Let's Do SCIENCE

Primary 3

Textbook A

The 5E Model – Guided Inquiry

The Let's Do Science series is based on the Biological Sciences Curriculum Study (BSCS) 5E teaching and learning instructional model. The 5E model is centered on the idea that students understand science concepts best by using prior knowledge to pose questions and find answers through guided inquiry.

This hands-on approach, integrated with engineering and design skills, has students learn science by doing science. Teachers guide the learning process and are able to assess student performance by evaluating student explanations and the application of newly acquired knowledge and skills.

Engage

The Engage phase of the 5E model provides students with the opportunity to demonstrate their prior knowledge and understanding of the topic or concept. Students are presented with an activity or question which serves to motivate and engage students as they begin the lesson. Teachers identify and correct any misconceptions and gather data from students which will guide informed teaching and learning.

Essential to stimulating and engaging students is the use of mixed media such as colorful photos, illustrations and diagrams found throughout the textbooks and activity books. Let's Do Science also includes extensive digital resources such as narrated videos, interactive lessons, virtual labs, slideshows and more.

Explore

This phase encourages exploration of concepts and skills through hands-on activities and investigations. Students are encouraged to work together and apply various process skills while gaining concrete, shared learning experiences. These experiences provide a foundation for which students can refer to while building their knowledge of new concepts. This student-centered phase comes before formal explanations and definitions of the concept which are presented by the teacher.

Explain

This phase follows the exploration phase and is more teacher-directed. Students are initially encouraged to draw on their learning experiences and demonstrate their understanding of the concept through explanations and discussion. After the students have had the opportunity to demonstrate their understanding of the concept, the teacher then introduces formal definitions and scientific explanations. The teacher also clarifies any misconceptions that may have emerged during the Explore phase.

Elaborate

In the Elaborate phase, students refine and consolidate their acquired knowledge and skills. Opportunities are provided for students to further apply their knowledge and skills to new situations in order to broaden and deepen their understanding of the concept. Students may conduct additional investigations, share information and ideas, or apply their knowledge and skills to other disciplines.

Evaluate

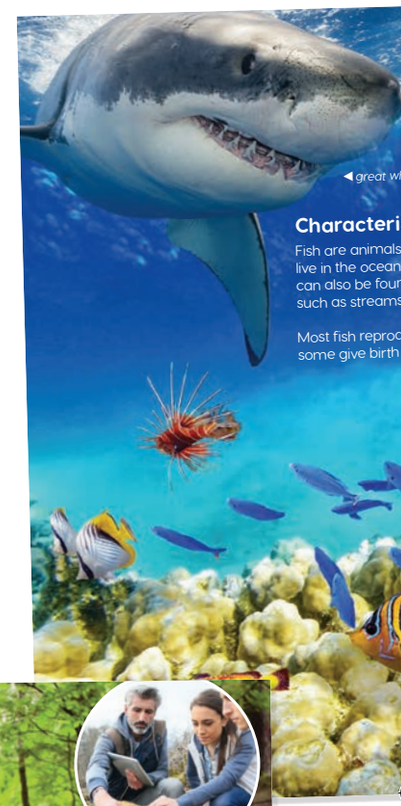
This final phase includes both formal and informal assessments. These can include concept maps, physical models, journals as well as more traditional forms of summative assessment such as quizzes or writing assessments. Students are encouraged to review and reflect on their own learning, and on their newly acquired knowledge, understanding and skills.

Let's Do Science

Let's Do Science is based on the United States Next Generation Science Standards (NGSS). The series consists of full-color textbooks and full-color activity books for Grades K to 6.

Let's Do Science engages students with a highly visual presentation of the disciplinary core ideas in the textbooks and places an emphasis on applying scientific knowledge using NGSS practices through numerous scientific investigations. Let's Do Science sees engineering as an essential element of science education and as such is tightly integrated into both the textbooks and activity books.

The Let's Do Science textbooks include the following features:

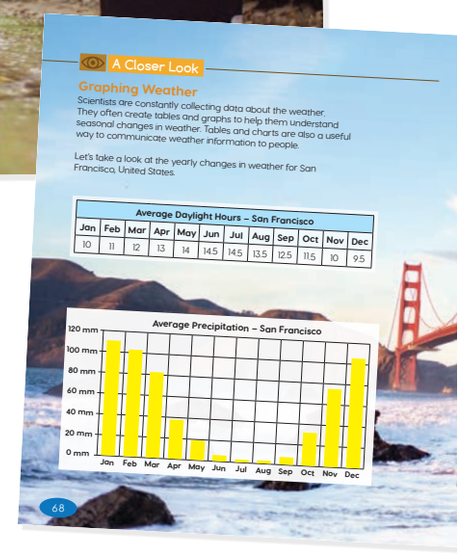


Think Deeply

Topic-related questions for group discussion aimed at deepening students' understanding of the topic.

Engineer It!

Goes beyond inquiry by encouraging students to design, model and build to engineer solutions to defined problems.

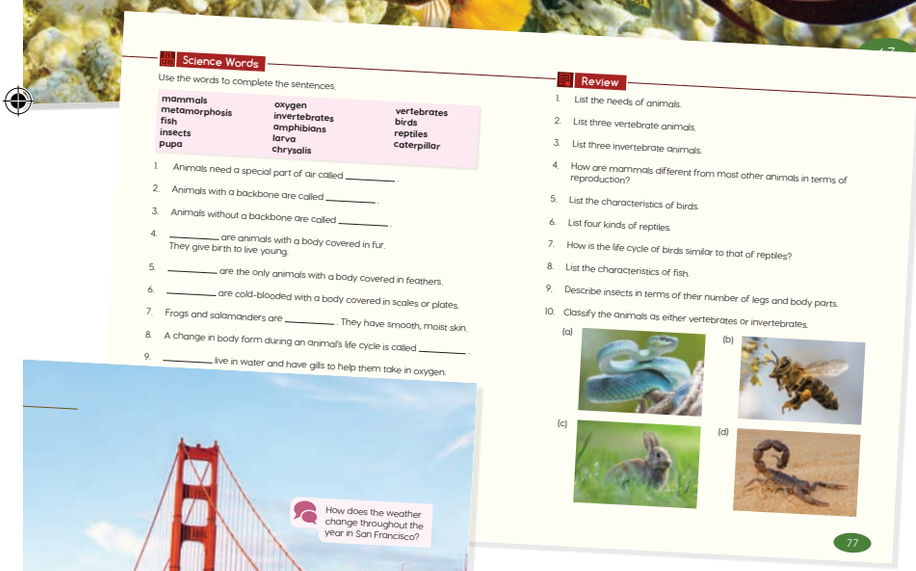


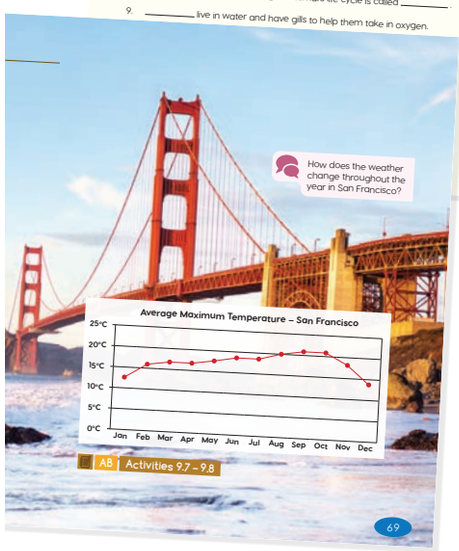
In the Field

Inspirational science-related professions to stir interest in science-related careers.

A Closer Look

Invokes enthusiasm in science by presenting interesting topics beyond the syllabus.





Amazing Fact!

Interesting facts to build interest and enthusiasm.

Did You Know?

Extra information to build students' knowledge base of the current topic.

Try This!

Optional hands-on activities to be conducted in groups or at home.

AB Activity

Links students to the Let's Do Science Activity Book at the appropriate juncture.

Discussion

Topic-related questions and situations for class discussion to build a deeper understanding of topics.

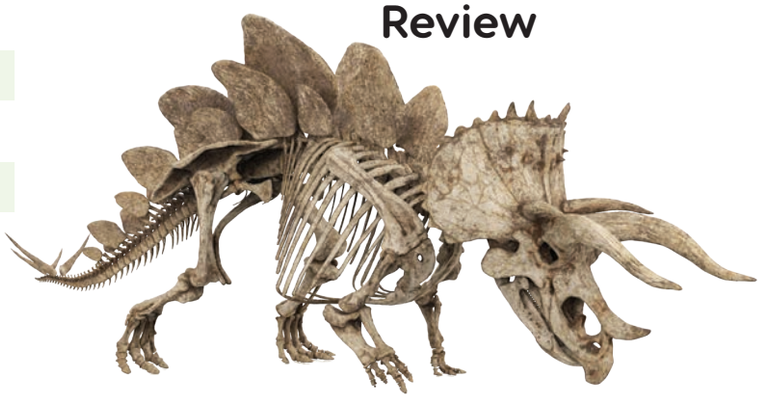
Review

Topical questions at the end of each chapter for formative assessment.

Science Words

Lists the essential science vocabulary covered in each chapter.

Contents



Science Skills

Scientists ask questions about the world around them. To find the answer to these questions, scientists use special skills to collect, analyze and interpret data. They communicate the things they find out.

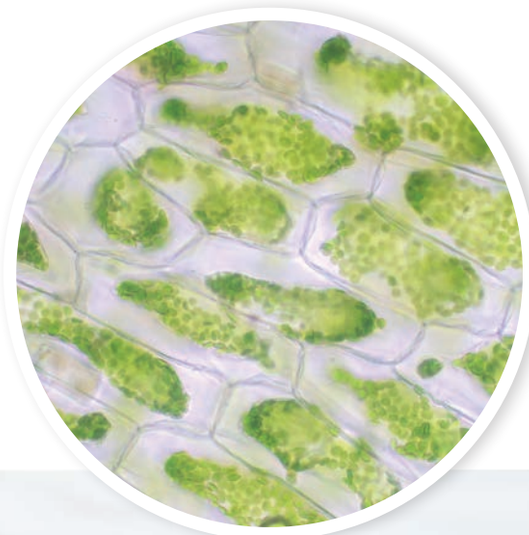
Let's look at how you can use these skills so you can be a scientist too.

