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CAMBRIDGE Primary Science

Learner's Book 5

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Introduction

Welcome to Stage 5 of Cambridge Primary Science. We hope you will enjoy using this book and find out how interesting and exciting science can be.

People have always asked questions about things they observed and looked for answers to their questions. For example, in Stage 5 you will find the answers to these questions:

- How does the body digest the food we eat?
- Why do insects visit flowers?
- How are sounds made?
- How do satellites stay in orbit?
- How do parachutes bring people safely to the ground?
- What gases are in air?
- Where does the sugar go when we stir our tea?
- What causes the seasons?
- How can mice escape from eagles?

You will work like a scientist to find the answers to some of these questions. You will also ask your own questions to investigate.

We have included a variety of different activities and exercises for you to try. Sometimes you will work with a partner or work in a group. You will be able to practise new skills such as drawing force diagrams, completing a key and using models. As you practise these new skills, you can check how you are doing and also challenge yourself to do better. You will be able to reflect on how well you have worked and what you could do differently next time.

We use science in our lives every day. You will see how science knowledge is important when we discuss issues such as pollution and how we must look after our air and water.

We hope you enjoy thinking and working like a scientist.

Liz Dilley and Fiona Baxter



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How to use this book

In this book you will find lots of different features to help your learning

What you will learn in the unit

We are going to...

- learn that some plants have flowers and other plants do not have flowers
- learn about the stages in the life cycles of a flowering plant
- sort and group flowers
- identify the parts of a flower and describe their purpose, or function
- observe and draw a flower
- describe patterns in observations

Questions to find out what you know already

Getting started

- 1 Draw a picture of a plant. Colour in the picture. Label the parts of your plant.
- 2 Tell a partner why the plant needs each of the parts in your drawing.
- 3 Does your plant have flowers? Do you think all plants have flowers?

Important words and their meanings

air resistance	streamlined
drag	upthrust
friction	water resistance

A fun activity about the Science you are learning

Activity 1

Your favourite flowers

Work in a group.

- Look at some pictures of flowers. Which flowers do you like best? Say why you like these flowers.
- Make a collage or draw pictures of your favourite flowers.
- Show your collage to another group.
- Tell them why you like each of the flowers on your collage.

An investigation to carry out with a partner or in groups

Think like a scientist 1

Collect flowers

You will need:
different flowers

Make sure you wash your hands after touching the flowers.

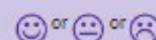
- Collect a range of different flowers.
- Group the flowers according to their size, colour and scent. How many groups can you make?
- Draw pictures of one of the flowers. Label any parts of the flower that you know.
- Try to name the flowers.

These questions help you track your progress

How am I doing?

How well can I:

- draw a flower and label its parts?
- identify the functions of different parts of a flower?
- record observations in a table?



Questions to help you think about how you learn

This is what you have learned in the unit

At the end of the unit, there is a project for you to carry out, using what you have learned. You might make something or solve a problem

Questions that cover what you have learned in the unit. If you can answer these, you are ready to move on to the next unit

How did the practical activities help me to understand more about parts of a flower?
What did I find difficult?
What would I like to learn more about?

Look what I can do!

- ☐ I know that some plants have flowers and other plants do not have flowers.
- ☐ I can say what the stages are in the life cycle of a flowering plant.
- ☐ I can sort and group flowers.
- ☐ I can identify the parts of a flower and describe their functions.
- ☐ I can observe and draw a flower.
- ☐ I can describe patterns in observations.

Project: How people use forces in my area

In this project you are going to use your knowledge of forces to describe how forces are used in a machine or equipment.

Choose a business, factory, transport or farm to visit in your area that uses a machine or equipment where you can identify the forces.

Here are some examples:

- farm equipment such as a pump or a tractor
- a sewing factory that makes clothes
- a factory that makes car parts or computers or any household appliance
- a bus or train service
- a scrapyard that uses magnets to separate iron and steel from other metals
- a water-purification centre.

Work in pairs or small groups. Decide what you will choose for your project. Ask your teacher if they think this is suitable.

Make a questionnaire with questions to ask on your visit. Questions can include:

Check your progress

- 1 Arrange these processes in the correct order to draw a life cycle diagram for a plant:

fertilisation seed dispersal fruit and seed formation pollination germination

- 2 Name two ways in which a fern plant is different to a tomato plant.

- 3 This drawing of a flower has some parts missing.

a Redraw the flower and add the missing parts from the list:

- sepals
- stamens
- anther
- ovary
- stigma
- eggs

b Label all the parts of the drawing.

c Which part of the flower forms the seeds?

d Name the process by which the seeds are formed.

e Where does the process take place?



Working like a scientist

We can use five different types of scientific enquiry to find answers to different kinds of science questions.

