



WELCOME TO THE WONDERFUL WORLD OF GARDENING!

Whether you have a big garden or a small windowsill, you can make the world a greener place. Gardening is one of the best hobbies in the world and it's good for you, your neighbourhood and our planet! People have been gardening in one way or another for thousands of years, so you will be continuing a very long and important tradition.

In this book, you'll learn about how plants work, how to grow your own vegetables, how to encourage wildlife to your garden and why protecting plants is important for our lovely planet. Along the way, there will be plenty of activities and experiments for you to try for yourself – mostly using everyday materials you can find at home.

What are you waiting for? Let's begin!

ALL ABOUT PLANTS



WHAT IS A PLANT?

Plants are living things that can be found all around the world. No matter what their shape or size, plants almost always have the same basic parts – **roots**, a **stem**, **leaves** and sometimes **flowers**. Each part of the plant has a very important job to perform.

Many plants have colourful flowers to attract **insects**. Flowers produce **seeds** that grow into new plants.

Plants need sunlight to stay alive and to grow. Leaves are used to trap light and they vary a lot in shape and size.

The stem (or trunk if it's a tree) holds the whole plant up. It also carries water, food and other goodness around the plant.

The roots anchor the plant to the ground. Their job is to take in water and **nutrients** from the soil.

WHAT DO PLANTS NEED TO SURVIVE?

AIR

Plants need air to make food and to breathe. During the day, plants absorb a gas called **carbon dioxide** from the air and they release a gas called **oxygen** (the gas we need to survive).

SUNLIGHT

Plants are able to create their own food using sunlight. Leaves are designed to absorb energy from the sunlight and they use this to convert water and carbon dioxide into special plant food. This amazing process is called **photosynthesis**.

SOIL

Soil and **compost** contain important nutrients that plants need to grow. When plants die, they put this goodness back into the soil for new plants to enjoy.

WATER

Just like with humans, water is essential for life on Earth. You'll notice that a plant needs watering if its stem and leaves become droopy.

WARMTH

Plants thrive in the right temperatures and most plants like a little warmth. Only certain plants will survive in extreme conditions, such as intense wind or heat.

WHY DO WE NEED PLANTS?

Plants are the foundation of all life on Earth and they help us in many wonderful ways. They are used for food and medicine, they clean the air we breathe, provide habitats for many different animals and are used to make products that we use every day. If you're reading this book on paper, it's made from a tree! So, how many different ways do plants help us?

Plants provide 80 percent of the food we eat. Most of your favourite meals will have come from plants, such as rice, wheat, potatoes and tomatoes.



For thousands of years, people have turned to plants to relieve aches, pains and ailments. Did you know that a blend of chamomile tea can help to settle an upset tummy?

Many modern materials are made from plants. They are used to create everything from clothing to building materials used to create housing. Most recently, plants can be used to reduce harm to our planet. For example, bamboo is an environmentally friendly alternative to plastic.



Plants are important for providing habitats for many different animals. Did you know the English oak tree provides food and shelter to over 2,000 wildlife species? How many can you see in this picture?



Plants are all around us. How many different ways do you use plants in your day?

Plants are the first link in most **food chains**. When plants grow, they take in nutrients from the soil. When an animal eats a plant, it takes in the nutrients, using them to live and grow. And when an animal eats another animal, the transfer continues. Without plants, the delicate food chain would break.

IT STARTS WITH A SEED

All living things, including plants, have a **life cycle**. This usually starts with a seed, which grows into a plant if it has three important things – light, water and warmth. With the right amount – not too much or too little – the plant will continue to grow a taller, thicker stem and more leaves, and sometimes flowers. The flowers make seeds and the whole cycle starts again.



1.

Once a plant seed is planted in soil, it will **germinate** (sprout) and start growing little roots. The roots anchor the plant into the soil and allow it to start sucking up water.

2.

Next, little leaves will pop out of the soil on the top of a thin stem. This gives the young plant the height it needs to grow above its neighbours to reach sunlight.

3.

Using soil, water, air and sunlight, the plant begins to make its own food and fuel for growth. This process is called photosynthesis.

4.

The plant will continue to grow a taller and thicker stem and more leaves until it becomes an adult. Depending on the species of plant, this can take anything from days to weeks or years!

5.

After the plant becomes mature, it will start to produce flowers. These flowers are important in a plant's life cycle as this is where the new seeds are made. In other words, the flower is where reproduction happens.