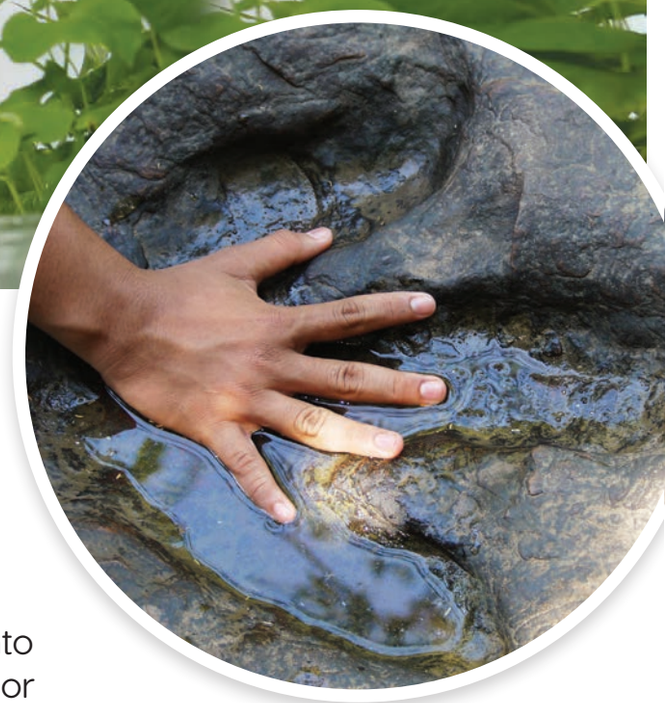
Observing

You make observations when you gather information about something using your senses. You can observe how something looks, feels, sounds, smells or tastes.

Scientists often use tools and instruments that allow them to observe things closely. Such tools include hand lenses, microscopes and telescopes.

It is important to accurately record your observations in a way that can be easily understood by others. You can make notes, and create charts and tables. You can also draw and label diagrams.

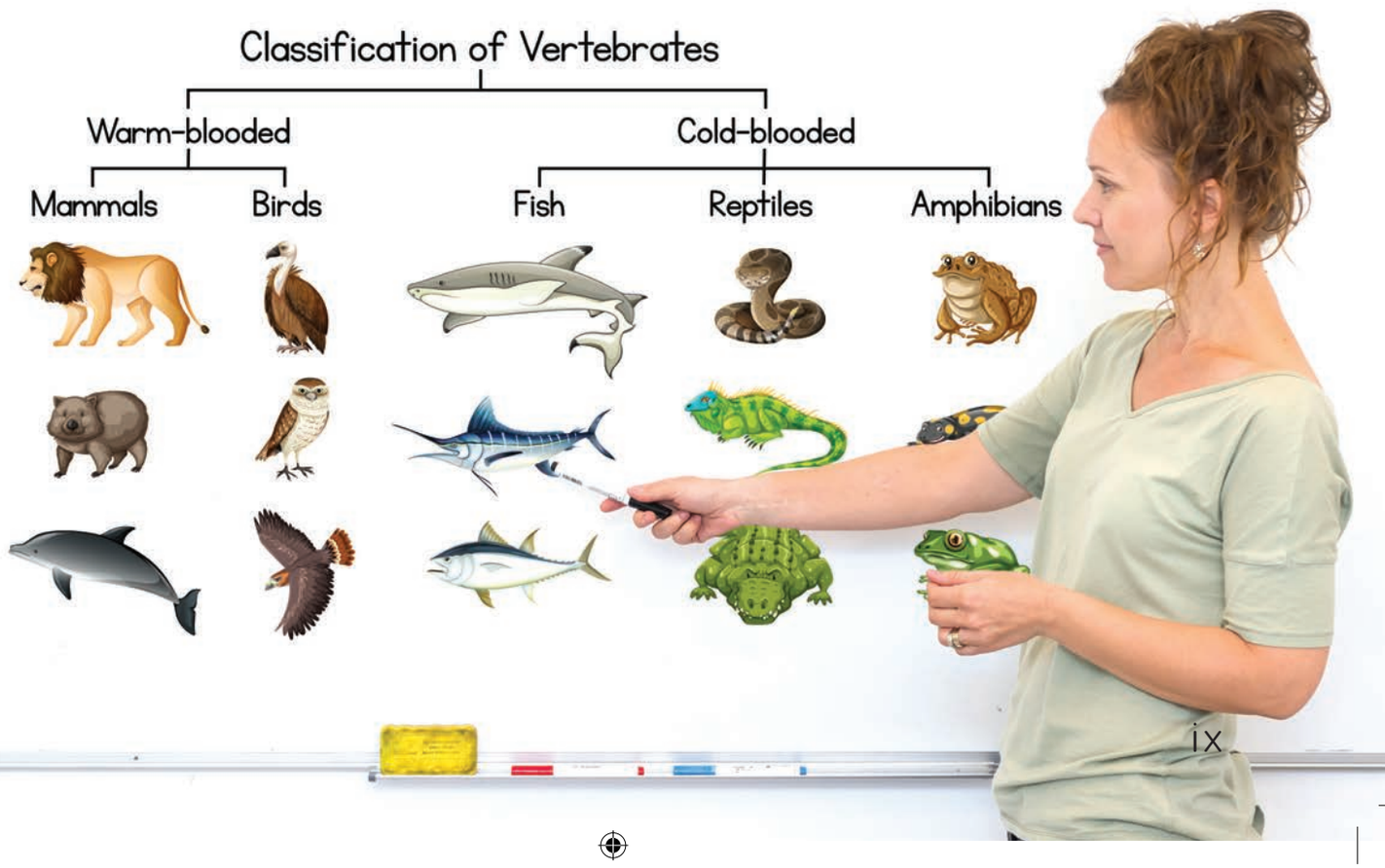




Comparing and Classifying

Scientists compare the things they observe. To compare means to observe the properties or characteristics of two or more things and identify their similarities and differences.

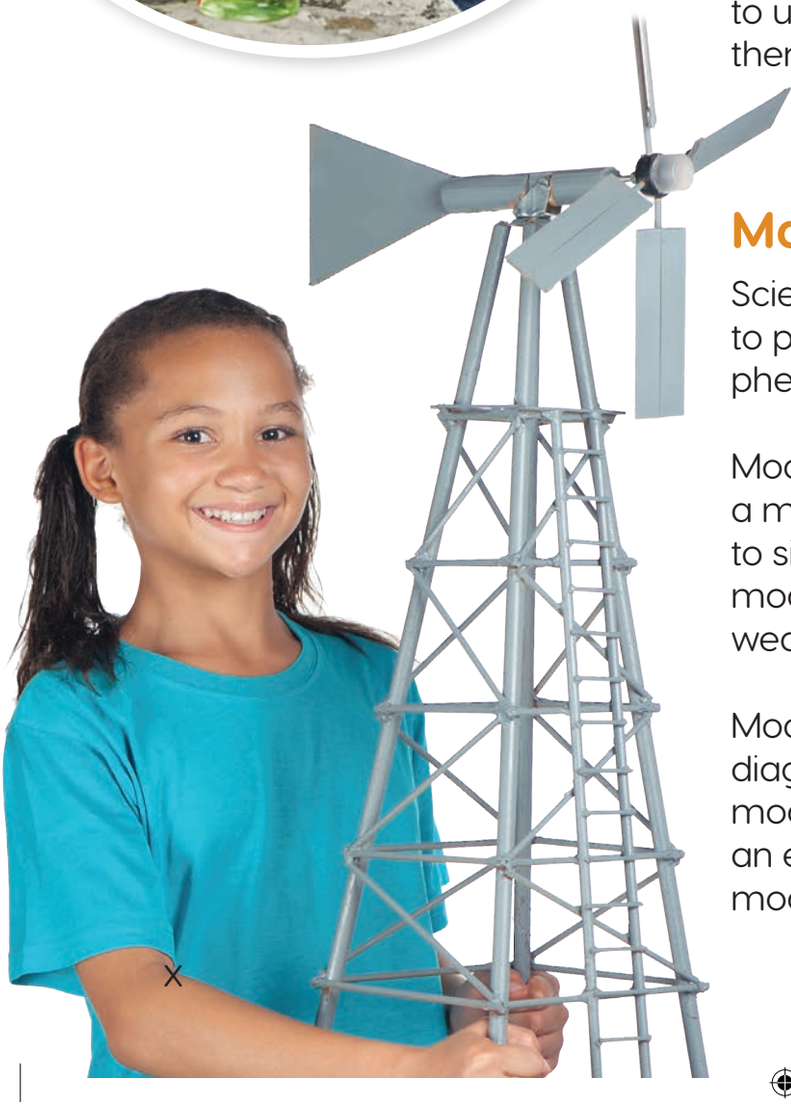
Classification is the process of placing things into groups based on similarities in their properties or characteristics. Objects around us can be classified by the properties of the materials they are made of. Organisms can be classified by their features, such as the presence or absence of a backbone.



Measure

Measuring is an important science skill. It allows you to quantify your observations. Distance, time, volume, mass and temperature are some quantities that can be measured.

To measure accurately, you often need to use tools such as rulers, beakers, thermometers and stopwatches.



Make a Model

Scientists often construct models to predict, test and observe real-life phenomena.

Models can be physical objects, such a model of a miniature wind turbine to simulate electricity generation or a model of the Earth's surface to simulate weathering and erosion.

Models can also be in the form of diagrams. A food web diagram is a model that shows the flow of energy in an ecosystem. A map is a diagrammatic model of an area of land or water.

Infer

You infer when you make a guess about something based on what you know or what you observe.

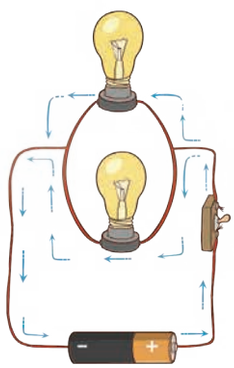
If you see footprints in the snow, you can infer that an animal has passed by after the last snowfall.