Research

Sometimes we cannot find the answer to a scientific question in a direct way, such as by doing an investigation or by speaking to people. Instead, we can do research to find the information we are looking for by reading books, using the internet or watching videos. These are all known as **secondary sources** of information. We can use this type of scientific enquiry to:

- find out about new scientific discoveries or discoveries made in the past, for example the discovery of magnetism
- find information to answer questions about different topics, such as which birds migrate to your country each year; compare information from different sources and decide which answer is best, for example which foods contain different vitamins or how plants and animals are adapted to their environment
- find images, such as examples of Earth features, that satellites in space photograph and send back to scientists on Earth
- help us realise that sometimes there is no definite answer to a question, for example why the Earth's axis is tilted at an angle.



Fair testing

In a fair test we change one factor or variable and keep all the others the same in order to try to answer a scientific question. By changing only one variable, we know that no other variable will affect the results of the test. A fair test involves three types of variables:

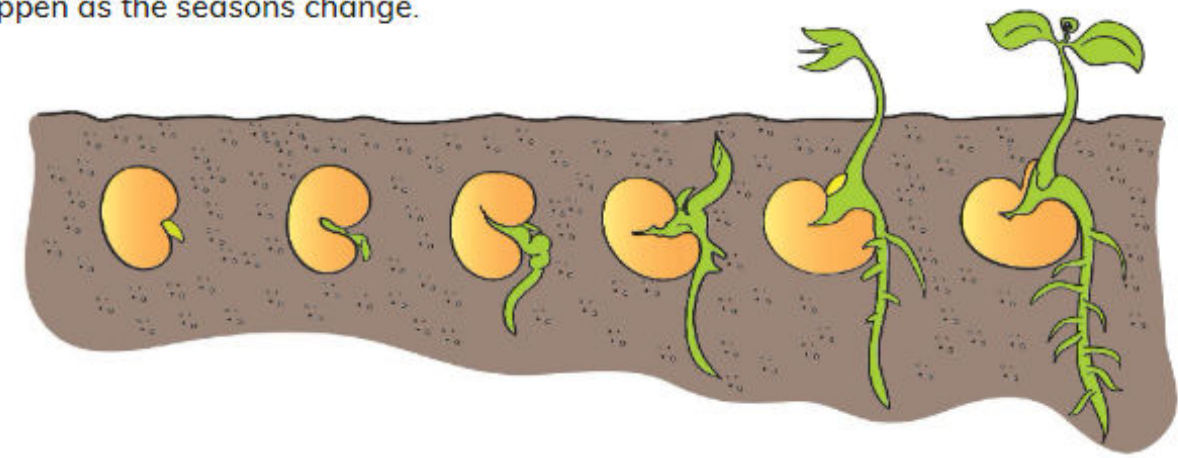
- The variable we change is called the **independent variable**
- The variable we measure or observe that changes is called the **dependent variable**.
- The variables we keep the same are called the **control variables**

For example, in Unit 2 when we investigate which material muffles sound best, the control variable is the source of sound because we keep this the same. The independent variable is the muffling material because we change this from newspaper to bubble wrap to a blanket. The dependent variable is the sound volume we measure, because this changes according to which muffling material we use.



Observing over time

In investigations we often need to observe changes caused by things we do. For example, what happens to water when we freeze it, or what happens when we mix sugar and water? How often we need to observe depends on the changes we are looking at. We can see some changes straight away, such as the change in colour of iodine solution when starch is present. If we observe what happens when we mix sugar and water, we can see the change in a few minutes. The changes to water when it freezes will take a few hours to observe. Observing changes in nature can often take longer. When we investigate what happens when a seed germinates, we will need to observe changes over days or weeks, depending on the type of seed. We will need a whole year to observe the changes that happen as the seasons change.



Identifying and classifying

Identifying is the process of naming something, for example an apple or an orange. We can name them because they have features we recognise. Classifying is organising things into groups. We classify objects, materials and living things in groups by looking at the ways in which they are similar or different. We can usually classify these things by asking a series of 'yes or no' questions. For example, does a flower have brightly coloured petals? Does the flower have a scent? The answers to these questions will help us decide if the flower is pollinated by insects or wind.



Pattern seeking

Pattern seeking involves observing, recording and analysing data. The patterns we observe can help us to identify a trend or relationships between one or more things. We often find patterns in nature where

we cannot easily control the variables. For example:

- a pattern in the relationship between seed size and the time it takes a seed to germinate
- a pattern in the type of material that sound travels through best.