6.

So that plants can make seeds, a sticky substance called pollen usually has to be transferred from one plant to another. This process is called **pollination**. Learn more about pollination on pages 16–17.

7.

In the final stage, the plant's seeds are dispersed (spread to new places) and a new plant life cycle begins. The seeds are usually spread by water, wind and sometimes by animals.

THE POWER OF POLLINATION

Did you know that insects help plants to grow? Without them, the natural world as we know it would not exist. This is because insects help to pollinate plants. Flowers contain a sticky substance called pollen, which needs to reach other flowers so they can make seeds. The best way for pollen to travel between plants is by insect!



1. When a bee visits a flower, the pollen gets stuck to the insect's hairy body.



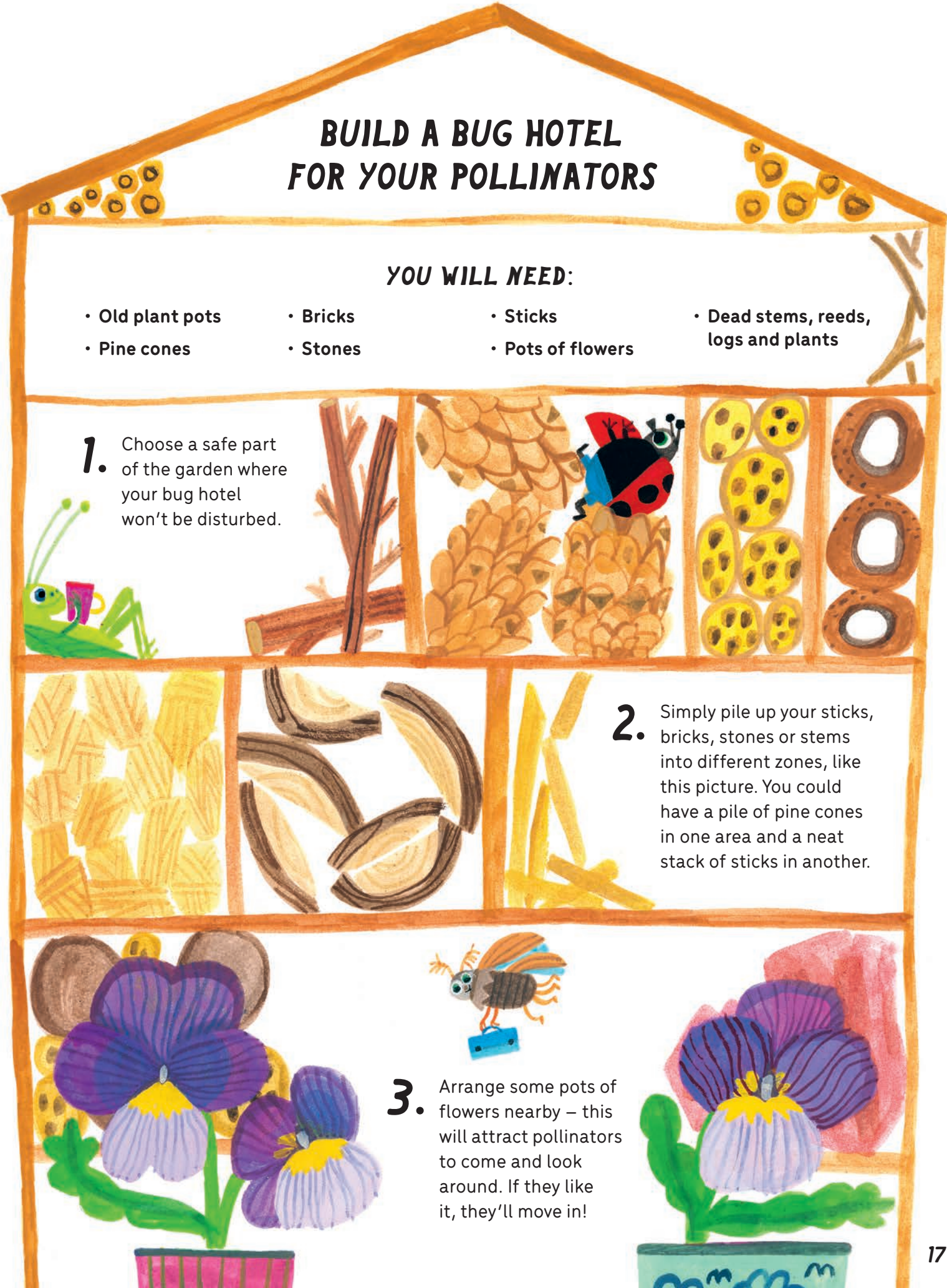
2. The bee flies off in search of another flower. When it lands, some of the pollen rubs off onto the stigma (female part) of the new flower.