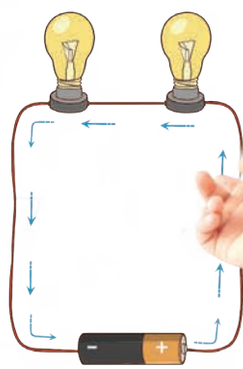
If you discover an animal jaw bone with large canine teeth, you can infer that the animal likely ate other animals.

Communicate

You communicate when you show or tell other people what you find out.

Communication can be in the form of a written report, visual displays or an oral presentation.





Scientific Method

Scientists ask questions based on observations of the world around them. To find the answers to their questions, they carry out tests and investigations following the scientific method.

Why is it useful for scientists to follow the same scientific method?

The scientific method is a logical set of steps that is followed to help guide an investigation. It also helps to ensure the investigation is carried out fairly and in a manner that can be understood and repeated by other scientists.

Make Observations

The scientific method begins by making observations about the world around you. You may observe that plants in one area grow faster and taller than plants in other areas. You may notice that you feel hotter in a darker-colored shirt than a lighter-colored shirt. You may observe that ice melts faster in a cup made of one material than a cup made of another material.

Such observations lead you to ask questions about why these things occur.

Ask Questions

Before a science investigation begins, it's important to ask questions about what you would like to find out.

Asking questions helps you to define the investigation. Your investigation should be designed to find the answer to your questions.

You can also used prior knowledge and experiences to provide possible answers to your questions.

Make a Prediction

Once you have asked questions based on your observations, it's time to make a prediction and form a hypothesis. A **hypothesis** is a statement about what you think your investigation will show.

A hypothesis is more than just a guess. It is a statement based on knowledge you already have or things you have observed in the past.

Based on past gardening experience, you may predict that plants will grow faster and taller in humus-rich potting soil than in sandy soil.

Based on a previous investigation, you may already know that metal is a better conductor of heat compared to wood or plastic. These past experiences can help you predict the results of an investigation.

Why is it important to write a procedure that can be easily followed by others?

Plan and Carry Out an Investigation

Once you have stated your hypothesis, it's time to plan and conduct an investigation that will test your prediction. In planning your investigation, you should include all the materials you will need and a procedure that clearly shows the steps you will take to conduct the investigation.

Your materials and procedure should be written in a way that allows the investigation to be easily followed and repeated by others. In your procedure, include the data you will collect and the way it will be recorded.

Variables

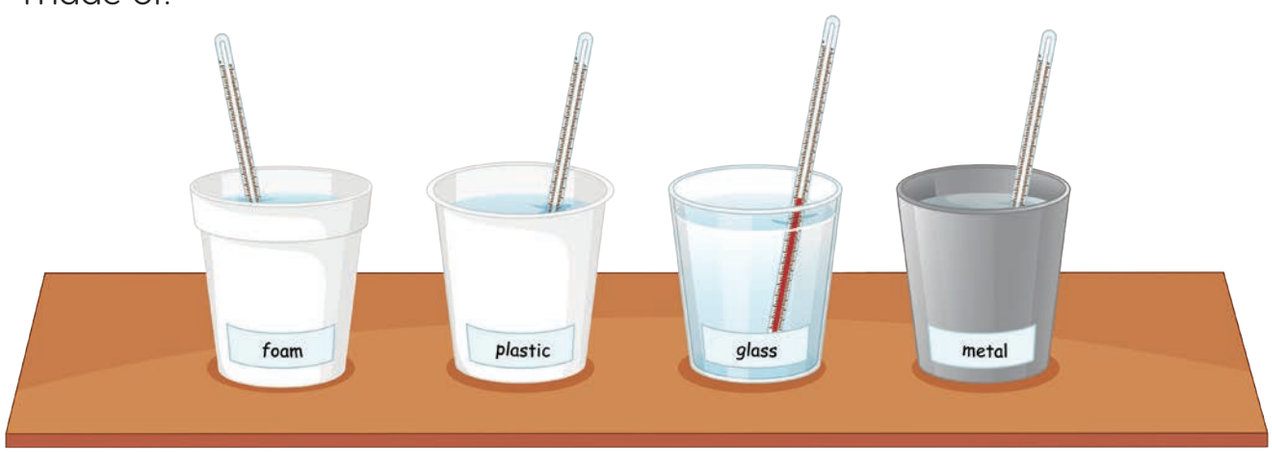
An important part in a science investigation are variables. A **variable** is any factor that can be controlled or changed during the investigation. There are three main variables – the independent variable, the dependent variables and the controlled variables.

The **independent variable** is the one condition in the investigation that you can change. Usually it is the thing that is being tested. If you were investigating which materials are good conductors of heat, the independent variable would be the type of material.

The **dependent variable** is the factor that you measure or observe. The dependent variable should change due to changes in the independent variable.

In an investigation on materials that are good conductors of heat, the dependent variable could be temperature of water in a cup. You would expect the temperature of the water to change as you change the independent variable – the type of material the cup is made of.

Imagine conducting an investigation about the growth rates of different seedlings. What would be the independent variable? What would be the dependent variable?



The **controlled variables** are variables that do not change during the investigation. Controlled variables could include the type and size of a container, the source and temperature of water and the types of instruments used to take measurements. The purpose of the controlled variables is to ensure that the only influence on changes in your observations is due to the independent variable.

Imagine you were carrying out an investigation into the effect of temperature on plant growth. What would be your controlled variables?

Collecting and Recording Data

Make observations and collect data as stated in your procedure. The data should be recorded in an organized way that can be read and understood by others.

Often, data is recorded in a visual manner, such as charts, graphs and diagrams. Data can also be entered into computer software which can make it easier to analyze and present the data.

Analyze and Interpret Data

Once your observations have been accurately recorded, it's time to analyze and interpret the data to see if your hypothesis is supported.

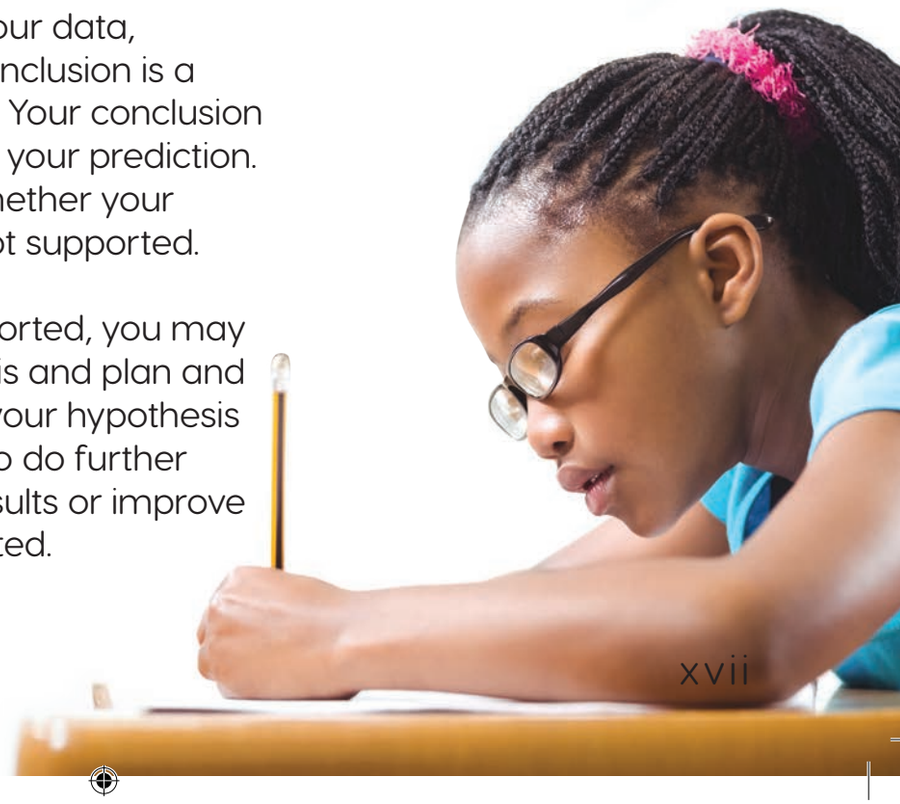
You **analyze** when you look closely at recorded data. You look for patterns to help explain your results. A pattern is when data repeats in a predictable way.

You **interpret** when you understand and explain what the data means. In interpreting data, you use your prior knowledge, experience, and skills to explain patterns and trends identified in the analysis of the data.

An important part of analyzing and interpreting is to check the accuracy of the data collected. If there are inaccuracies or inconsistencies in the data, you may need to adjust your procedure and repeat the investigation.

Draw a Conclusion

By analyzing and interpreting your data, you reach a conclusion. Your conclusion is a summary of the data collected. Your conclusion should indicate the accuracy of your prediction. Your conclusion should state whether your hypothesis was supported or not supported.



