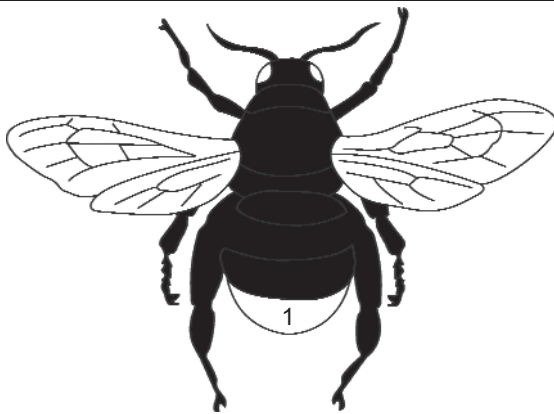
Numbers Seen



EARLY

- Small bee
- 2 yellow bands with orange tail

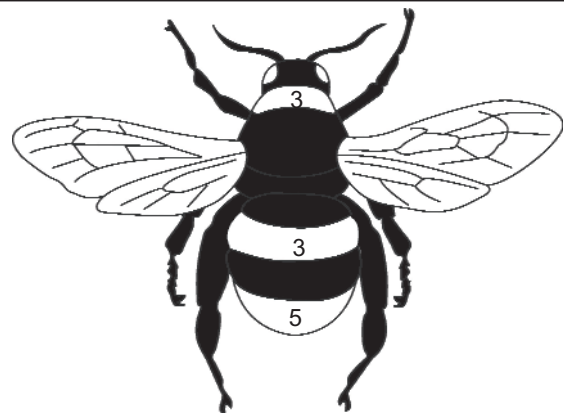
Numbers Seen



RED TAILED

- No stripes
- Red/orange tail

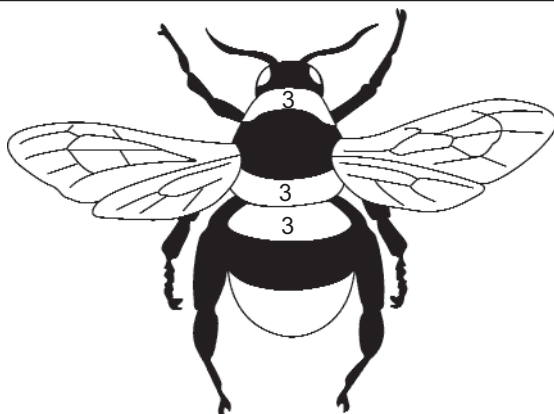
Numbers Seen



WHITE TAILED

- 2 bright lemon yellow stripes
- pure white tail

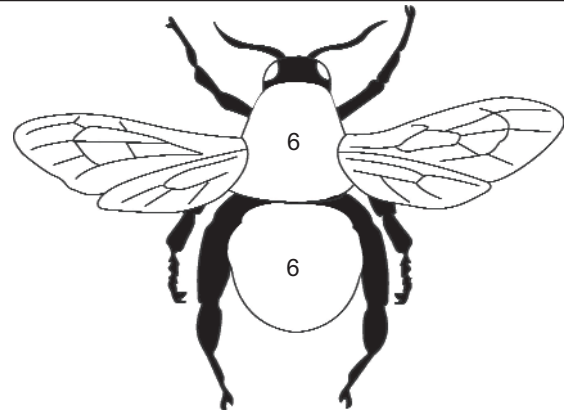
Numbers Seen



GARDEN

- 3 yellow stripes
- white tail

Numbers Seen



COMMON CARDER

- no stripe
- light brown all over

Numbers Seen

BUMBLEBEE SURVEY SHEET

School:-

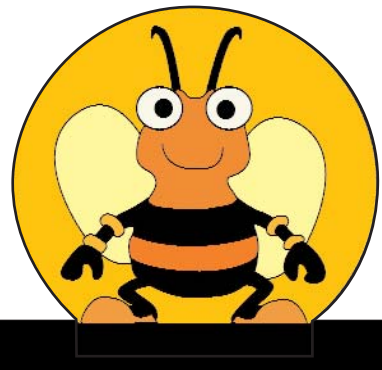
Name of Student:-

Date of survey:-

Teacher:-

Species	Numbers seen	Flowers/Plants
Buff-tailed Bumblebee		
Red-Tailed Bumblebee		
Garden Bumblebee		
Early Bumblebee		
White-tailed Bumblebee		
Common Carder Bumblebee		

Lesson Activities



1. Build a Bumblebee

Materials

- Bumblebee body part card (resource 1)
- Scissors
- Coloured pencils

Give each child a bumblebee body part sheet

Ask the children to colour in the body parts as labelled

Cut out the body parts

These can be used in Activity 2 (Bumblebee Drive) or Activity 3 (What do body parts do?)