> Acknowledgements

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1 Life cycles of flowering plants

> 1.1 Flowering and non-flowering plants

We are going to:

- learn that some plants have flowers and other plants do not have flowers
- learn about the stages in the life cycles of a flowering plant
- sort and group flowers
- identify the parts of a flower and describe their purpose, or function
- observe and draw a flower
- describe patterns in observations

Getting started

- 1 Draw a picture of a plant. Colour in the picture. Label the parts of your plant.
- 2 Tell a partner why the plant needs each of the parts in your drawing.
- 3 Does your plant have flowers? Do you think all plants have flowers?

anther	ovary	sepals
carpel	petals	spores
filament	plan	stamen
function	pollen	stigma
fruit	reproduce	
life cycle	scent	

1.1 Flowering and non-flowering plants

Plants with flowers

Many plants have flowers. They are called flowering plants. There are many different kinds of flowers. Some flowers are big. Some flowers are small. Some flowers are colourful. Some flowers are not brightly coloured. Some flowers have a smell – a **scent**. Others do not have a scent.



Activity 1

Your favourite flowers

Work in a group.

- Look at some pictures of flowers. Which flowers do you like best? Say why you like these flowers.
- Make a collage or draw pictures of your favourite flowers.
- Show your collage to another group. Tell them why you like each of the flowers on your collage.

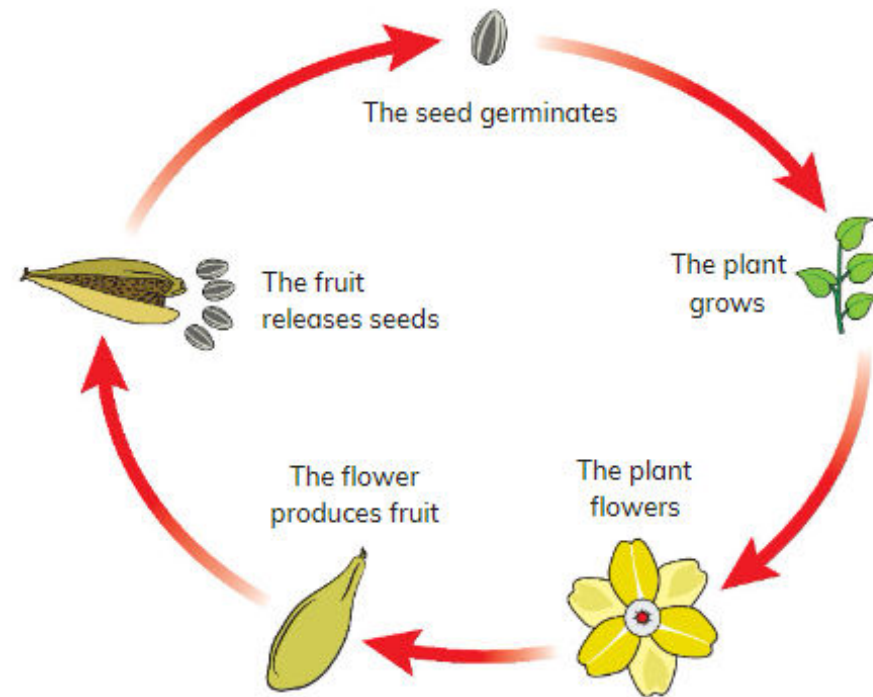
Plant life cycles

All flowers have the same important **function**. Can you think what it is?

When a plant produces flowers, the flowers usually last only a few days. Then they die and fall off the plant. However, part of the flower stays behind on the plant. This part becomes the **fruit**. The seeds form inside the fruit. The seeds grow into new plants. The new plants grow and produce flowers to form new fruits and seeds.

So flowers help the plant **reproduce** to form new plants.

All the changes in a flowering plant, from flowers to seeds growing into new plants, are called the plant's **life cycle**. A cycle is something that happens over and over again. There are different stages in the life cycle of a flowering plant.



Plants without flowers

Not all plants have flowers. Plants without flowers are called non-flowering plants. Mosses, ferns and plants with cones are non-flowering plants.

Some non-flowering plants, such as ferns and mosses, do not form seeds. Instead they make tiny **spores** that can grow into new plants. Other non-flowering plants, such as pine trees, do form seeds. But their seeds form in a cone and not from a flower.



Questions

- 1 Name an example of a flowering plant that you have seen or know of.
- 2 Name an example of a non-flowering plant that you have seen or know of.
- 3 In what ways are flowering plants different to non-flowering plants?
- 4 Why don't we usually find flowers and fruits on a peach tree at the same time?

5 These are the stages in the life cycle of a bean plant:



The stages are in the wrong order. Put them in the right order and draw the life cycle of the bean plant with labels.