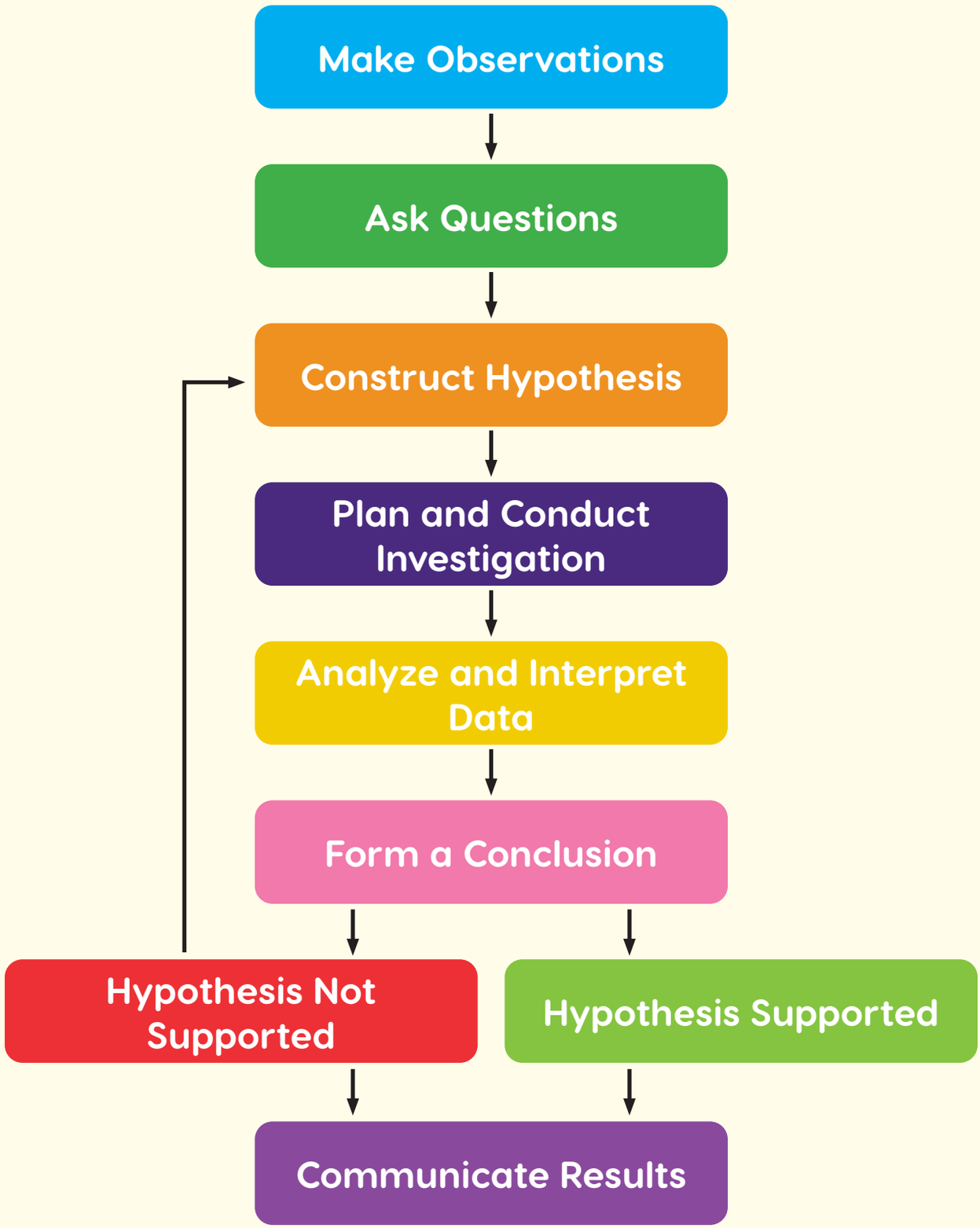
If your hypothesis was not supported, you may decide to form a new hypothesis and plan and conduct a new investigation. If your hypothesis was supported, you may wish to do further investigations to confirm the results or improve the accuracy of the data collected.

Communicate

The final step in a science investigation is to communicate your findings to others. This allows you to share what you have discovered and also allows others to assess the accuracy of your investigation.

The people you communicate your results with may wish to conduct a similar investigation and compare results. They may also wish to conduct further investigations to find out more. If they do, they'll also communicate their results so others can learn from their investigations too.

Scientific Method Flowchart



Science Safety

In the Laboratory

Follow these safety rules when in your science laboratory or when carrying out any science investigation.

- Do not enter the laboratory without a teacher.
- Follow your teacher's instructions. If you have any questions or are unsure of what to do, raise your hand and ask your teacher.
- Do not eat, drink, play or run in the laboratory.
- Wash your hands with soap when entering and before leaving the laboratory. Dry your hands properly, especially if you will be working with electrical equipment. If any chemical or hazardous material gets on your hands, inform your teacher immediately.
- Wear appropriate safety gear when carrying out scientific investigations. Safety gear includes a lab coat, safety googles and gloves. Tie long hair back and do not wear open-toed shoes.
- Be careful when handling sharp tools or working with burners and hot substances.

- Do not panic if an accident occurs. Be aware of eyewash stations, fire extinguishers, exit doors and other safety equipment and procedures in case of an emergency.

- Keep your workspace clean and organized. Report any spills or breakages to your teacher. Clean up any spills straight away and dispose of the cleaning products safely.

- When cleaning up, ensure all materials and substances go into the correct bin or container. Do not pour any liquid down the sink unless your teacher has instructed you to do so.

- Look after the equipment you use and return it to its proper location in the same condition you received it. Wipe your workstation down after use.

In the Field

- Make sure you are accompanied by an adult when on field trips or doing other activities outside of the schoolyard.

- On long trips, make sure you take enough water and food. Bring insect repellent if necessary.

- On sunny days, take Sun protection such as a long-sleeved shirt, hat and sunscreen.

- Do not touch plants, animals or other organisms unless instructed to do so by your teacher.

Try This!

Create a poster of the rules to be followed in your science laboratory or classroom. Display the poster in a place for everyone to see.

1 Living Things Around Us

In this chapter you will ...

- list the characteristics of living things.
- list the needs of plants and animals.
- understand that all living things are made up of one or more cells.
- list the four main groups of organisms.

How can you tell that something is a living thing?

What do plants and animals need to live and grow?

Go Online!

Access interactive content relating to this topic on the NGScience website.
ngscience.com

How can we organize and classify living things?

What Are Living Things?

There is a great diversity of things around us. Some are living things. A living thing is called an **organism**. Other things are non-living.

How can we tell which things are living and which are non-living?

AB Activity 1.1

Growth

Look at a photograph of when you were one or two years old. How have you changed since you were a baby?

You are a living thing and like all living things, you grow as you get older.

A newborn kitten grows as it gets older. It gets bigger and taller. As an adult cat, it will produce new kittens of its own.

AB Activity 1.2

Try This!

Predict how much you think you will grow in one year. Measure and mark your height on a wall once a month. How accurate was your prediction? In what other ways do you change as you grow?

▼ *A young kitten gets larger and heavier as it grows into an adult cat.*

Sunflower seedlings get bigger and taller as they grow. As adult sunflower plants, they will develop seeds and produce new sunflower plants.

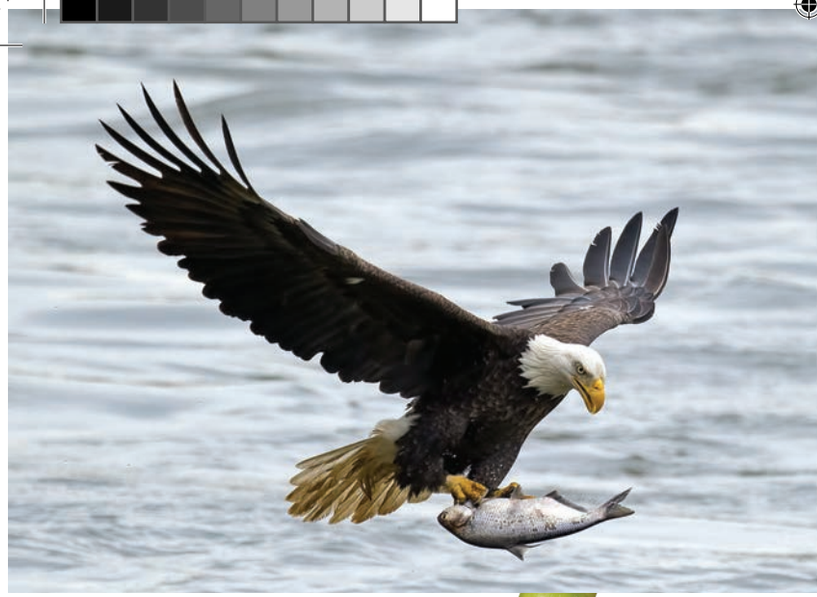
▲ *sunflower seedlings*

Response to Change

Living things **respond** to changes around them. Some plants bend their leaves to face the sunlight. Other plants, like the mimosa plant and Venus flytrap, close their leaves in response to touch. The leaves of an oak tree change color and fall to the ground in response to changes in seasons and the weather.

Animals respond to changes around them too. Kangaroos may seek shade on hot days in the Australian bushland. When a meerkat senses danger, it will respond by retreating to its burrow.

AB Activities 1.3 – 1.4



Movement

Living things move. Animals move from place to place in search of food or to flee from danger.

Some plants move their parts in response to changes around them. The Venus flytrap closes its leaves to catch small insects.

Other plants move their stems, leaves or flowers to follow the movement of the Sun.

Think Deeply

A car can move from place to place. Explain why a car is not a living thing.

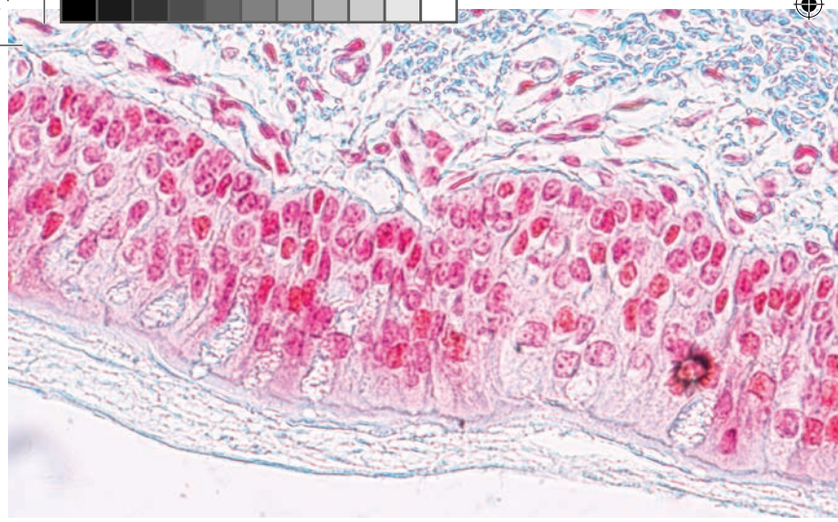
Reproduction

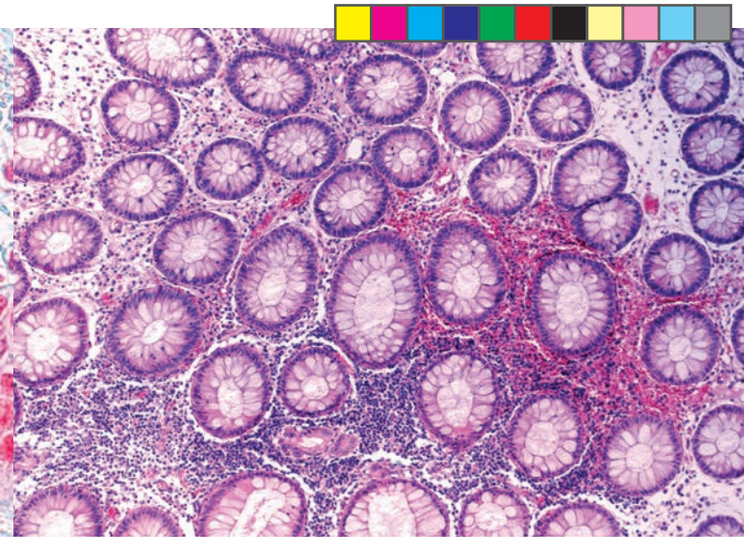
All living things reproduce. To **reproduce** means to produce new young of the same kind.