2. Bumblebee Drive

Materials

- Bumblebee parts (See above)
- Bumblebee drive game guide (resource2)
- 6 Dice (one per group)

The aim of the game is to be the first to build a complete bumblebee.

Children sit in groups of 6, with their bumblebee body parts nearby

They take it in turns to throw the dice.

Each number on the dice refers to a different body part, which is placed in front of them.

Children must shake a 6 (abdomen) and 5 (thorax) to start with, before adding other parts.

The dice is shaken only once by a child and passed to the next child.

The first child to complete their bumblebee shouts 'Bumble bee!'

3. What are the Body Parts for?

Materials

- Bumblebee body cards
- Body Part Function cards (resource 3)
- Straws

Children assemble their body parts into a complete bumblebee

They cut out the function cards.

They write in the name of the body part, which they think corresponds to the description and link it with a straw to that part of to their bumblebee.

Abdomen	contains heart, stomach, gut, breathing and reproductive systems
Thorax	contains all the muscles for wings and legs
Head	contains the brain, mouth, eyes
Antennae	for smelling
Legs	for walking, storing pollen and cleaning
Wings	for flying and air conditioning

Discussions

Discuss how the function of each part and compare with parts/functions of the human body

4. Lifecycle Role-Play

Activity 1

In the classroom, read through the story of the lifecycle of bumblebees. Make sure that the children understand what each word means. You may find it useful to find some pictures on the internet (www.arkive.org has some great pictures you can show).

*'In early **spring** the big queen bumblebee wakes from hibernation and heads*

off looking for flowers to get pollen and nectar from. When she finds some flowers, she feeds on the nectar and puts some of the pollen on her back legs in special 'pollen baskets'.

She now spends a lot of time looking for a good place to build her nest, usually an old mouse hole. When she has chosen a nest site she makes a small wax 'pot' to store honey, which

she makes from the nectar and pollen she collected. Next she lays some eggs and incubates them by lying on them and shivering to keep them warm. While she does this she feeds on honey from the 'honey pot'. After 4 days the eggs hatch into legless larvae that feed on the stored pollen. They grow quickly and pupate into worker bees in a few weeks. The worker bees help the queen collect food from flowers, expand the nest, feed and look after the larvae, clean the nest and protect it from predators.

*By the **summer** the nest can contain 100 workers. Near the end of summer the queen, lays eggs that will be both workers (females) and drones (males). Some of the female larvae are fed extra food to create new queens as the present queen is getting old. The new males (called drones) and the new queens fly off from the nest. The males try to find new queens from other colonies and mate with them.*

In early autumn the old queen and the workers abandon the nest and die off. The new queens find a safe warm place to hibernate to see the winter out before waking in spring to start the life cycle again.'

Discussion

Talk about the seasons what makes each one different, how insects need to be warm to function. Explain any new words.

Activity 2

Lifecycle Role-play. The role-play may be carried out in the classroom, hall or yard.

You will need:

- 5 chairs (tunnels into pretend nests)
- 8 big colourful flower shapes
- 9 paper crowns for the old new queens (resource 4)

Chairs are placed randomly around the role-play area and 3 of the flowers placed on the floor. The teacher will place more on the floor as throughout the summer. The class is divided into 3 groups of 10 (adjust roles for your class size) and allocated the following roles.

1 x Queen (crown)

2 x Workers

3 x Larvae

2 x New (crown)

2 x Males

The teacher stands in the middle of the area and reads the lifecycle script aloud and directs the acting.

The children stand to one side and do not join in until they feature in the script. It may be worth doing a trial run first.

Ask the worker bees to stand to one side, as they have not been born yet.

Tell the queens to pretend to be asleep, hibernating as our story begins at the end of the winter.

Now the performance can begin!