Some insects such as butterflies, moths and wasps use their legs or long tongues to pollinate flowers.



3. The pollen fertilises the flower and it is now able to make seeds. The **pollinator** has done its job by spreading pollen to create new plants!



BUILD A BUG HOTEL FOR YOUR POLLINATORS

YOU WILL NEED:

- Old plant pots
- Bricks
- Sticks
- Dead stems, reeds, logs and plants
- Pine cones
- Stones
- Pots of flowers

1. Choose a safe part of the garden where your bug hotel won't be disturbed.

2. Simply pile up your sticks, bricks, stones or stems into different zones, like this picture. You could have a pile of pine cones in one area and a neat stack of sticks in another.

3. Arrange some pots of flowers nearby – this will attract pollinators to come and look around. If they like it, they'll move in!

ALL ABOUT SOIL

Soil is the brown earth that plants grow in and it plays a very important role in supporting life on our planet. The best way to keep your plants happy is to take care of their soil!

Once a seed has sprouted, the soil helps to anchor the plant's roots in the ground. From here, the roots can absorb water, nutrients and minerals from the soil that help the plant to grow.

Soil is teeming with life. Did you know that there are more living things in a handful of soil than there are humans on Earth? Soil is full of tiny living organisms such as plants, fungi, insects and bacteria.

These organisms have special functions. Worms, for example, are little underground helpers. They munch on things at the soil's surface, then dig tunnels deep down. As they dig, they poop out what they have eaten, which is like a special kind of food for the soil.

GET TO KNOW YOUR SOIL

Soils vary around the world, but they all contain sand, silt, clay, moisture and air. As a gardener, it's important to get to know your soil. If a plant is from a sandy part of the world and you try growing it in a wet clay soil, it won't be happy! Similarly, a plant from a damp area won't like to grow in a sandy soil.

1. Using a trowel (see pages 24–25), collect a soil sample from your garden. Lay it out on a piece of paper, remove any twiggy bits, then using your trowel, crush the soil so it's as fine as possible.
2. Next, part fill a large jar with the soil sample, cover with water, put the lid on tightly and then give it a good shake before leaving it for at least 24 hours to settle.



3. You should now be able to see the different layers of your soil. The parts of soil are different weights and the heavier ones – like sand – fall to the bottom first. Clay will settle last and even make the top layer quite cloudy for a while, as its tiny particles float in the water.

GETTING STARTED...



ALL KINDS OF GARDENS

Did you know that gardens don't have to be outside? Whether it's a windowsill or small hanging basket, as long as there is enough sunlight, shade, moisture and wind plants can thrive.

WINDOWSILLS

Many plants love windowsills, because they get plenty of light. Just keep an eye on the soil to make sure it doesn't dry out! Growing plants in containers is a great activity if you don't have a lot of outdoor space.



AROUND THE HOUSE

Many plants love living indoors. There are hundreds of different varieties of house plants and **vegetables** that can easily be grown in your house.



HANGING BASKET

You don't need a lot of space to put up a hanging basket! Some plants can grow downwards as well as up and out.



FAMILY GARDEN

If you have a garden, ask an adult if you can use part of it to grow your first plants. It can be helpful to ask for hints and tips about what has grown well there before!



COMMUNITY GARDEN

Community gardens offer local people a place to garden and to make friends. The garden can be a few beds or a huge space, and there is always room for one more helper!



Go for a walk near your home. How many different types of gardens can you spot?



ALLOTMENT

An allotment is a patch of land away from your house that is just for your plants. Often there are also other gardeners at the allotment who can offer you help and advice.

TOOLS AT THE READY

There are a few handy tools that can come in useful when tending to your garden. Sometimes you might even be able to make your own tools at home.

SPADE

Spades can be used for larger jobs, such as planting trees and shrubs.



GARDEN HOE

A garden hoe is useful for shaping the soil and pulling up weeds.



KNEELING MAT

It can make your knees hurt if you kneel on hard ground for too long. Try using a kneeling matt – or even an old towel or piece of cardboard.