An adult lion will give birth to lion cubs. An adult chicken will lay eggs from which baby chicks will hatch.

An adult tomato plant has flowers and fruits. Under the right conditions, the seeds inside the fruits will fall to the ground and grow into new tomato plants.

Why is it important that all living things are able to reproduce?





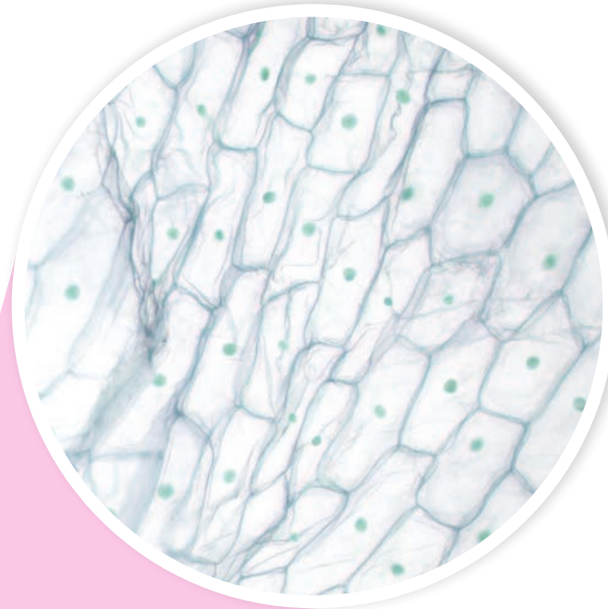
Did You Know?

Some living things, such as bacteria, are made up of only one cell. They are called unicellular, or one-celled organisms.

Cells

All living things are made up of tiny building blocks called **cells**. Most cells are too small to see using only your eyes. To observe cells, scientists use a microscope. A microscope is a scientific instrument that is used to closely observe very small objects.

Most organisms are made up of many different types of cells. The different cells help the organisms in different ways.



▲ *onion skin cells*

AB Activity 1.5

Needs of Living Things

Another way you can tell if something is a living thing is by looking at the things it needs. All living things need food, air and water. Different living things get what they need in different ways.

Food

Food gives living things the energy they need to grow and carry out life processes. Plants use air, water and the energy in sunlight to make their own food. This food-making process is called **photosynthesis**.

Plants store the energy they make in different parts. This energy is passed to animals when they eat those plant parts. Other animals get the energy they need by eating other animals.

Water

All living things need water. Many animals drink water. Others get water from the food they eat. The water helps animals to break down and transport food inside their bodies.

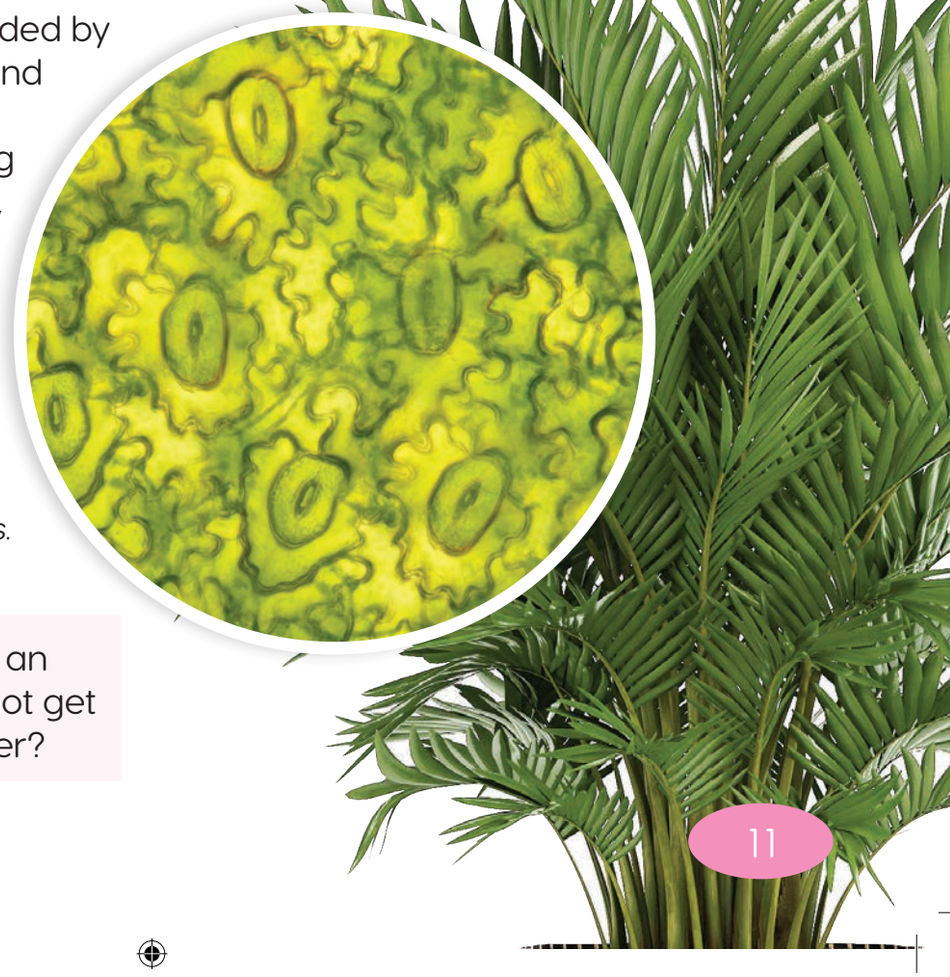
Plants take in water through roots. The water is used in photosynthesis. It also helps to transport food, nutrients and minerals within the plant.

Oxygen and Carbon Dioxide

Air is a mixture of different gases. To make food, plants need a gas in air called **carbon dioxide**. They take in carbon dioxide through small openings found mostly on the underside of their leaves.

When plants make food, they also produce a gas called **oxygen**. The oxygen leaves the plant through the openings in the leaves.

Oxygen is the part of air needed by people and animals. Many land animals get the oxygen they need by breathing in air using lungs. Many aquatic animals, such as fish, have gills that help them take in oxygen from water.



▶ *Gases enter and exit a plant through tiny openings found mostly on the underside of leaves.*

What will happen to an organism if it does not get enough food or water?

Amazing Fact!

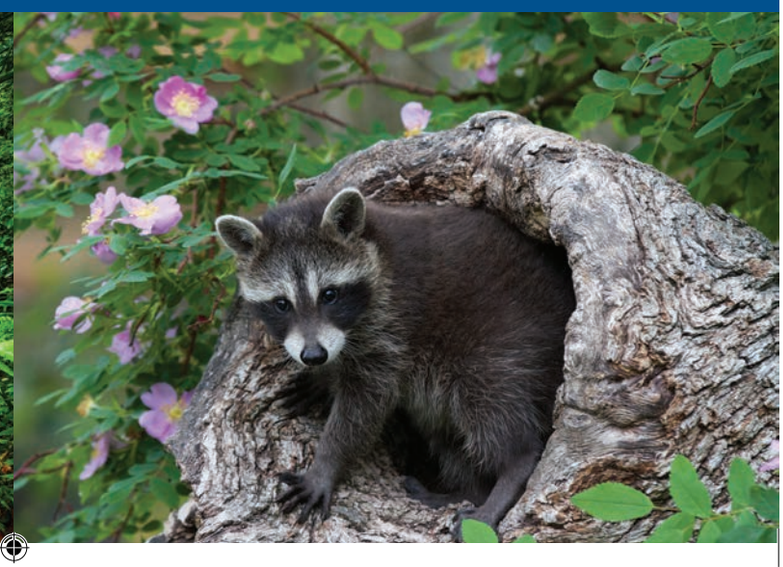
Every year, about 25,000 humpback whales swim thousands of miles from the icy waters of Antarctica to the much warmer waters of Queensland, Australia. In the warmer waters, they give birth to young before making the return trip to Antarctica.

A Place to Live

All organisms need a place to live. Animals need a place that provides them with all the food, water and oxygen they need. The place an animal lives also keeps them safe from danger and provides them with a safe space to raise their young. Some animals, like a frog or fish in a pond, only need a small place to live. Others, such as humpback whales and grizzly bears, need much larger places to live.

Plants need a place to live too. They need space for their roots to spread out and take in minerals and water. The need a place with enough sunlight to photosynthesize.

AB Activities 1.6 – 1.7



Classifying Living Things

There is a great variety of living things around us. Plants fill our parks, gardens and forests. Animals, big and small, can be found all over the Earth, underground and underwater too. There are also many living things that are too small for us to see!

To organize and learn more about different types of organisms, scientists classify them into four main groups – microorganisms, fungi, plants and animals.

Go Online!