5. Flower Attraction Experiment

Background information

Bumblebees are vital in the pollination of plants. Plants produce flowers, which attract bumblebees to them by looking colourful, smelling nice and providing a free sugary drink for them called nectar. While the bumblebee is drinking the nectar, the flower covers the bumblebee's body in pollen. When the bumblebee visits another flower this pollen rubs off on the new flower and pollinates it. The flower will then die off and seeds will appear. Some of the seeds are hidden in fruits.

Materials

- 6 different coloured flower cards (resource 5)
- Cotton wool
- Scissors
- Milk Bottle tops
- Sticky tape
- A small bottle of sugar water (sugar and water mixed together)

Cut out the flowers

Cut out the middles of the flowers

Push the milk bottle tops through so the edge is level with that of the paper flower & tape it

Put some cotton wool in the milk bottle top.

Carefully, add some sugar water to the cotton wool.

Create a chart that can be used to record what insects visit each colour.

Take the coloured flowers outside to a place where there might be a lot of insects

Place on flat grassy surface, in full sunlight

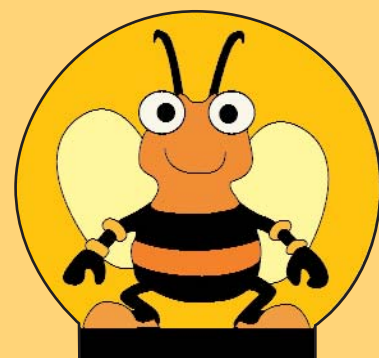
Sit children 1 meter away. Keep still and watch for about 20 minutes

Make a note of the number of insects that land on each colour.

Discussions

What colour did most insects visit, what colour did most insect not visit

Ask all the children for their results and then create bar charts.



6. Bumblebee in my Shopping Bag

Bees are important pollinators of plants that provide food for us. Choose one of the two activities below to get this over to the children.

Activity 1

Bring in a typical shopping bag of groceries using the list below. Take items out one at a time and ask the children if bees have helped in making each product. Discuss how they do this.

Activity 2

Ask children to look in their packed lunches. Give them a copy of the list of plants that are pollinated by bees and see if they can find any food items that they think have been made from plants on the list. Discuss how bees have helped in the production of the selected food items.

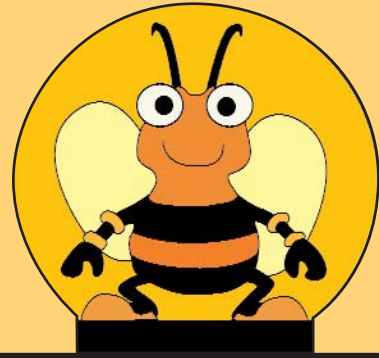
Put a typical shopping bag of goods together chosen from the following list.

Plant pollinated by Bumblebee	Product Example	Plant pollinated by Bumblebee	Product Example
Kiwi fruit		Clovers	Milk (feed for cows)
Cranberry	Juice	Lupin	
Blue berry	Muffin	Buckwheat	
Gooseberry		Runner beans	
Currants	Blackcurrant drink	Broad beans	
Cherry	Dr Peppers	Soya beans	Tin of Soya milk
Pear		Aubergine	
Plum		Peppers	
Apple		Cucumber	Sandwich
Blackberry		Tomato	Soup
Orange	Marmalade	Squash	
Lemon	Meringue Pie	Cotton	Shirt
Melon		Peas	Frozen peas
Oil seed rape	Vegetable oil	Pumpkin	
Sunflowers	Margarine	Raspberry	Jam
Peach		Celery	
Coriander	Pot of curry	Mustard	Pot of
Strawberry	Jam		
Alfalfa			

Help Bumblebees in Your Grounds

Grow the free seeds enclosed with this survey in a sunny bed or container.