LABELS

It can be helpful to add labels to your pots or plant beds to help you identify your plants while they're growing.



WHEELBARROW

A wheelbarrow is a useful tool as it helps to transport heavy items around the garden, such as plants or compost.



SECATEURS

Secateurs are garden scissors that are often used to cut small stems and branches.



TROWEL AND FORK

A trowel helps you to dig small, neat holes. If you don't have one, an old wooden spoon will work just fine. A garden fork can be used for breaking up clumps of hard soil and for carefully digging up weeds.



MATTOCK

A mattock is hand tool that can be used for creating holes and removing large roots and rocks.



BUCKET

A bucket or old container can be very useful for collecting weeds, rather than leaving piles around your garden.



WATERING CAN

Your seedlings and plants will need plenty of water to grow. If you don't have a watering can, you can always ask an adult to pierce holes in the lid of a drink carton.



GARDENING GLOVES

Some plants can be prickly and might graze your hands. It can be helpful to wear special gardening gloves to protect your hands.

RAKE

A rake can be helpful to break up the soil and level the ground.



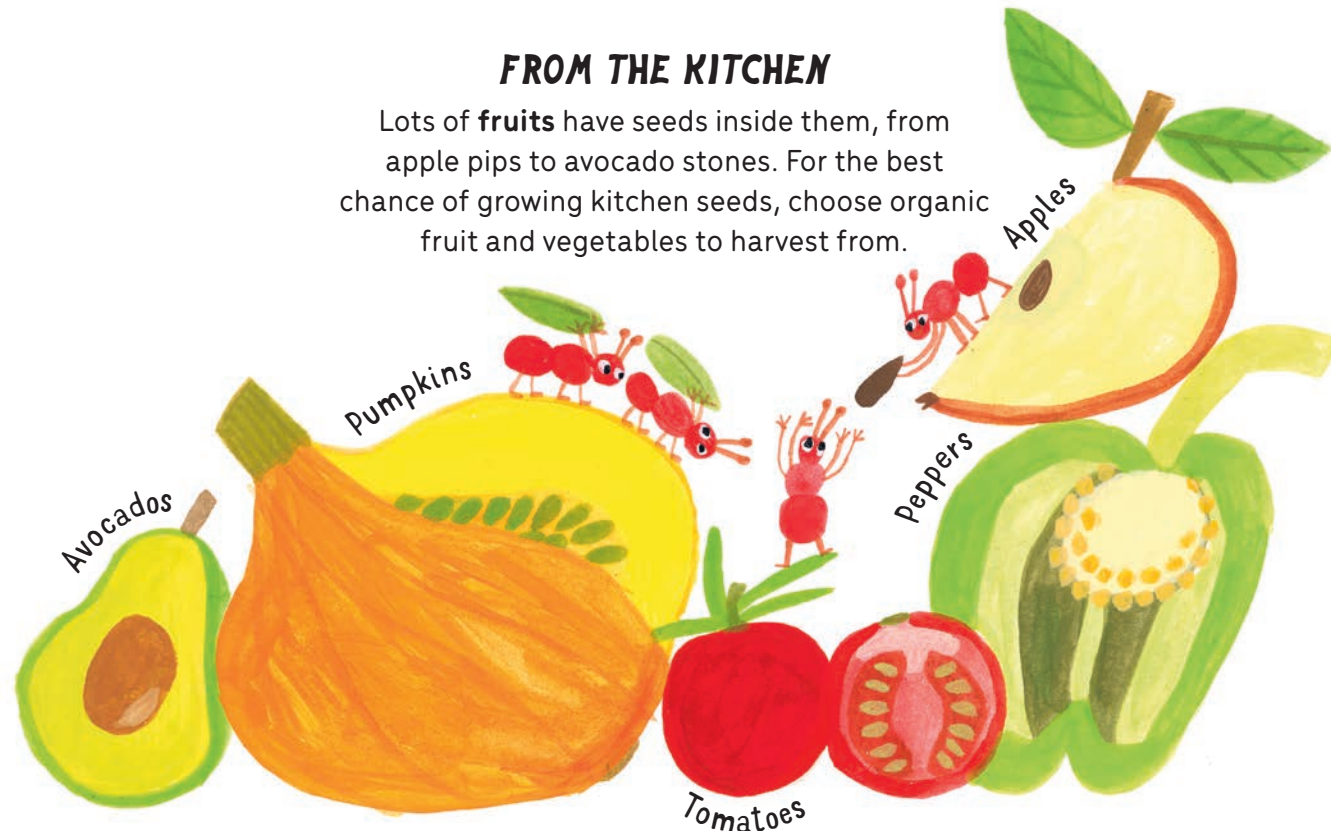
SEARCHING FOR SEEDS

You can find seeds almost everywhere if you know where to look.