Watch a video about how scientists classify organisms into groups on the NGScience website.
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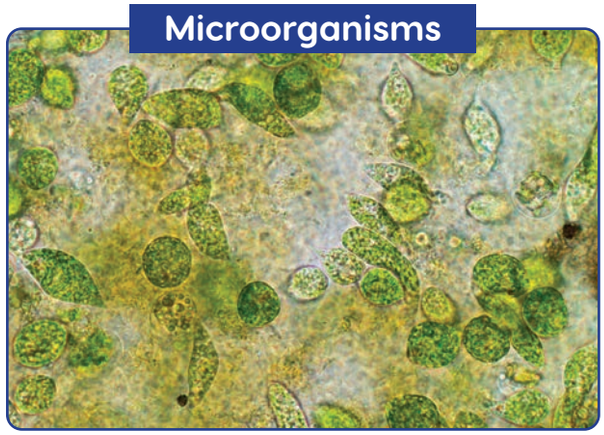
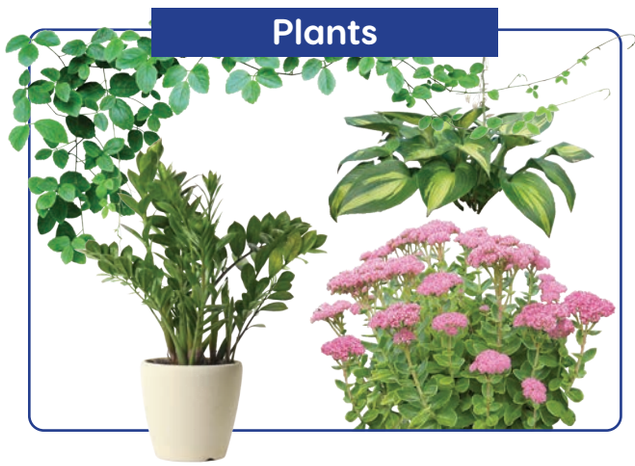
AB **Activity 1.8**

Microorganisms

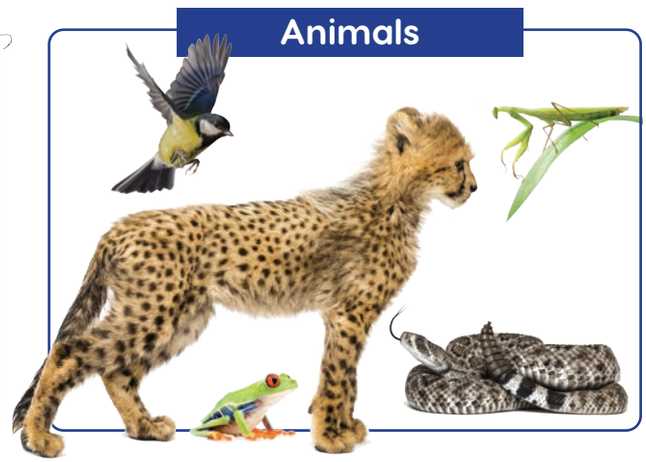


Fungi

Plants



Animals



Make a list of some organisms found in your local area. How can you classify them into groups?

Science Words

Use the words to complete the sentences.

organism	**cells**	**carbon dioxide**
respond	**photosynthesis**	**oxygen**
reproduce		

1. To help them survive, organisms _____ to changes around them.
2. All organisms are made up of one or more _____ .
3. Plants make their own food through the process of _____ .
4. All organisms produce new young of their own, they _____ .
5. A living thing is also called an _____ .
6. Plants take in _____ through holes found mostly on the underside of their leaves.
7. Fish have gills that help them to take in _____ from water.

Review

1. True or false.
   (a) Plants take in carbon dioxide and give out oxygen.
   (b) All organisms grow as they get older.
   (c) Only organisms that can move from place to place are living things.
2. List the things plants need in order to carry out photosynthesis.
3. What can you use to observe the cells that make up all organisms?
4. What must the place an organism lives have?
5. List the four main groups of organisms.

A Closer Look

Fungi

Mushrooms are similar to plants in some ways. They often grow in soil or are attached to trees, and they don't move about like animals. In fact, up until about 150 years ago, scientists classified mushrooms as a type of plant.

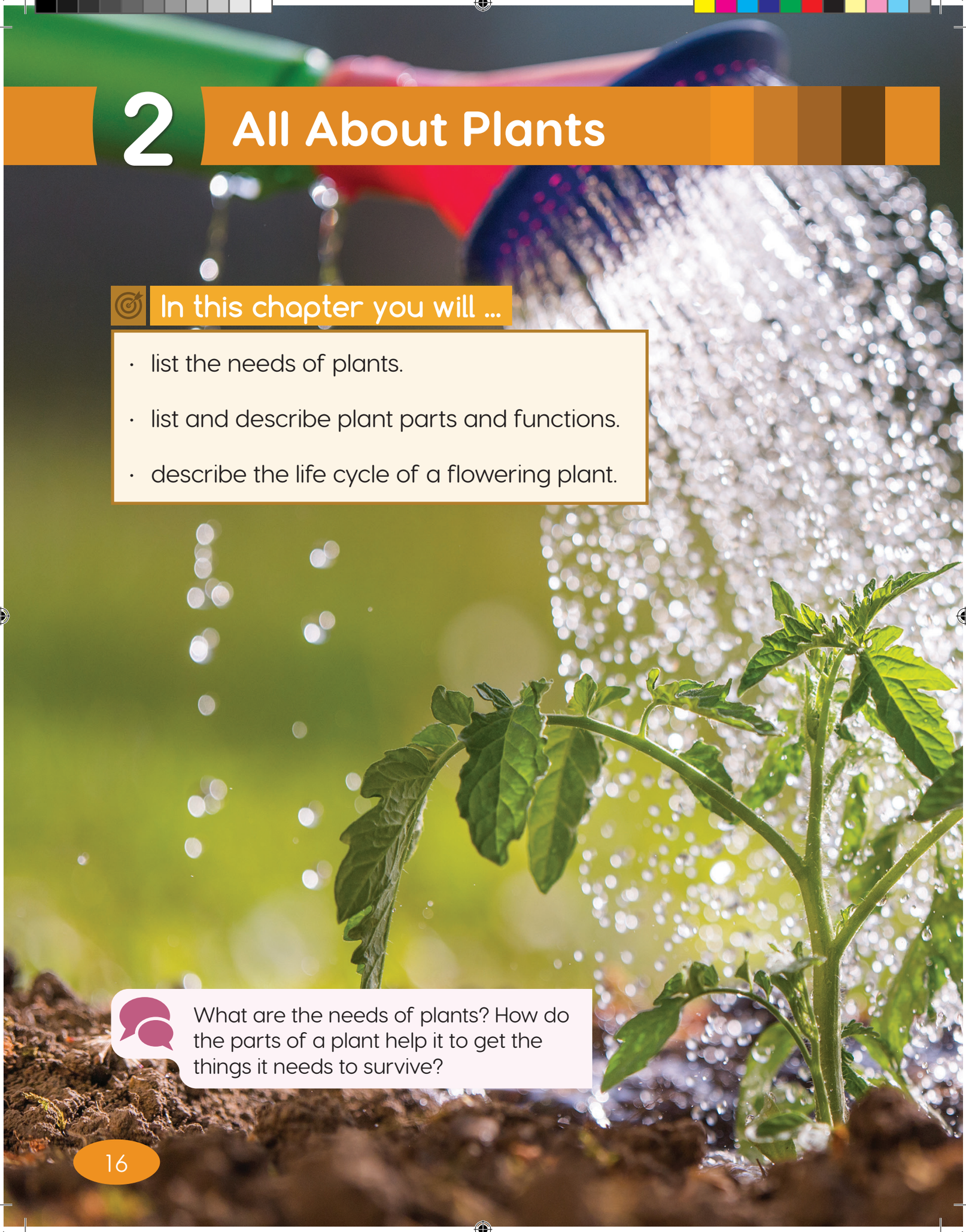
Mushrooms however, are not able to photosynthesize. They get the energy they need by breaking down dead or living plants and animals. As such, scientists now classify mushrooms into a special group of organisms called **fungi**.

Other types of fungi include bracket fungi, puffballs and molds.

Go Online!

Discover more about fungi on the NGScience website.
QuickCode: **E6G3**

2 All About Plants



In this chapter you will ...

- list the needs of plants.
- list and describe plant parts and functions.
- describe the life cycle of a flowering plant.

What are the needs of plants? How do the parts of a plant help it to get the things it needs to survive?

What are the stages in the life cycle of a flowering plant?

Go Online!

Access interactive content relating to this topic on the NGScience website.
ngscience.com

Plant Needs

Plants come in all shapes, sizes and colors. They live in all areas of the Earth – from lush, tropical rainforests to icy tundras. Plants also live on and in water. The place where a plant lives is its **environment**. An environment provides a plant with the sunlight, water, air and nutrients it needs to live, grow and reproduce.