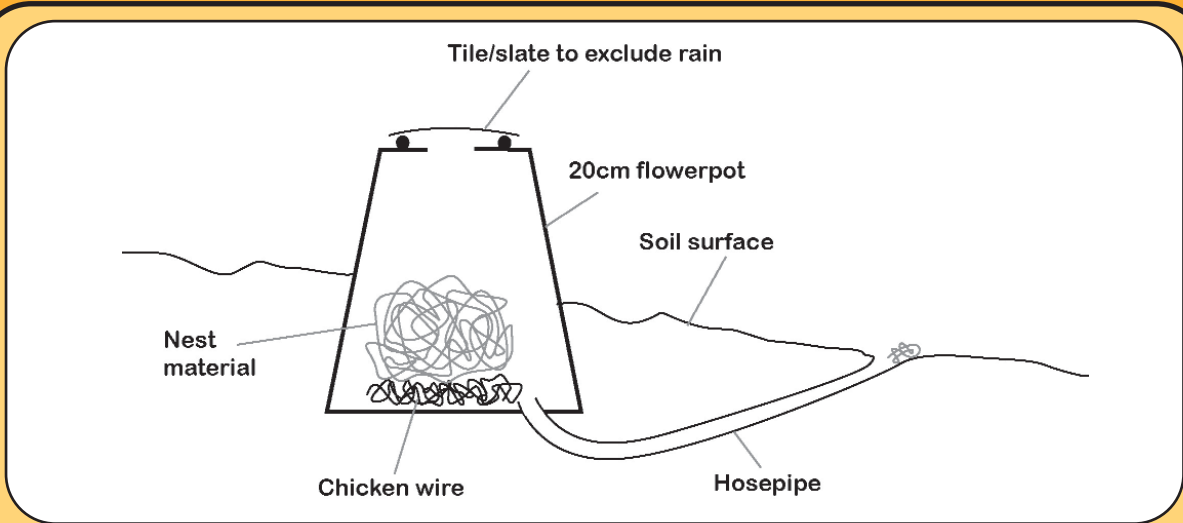
Below is a list of other plants, which help bumblebees. Why not send this list home and see if the parents can donate some plants from their own gardens.



Apple	Marjoram
Allium	Meadow cranebill
Aquiligia	Mint
Bird foot trefoil	Pear
Bluebell	Penstemon
Borage	Phacelia
Bramble	Plum
Broom	Purple Loosestrife
Campanula	Pussy willow
Ceanothus	Raspberries
Cherry	Red campion
Chives	Red dead nettle
Clover	Roses
Comfrey	Rosemary
Cotoneaster	Sage
Escallonia	Sainfoin
Everlasting Pea	Salvia
Everlasting wallflower	Scabious
Flowering currant	Snap dragons
Foxglove Geranium	Sunflower
Heather	Thyme
Honeysuckle	Teasels
Kidney Vetch	Thistles
Knapweed	Viper bugloss
Lavender	White dead nettle
Lupin	Wisteria
Lungwort	Woundwort

You can buy bumblebee boxes from garden centres and online or you could make your own (see below). They should be sited in a sheltered spot along a linear feature (hedge, fence)

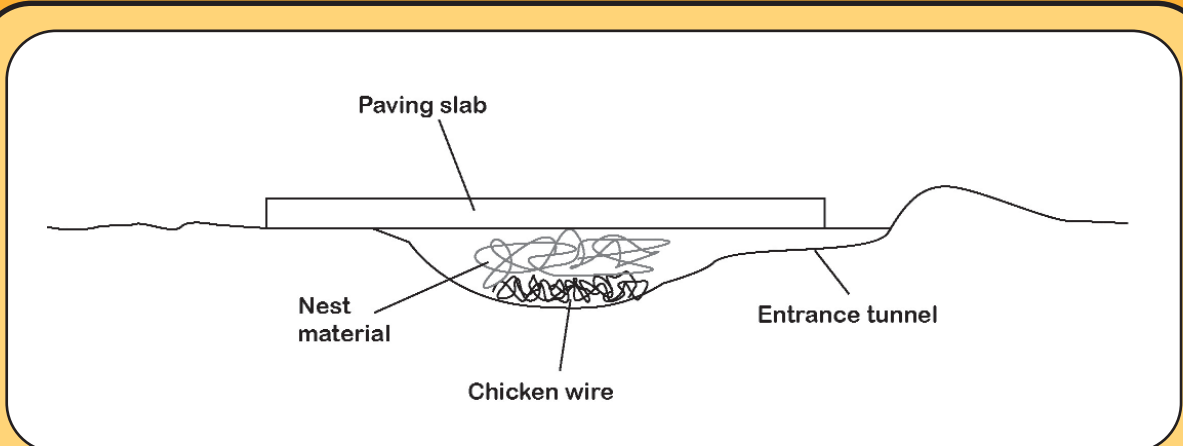
and out of direct sunlight. Put in either some dry moss or old hamster bedding which the bumblebees can make a nest in.