6 Why do we make life cycle drawings in a circle?

Think like a scientist 1

Collect flowers

You will need:
different flowers

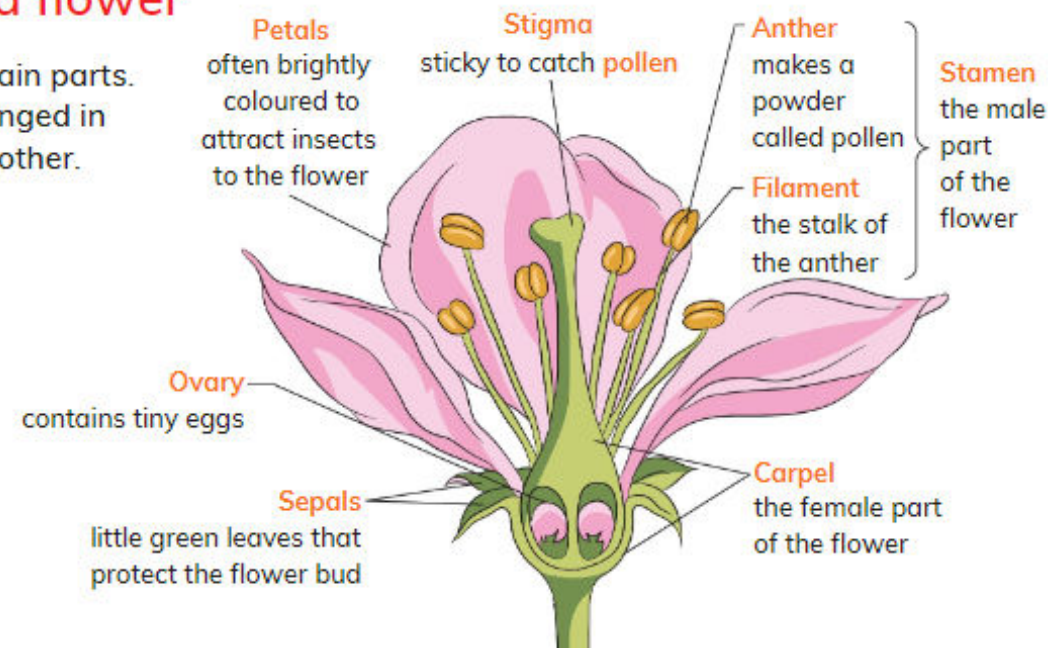
Make sure you wash your hands after touching the flowers.

- Collect a range of different flowers.
- Group the flowers according to their size, colour and scent. How many groups can you make?
- Draw pictures of one of the flowers. Label any parts of the flower that you know.
- Try to name the flowers.



The parts of a flower

Flowers have four main parts. These parts are arranged in rings, one inside the other.



Most flowering plants have flowers with both male and female parts. But some plants have flowers with only male parts or female parts, not both.

Think like a scientist 2

Observe and draw a flower

You will need:
a flower, hand lens, tweezers

Make you sure wash your hands after touching the flower.

- Draw the flower and label its parts.
- Count and record the number of petals, sepals and stamens. Record the results in a table. Can you see a pattern?
- Carefully pull off the petals and sepals with the tweezers.
- Use the hand lens to look at the stamens and the carpel.
- Find the anthers. Touch their tips gently. What do you notice on your fingers?
- Find the stigma. Touch the tip. How does it feel?

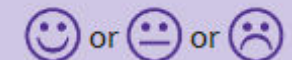
Questions

- 1 Describe the function of each of these parts of a flower:
 - a petals
 - b anthers
 - c stigma
 - d ovary
- 2 Which part of the flower do you think makes scent?
- 3 Why are some flowers dark reddish brown with a scent like rotting meat? You may need to look for the answer in a book or on the internet.



How am I doing?

How well can I:



- draw a flower and label its parts?
- identify the functions of different parts of a flower?
- record observations in a table?

Activity 2

Plan an investigation on flowers

Flower petals are different colours.

- **Plan** an investigation to find out which colour is most common.
- Say how you will present your results.



How did the practical activities help me to understand more about parts of a flower?

What did I find difficult?

What would I like to learn more about?

Look what I can do!

- ☐ I know that some plants have flowers and other plants do not have flowers.
- ☐ I can say what the stages are in the life cycle of a flowering plant.
- ☐ I can sort and group flowers.
- ☐ I can identify the parts of a flower and describe their functions.
- ☐ I can observe and draw a flower.
- ☐ I can describe patterns in observations.

> 1.2 Pollination, fruits and seeds

We are going to:

- draw and label flowers
- identify types of pollination and sort flowers into groups according to how they are pollinated
- say how flowering plants are adapted to attract pollinators
- say how pollination is part of a flowering plant's life cycle
- use knowledge and understanding to make predictions about pollinators
- collect and record observations of pollination in a table
- draw a bar chart of findings
- describe patterns in results, and any results that do not fit the pattern
- do research to answer a question about pollination

Getting started

- 1 What colour flowers do you like best?
- 2 Why do you think flowers are different colours?
- 3 Which parts of a flower make pollen?
- 4 Why do you think flowers need pollen?

adaptation	nectar
adapted	pollinate
fertilisation	pollination
fertilise	pollinator