Many of the plants we have in the garden or kitchen already contain the seeds we need to grow the same plant. If it's the right time of year, you can plant the seeds straight away, or you can store them in a labelled envelope for next year.

FROM THE KITCHEN

Lots of **fruits** have seeds inside them, from apple pips to avocado stones. For the best chance of growing kitchen seeds, choose organic fruit and vegetables to harvest from.

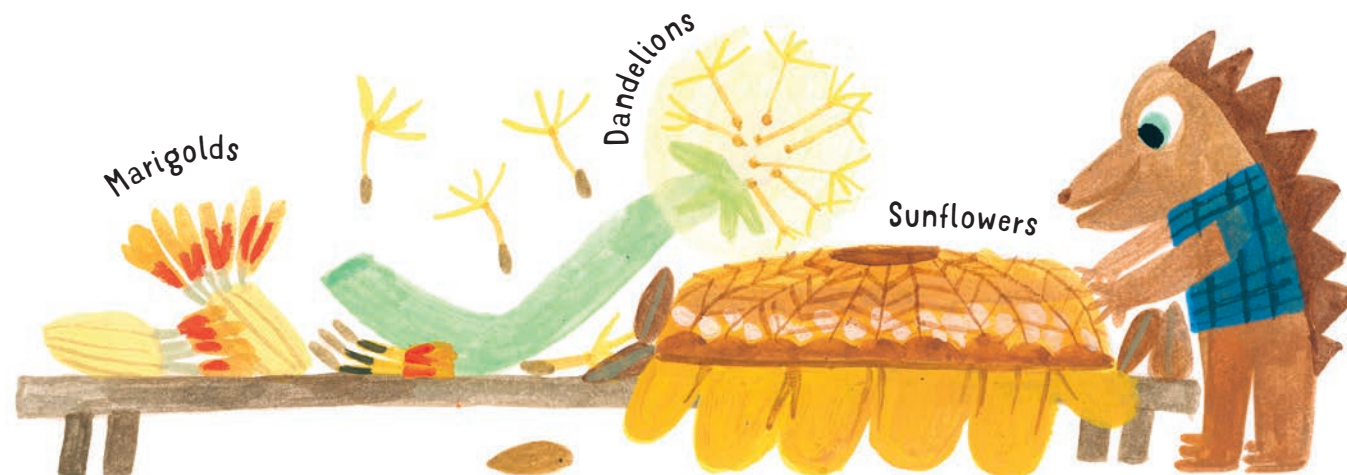


IN THE GARDEN

There are many different seeds that you can find in your garden. Did you know that you can find seeds inside sunflower heads? Collect seeds on a dry day and leave them in a cool place indoors.

BUYING SEEDS

You can also buy seeds from a supermarket, garden centre or online seed shop. Specialist shops have lots of information about what plants can be grown in particular conditions.

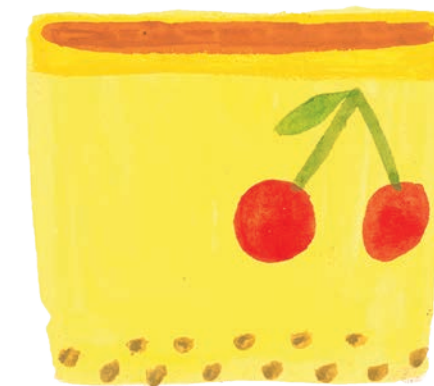


HOW TO SOW SEEDS

Learning how to sow seeds is an essential skill for any gardener. Seeds don't need large containers to begin with – you can start growing new seeds in small pots before transferring them to your garden. You can use anything from egg boxes to yogurt pots or even toilet roll tubes!

YOU WILL NEED:

- Any small reused containers
- Compost
- Cress seeds
- Fruit punnet or plastic bottle (cut into two halves)
- Water



1. Fill each pot with compost. Ask an adult to pierce drainage holes in the bottom.

2. Sprinkle cress seeds into the pot, add a little compost and water well.



3. Cover the seeds with a fruit punnet or plastic bottle, and place on a windowsill or in a warm spot. Give them water each day.