Bumblebee Nest Site 1

Sink an upturned >20cm diameter flowerpot into the ground. Put a slate/ tile over the drainage holes to keep out rain. Run a 18mm diameter hose or pipe underground to the pot,

leaving a prominent entrance. Be sure to make drainage holes in the pipe. Make a chicken-wire cradle for ventilation, and fill with a handful of nesting material (see above).



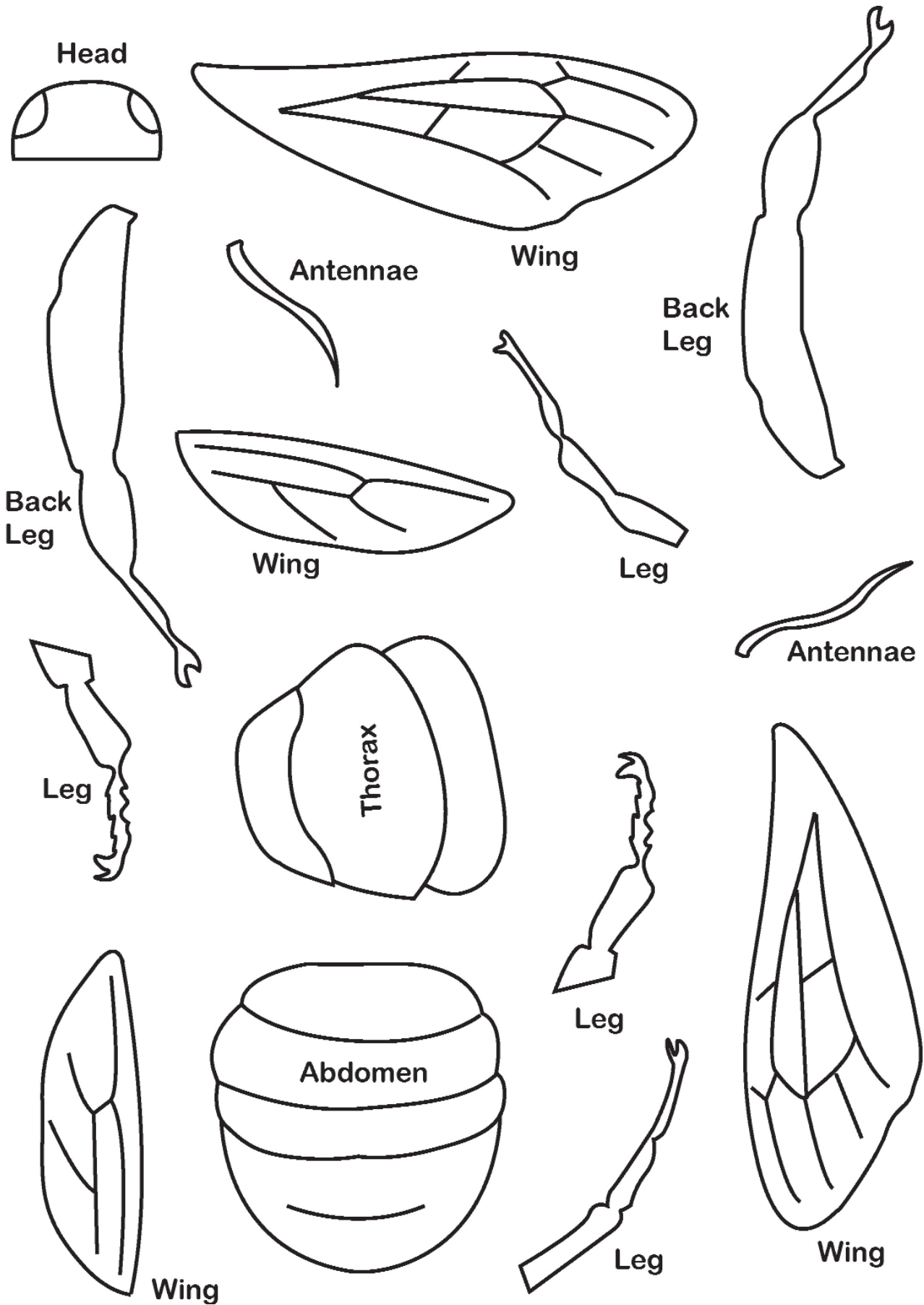
Bumblebee Nest Site 2

Simply dig a cavity in the ground (roughly 15cm deep and 25 cm wide) and cover with a paving slab or piece of thick plywood. Dig channels at the sides to provide entrance holes and ventilation (2cm wide). It should be dry underneath. Try to