Think Deeply

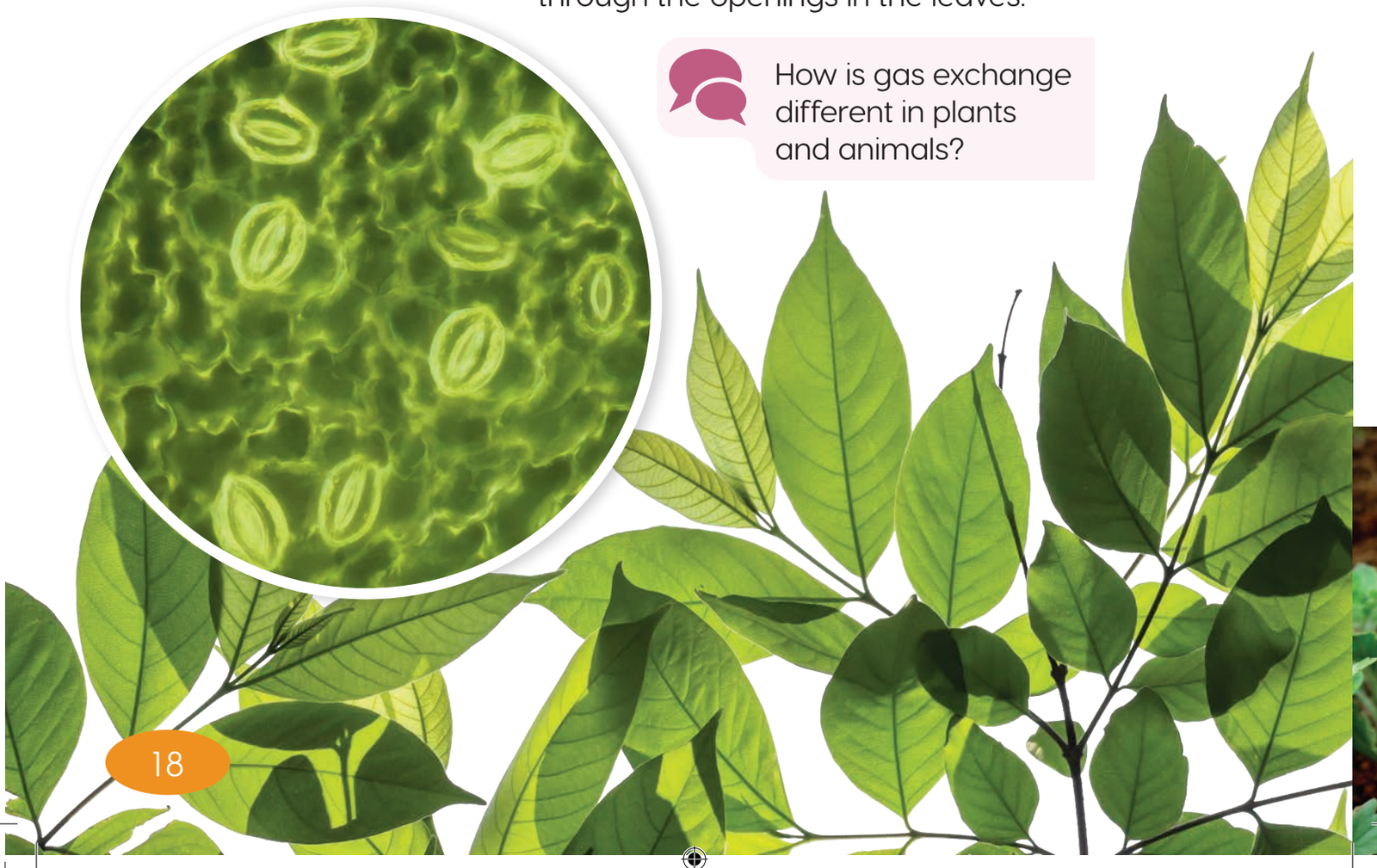
Deep inside a cave is one place you will not find any plants. Why is this so?

Carbon Dioxide

Air is a mixture of different gases. To make food, plants need a gas in air called **carbon dioxide**. They take in carbon dioxide through small openings found mostly on the underside of their leaves.

When plants make food, they also produce a gas called oxygen. The oxygen leaves the plant through the openings in the leaves.

How is gas exchange different in plants and animals?



Water and Nutrients

All plants need water to survive. They take in water through their roots. The water travels from the roots, through the stem to the leaves. In the leaves, plants use water to make food.

When plants take in water, they also take in nutrients from the soil. **Nutrients** are substances dissolved in water. They help the plant to grow and stay healthy.

Try This!

You know that all plants need water. What do you think happens if a plant gets too much water? Conduct an investigation to find out.

Light

You have learned that plants need carbon dioxide from the air and water to make food. This process of making food is called **photosynthesis**. The word 'photo' means light and the word 'synthesis' means to put together. That's exactly what plants do! They use the energy in light to combine carbon dioxide and water to make food. Without light, plants would not be able to make food and would not live and grow.

Think Deeply

A vegetable garden is an environment for plants made by people. What things do people have to do to make sure the plants grow and stay healthy?

AB Activity 2.1

Space to Grow

All plants need a space to grow. Some plants are able to grow close together. Other plants need more space. If they grow too close together, individual plants may not get enough sunlight. There also may not be enough water and nutrients for plants to grow.



Plant Parts

Plants can be found in almost all areas of the Earth. They come in all shapes and sizes. So far, scientists have identified about 390,000 types of plants. Most plants have the same basic parts. They have roots, stems and leaves.

Many plants also have flowers and fruits. Each plant part plays an important role in helping the plant get the things it needs to survive and reproduce.

Try This!

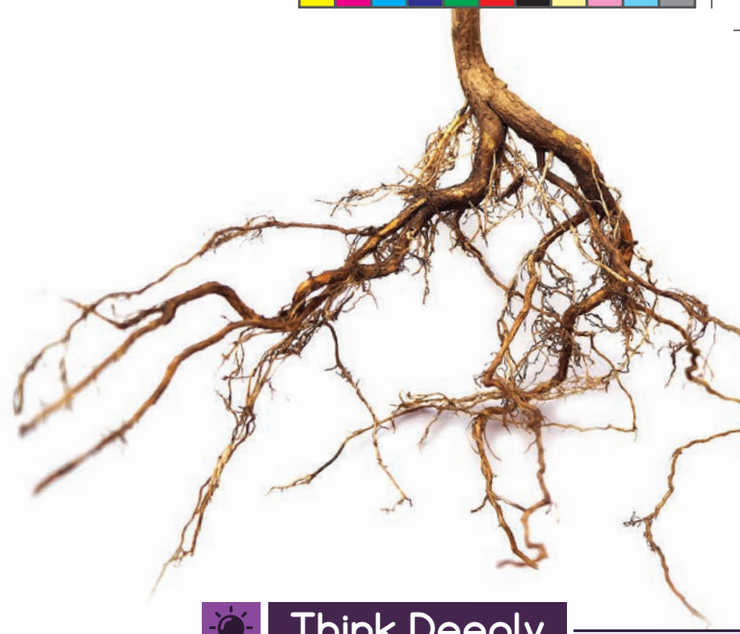
Make a list of the plant-based foods you eat in a week. Group the foods by the part of the plant they come from.

How do the parts of a plant help it to get the things it needs to survive?

Roots

Roots are the plant part that usually grows down into the soil. They often branch out in all directions or grow deep underground.

The roots hold the plant firmly in the ground. Tiny structures on the surface of the roots, called **root hairs**, take in water and minerals from the soil.



Think Deeply

Some plants, such as vines, are called climbers. They have stems that wrap around and cling to the trunk and branches of trees. How does this help the plant get the things it needs?

Stems

The **stem** is usually the part that holds up the plant. The water and minerals taken in through the roots travel through the stem to the upper parts of the plant. By holding up the plant, the stem also helps leaves to take in more sunlight.

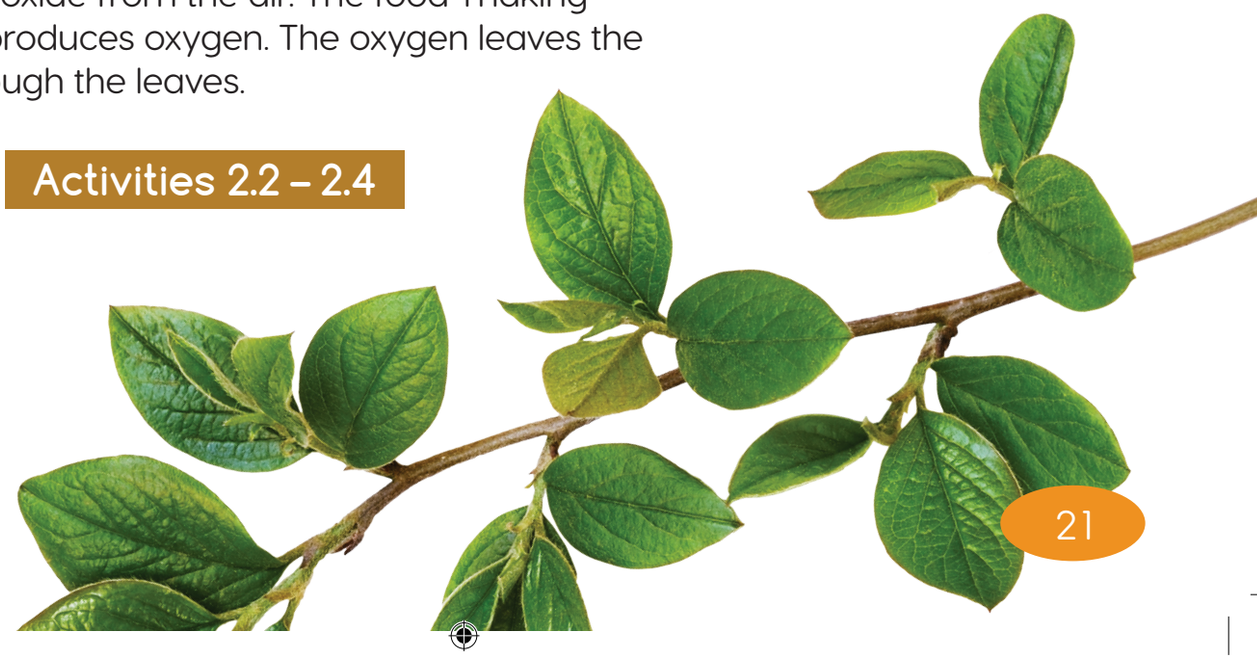
Leaves

The **leaves** of a plant is where the food-making process takes place. To make food, plants need the energy from sunlight. Many plants have leaves that are wide and flat. This gives them a large surface area which enables them to take in more sunlight. To make food, leaves take in carbon dioxide from the air. The food-making process produces oxygen. The oxygen leaves the plant through the leaves.

Go Online!