4. The cress seeds will start to sprout in just a few days, and a few days after that you can harvest and eat them!

CARING FOR YOUR PLANTS

Taking care of your plants may seem tricky at first, but with a little patience and care, your plants will be healthy and happy. Here are some helpful tips all gardeners must know.

WATERING

Plants need water to survive, but different plants require different amounts of water. It's important to check the instructions that come with each plant – over watering or under watering can be harmful.

FEEDING

Just like us, plants sometimes need extra help to grow strong and healthy. You can feed your plants with organic **fertilisers** to give them the nutrients they need.

WEEDING

Weeds are plants that grow where we don't want them to. While some weeds are harmless, others can overcrowd your garden plants. To keep your garden looking neat and tidy, remove unwanted plants regularly by pulling them out by the roots.



LIGHT AND SHELTER

Some plants like a lot of sunshine, while others prefer shade. It's important to position your plants in the right place so that they get the right amount of light. Shelter from wind, rain and frost may also be needed.



REPOTTING

When you notice roots poking out of the bottom of the pot, your plant needs repotting. Choose a pot that is a few centimetres bigger and your plant will be happy. Start repotting during a warm part of the day and handle your plant as little as possible. Remember to water your plant when it's settled into its new home!

PRUNING

Pruning is the process of cutting away overgrown branches or stems, especially to encourage growth. It is an essential garden task that keeps your plants healthy and tidy.



FIRST AID

Just like people, plants can sometimes get sick. If you notice that your plant is wilting or the leaves are turning brown, it may be a sign of a problem. Some solutions include changing the amount of water or light the plant is getting, adding fertiliser or compost, or removing any damaged parts of the plant.



SOWING WITH THE SEASONS

Gardeners have to grow along with the seasons – sowing seeds at particular times of the year to fit in with each plant's life cycle. But there are always ways to extend the season and bend the rules a little. For example, growing certain seeds indoors to give them a head start before spring comes.

SPRING

Spring is the perfect time to prepare your garden and to sow your seeds. It starts to feel warmer and sunnier during spring, and existing plants start to grow. You'll also notice birds singing and insects buzzing around. Nature is waking up...



WINTER

The coldest months of the year can be tough on nature, but many plants are well adapted to survive. Now is the time to think about what has worked well in your garden and what you'd like to plant next year. You can also start growing some plants indoors to give them a head start before spring.

SUMMER

It's time to harvest your summer crops! The summer sunshine and showers can cause your garden – both the plants you want and the weeds you don't – to grow wild. Along with juicy new plants come hungry mini beasts, so keep an eye out for garden visitors!



AUTUMN

As the air gets cooler, flowers drop their petals and some trees lose their leaves. It's time to tidy up, harvest the last of the early autumn crops and protect your plants before the cold winter begins. For example, you can position sensitive plants under large evergreen trees to shelter them from the worst of the weather.



WELCOME WILDLIFE

Wildlife gardening can be great way to help to protect the natural world. Gardens are a safe haven for many different kinds of creatures – from bees to butterflies, birds, hedgehogs and even frogs. Your garden is a mini ecosystem right on your doorstep!

GROW THE RIGHT PLANTS

It's important to choose plants that will benefit your local wildlife. Chamomile is often found in the United Kingdom, because it helps to provide food and shelter for the animals that live there, such as mice and other small mammals.

BUG HOTEL

Insects are important pollinators in your garden. A bug hotel (see page 17) provides a safe and warm place for bugs, such as bees, to return to once they've foraged for food and water, and are in need of a rest.

LOG PILE BENCH

Some bugs – such as beetles, spiders and woodlice – love the shade and dampness found underneath logs. If your log is large enough, you could even use it as a bench, so it helps your local wildlife and gives you a lovely place to sit and enjoy your garden.

BIRD FEEDERS

When birds have babies in spring, it's important to support them by leaving out extra food. You can make fat balls by mixing lard and seeds together, put out feeders of seeds and nuts, and leave out any berries or fruit that you no longer want.