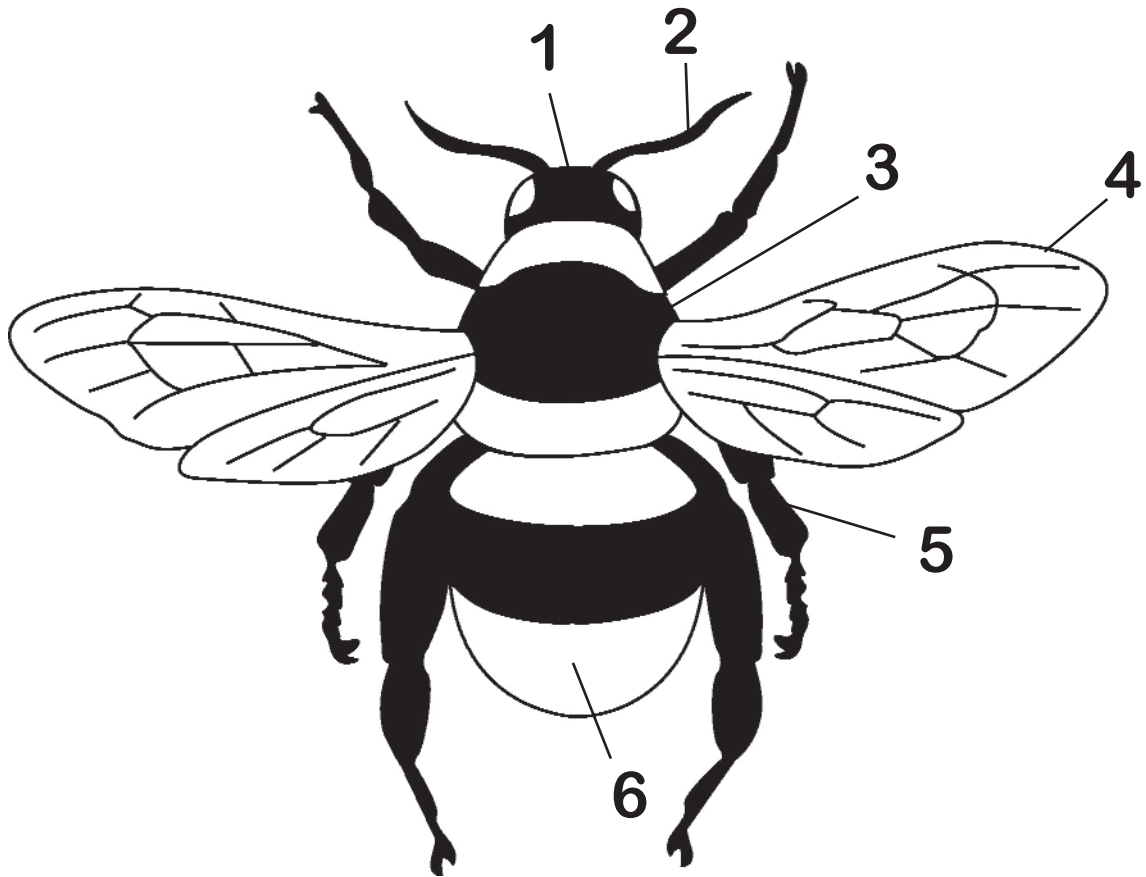
make the entrance holes as obvious as possible so that the queens can find them.

Again, put a handful of nesting material in the cavity, perhaps in a chicken-wire cradle.

RESOURCE 1 - BUMBLEBEE BODY PARTS



RESOURCE 2 - BUMBLEBEE DRIVE GUIDE



1. HEAD
2. ANTENNAE
3. THORAX
4. WING
5. LEG
6. ABDOMEN

RESOURCE 3 - BODY PARTS FUNCTION CARDS

Carefully cut out these function cards

----- contains heart, stomach, breathing and reproductive system	----- for smelling
----- for flying and controlling heat in the nest	----- for walking, storing pollen and cleaning body
----- contains muscles for flight and walking	----- contains brain mouth and eyes

RESOURCE 4 - QUEEN BEE CROWN