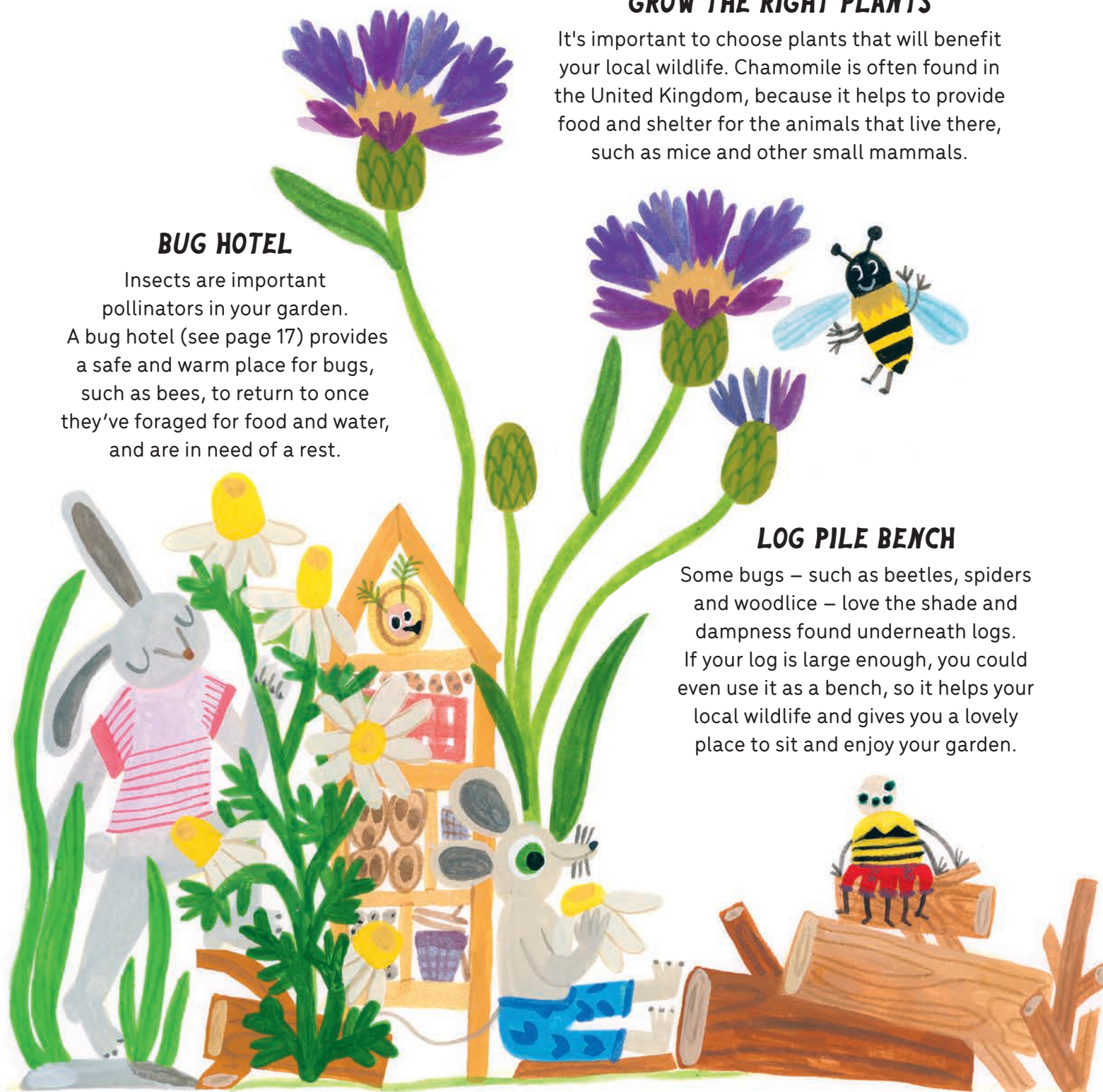
BIRD HOUSES

As well as sharing food, you can help birds by putting out nesting materials, including twigs, leaves, dry grass, feathers, plant fluff, moss and bark strips.

WATERY WONDERS

Water is an important part of a wildlife garden. By adding a bird bath or small pond, you can provide drinking water for wildlife and attract new species to your garden. Make sure to keep the water fresh and clean to prevent the spread of disease.

It's amazing to watch wildlife thrive in your garden. Can you see how different creatures interact with the plant life and the features you've added? Welcoming wildlife is a great way to connect with nature, learn about the world around you and make you feel happy!



GARDEN FOES

Sometimes your garden might be visited by some not so welcome wildlife visitors – munching their way through your plants and obliterating weeks of hard work. Rather than using harmful chemical pesticides, there are some natural ways you can discourage any unexpected visitors to your garden.

ENCOURAGE BENEFICIAL ANIMALS

You can control pest populations naturally by encouraging beneficial creatures such as ladybirds, wasps, hoverflies, birds and frogs in your garden. Try planting flowers that attract these insects, making a bug hotel or adding a bird feeder.



PROTECT PLANTS

You can cover your plants with netting to stop birds swooping down for a tasty snack.



PEST REPELLENTS

To repel insects, you can make an organic pest spray using a mixture of water, garlic, onion and chilli.



KEEP AN EYE OUT FOR PESTS

Slugs and snails can eat a whole batch of seedlings overnight. You can try adding a barrier such as gravel because they find it more difficult to slither across. Remember to check your pots every day for hiding snails – gently picking them up and putting them in another part of your garden.



PLANTS THAT HELP OTHER PLANTS

Did you know that certain plants can deter or encourage insects to your garden? Growing particular plants together can also aid pollination, prevent disease and even keep pest numbers down. This is called **companion gardening**.

The strong smell of French marigolds deters the pest whitefly when grown with tomatoes.

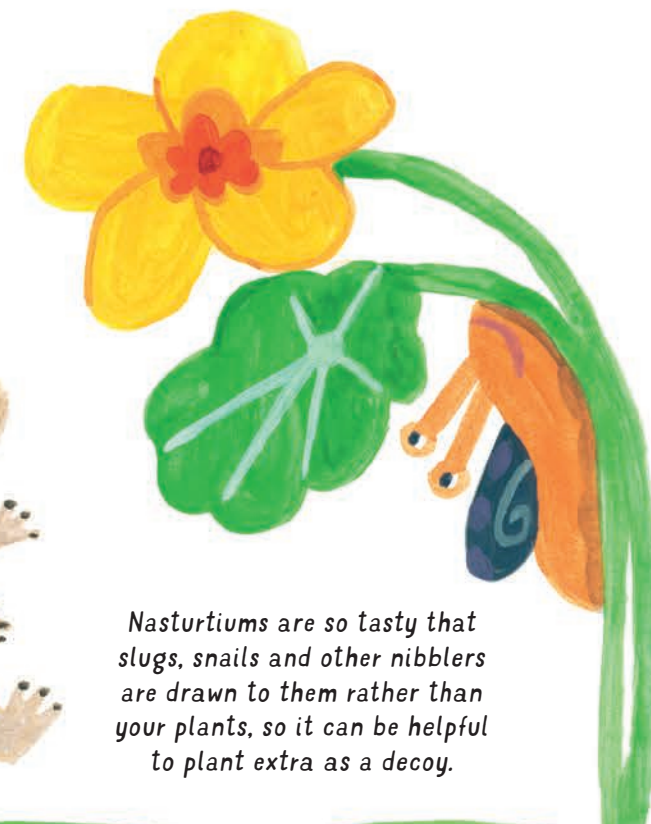


When planted near strawberries, the borage flower attracts pollinators and can enhance the strawberries' flavour.

Onions, garlic and leeks deter pests from carrot and parsnip plants.



Nasturtiums are so tasty that slugs, snails and other nibblers are drawn to them rather than your plants, so it can be helpful to plant extra as a decoy.



BUILD A COMPOST HEAP

Gardeners often improve the quality of their soil by adding compost – a nutrient-rich mixture that is made from organic materials like leaves, paper and food scraps. You can buy compost at your local garden centre or you can even make it yourself! With the right conditions, you can make a natural compost that helps your plants to grow.

YOU WILL NEED:

- **Green matter** (leaves, lawn clippings, weeds, fruits and vegetable scraps from the kitchen, coffee grounds and tea)
- **Brown material** (dried twigs, wood chips, fallen leaves, straw, sawdust, card and paper)
- **Water**



1. Start by mixing one part of your green matter to two parts brown matter together. Add two spadefuls of soil from your garden to the mix.



2. Turn your pile once a week to let more air in. If it feels like it's drying out, add a little water. If you keep up this routine, you should have a nice compost to use in your garden in about two months.



3. Once your compost heap is ready, you can sift out the finest compost and use it when repotting container plants. Any larger twigs can either go into the next heap or be put onto a garden log pile for wildlife.



Perfect! Now your compost is prepared and you're ready to get growing...