Observe how water and food are transported through a plant on the NGScience website.
QuickCode: **K8T5**

AB **Activities 2.2 – 2.4**

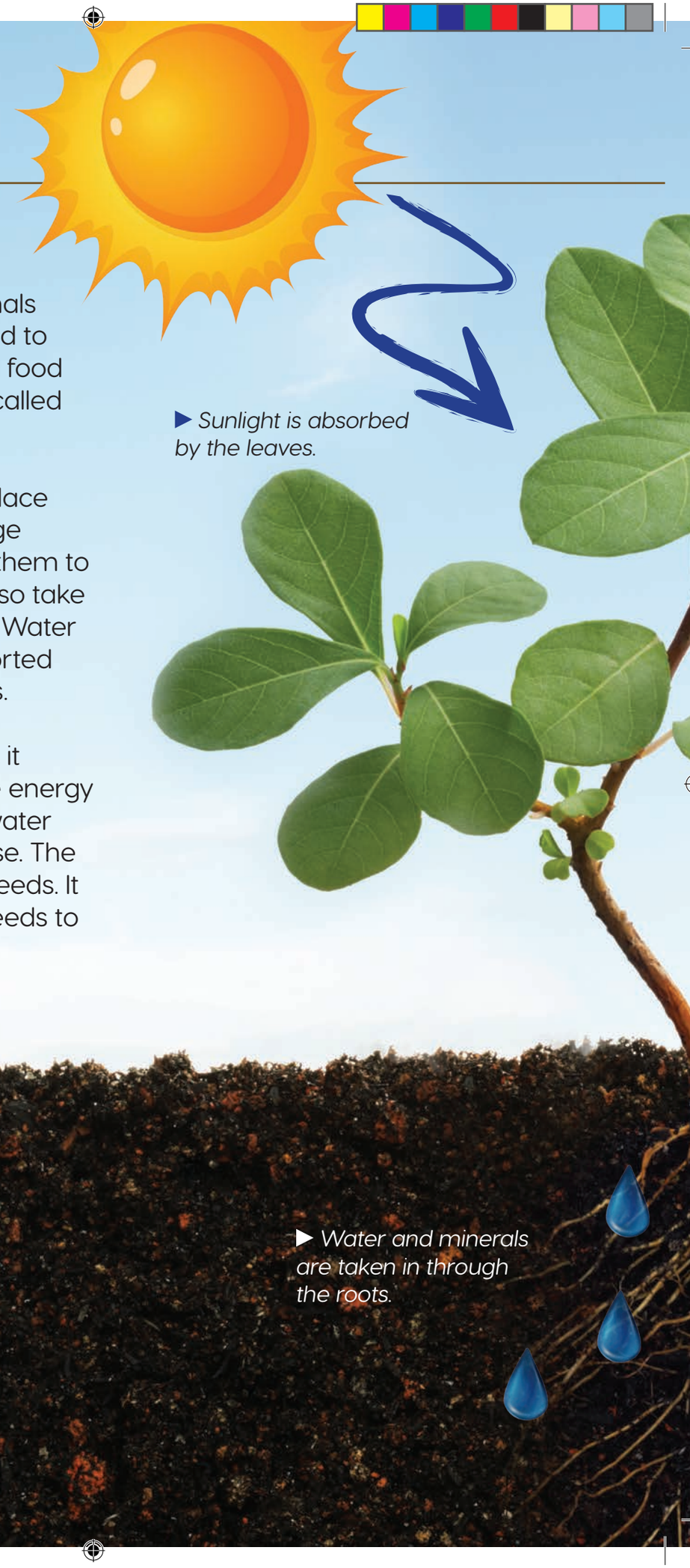


Photosynthesis

Plants do not eat food as animals do. To get the energy they need to survive, plants make their own food through an amazing process called photosynthesis.

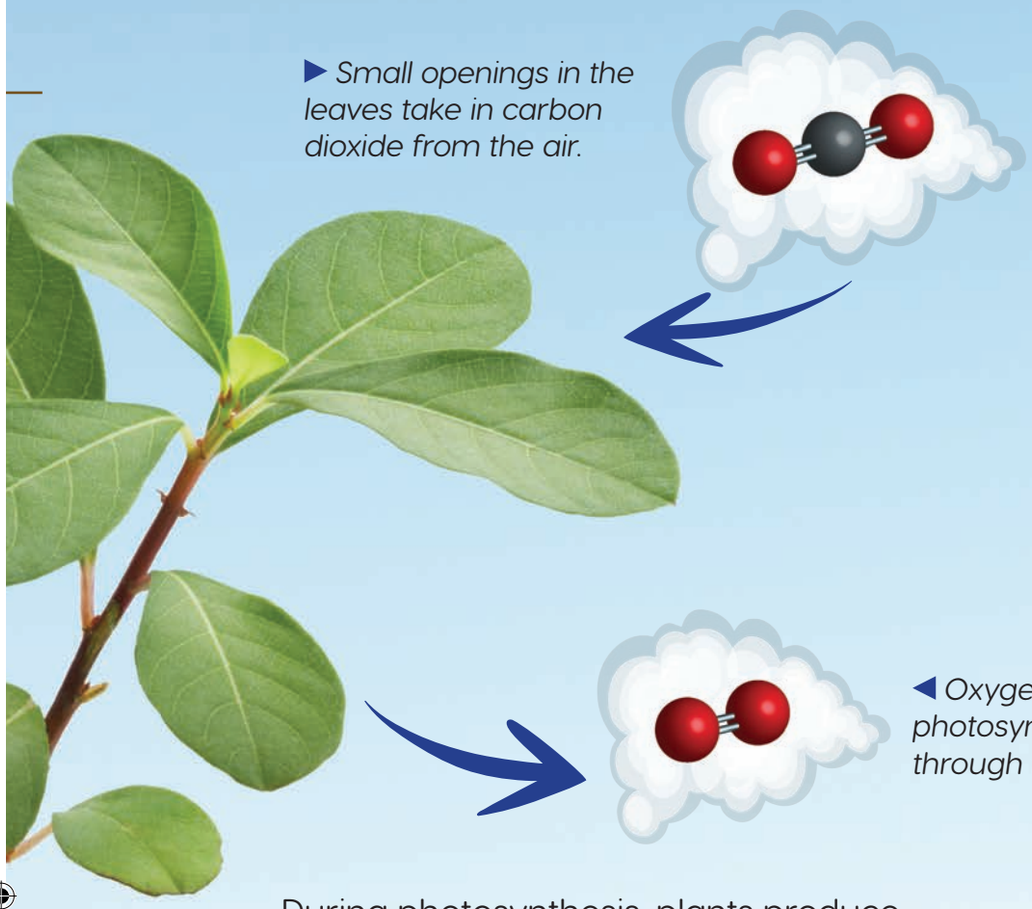
Photosynthesis usually takes place in the leaves of plants. The large surface area of leaves allows them to absorb lots of sunlight. They also take in carbon dioxide from the air. Water taken in by the roots is transported through the stem to the leaves.

The leaf now has all the things it needs to make food. Using the energy from sunlight, it converts the water and carbon dioxide into glucose. The glucose is the food the plant needs. It gives the plant the energy it needs to live, grow and reproduce.



▶ *Sunlight is absorbed by the leaves.*

▶ *Water and minerals are taken in through the roots.*



▶ *Small openings in the leaves take in carbon dioxide from the air.*

◀ *Oxygen produced during photosynthesis is given off through the leaves.*

Go Online!

Get a better understanding of photosynthesis by watching an animation on the NGScience website.
QuickCode: **G6S8**

During photosynthesis, plants produce oxygen. The oxygen is given off through the leaves. Oxygen is the part of air that animals and people need to survive.

AB **Activity 2.5**

Think Deeply

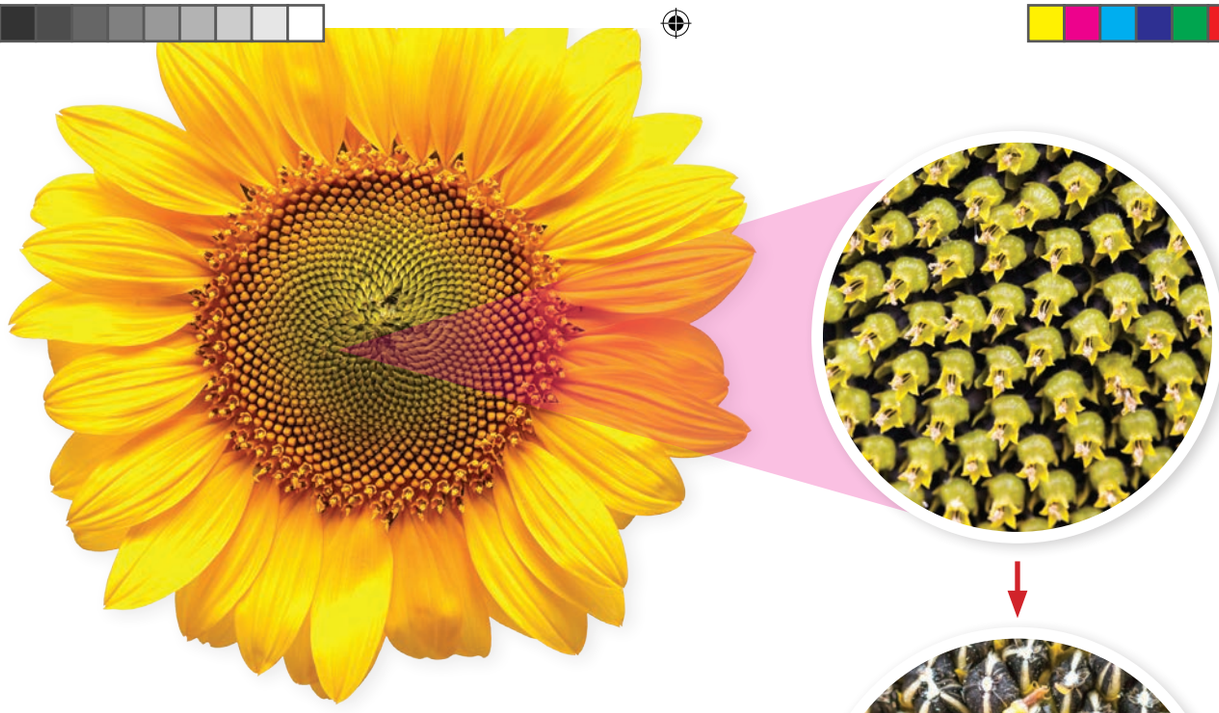
Plants are able to photosynthesize in moonlight, but they cannot produce as much food as they do during the day. Why is this so?

Flowers and Fruits

Most of the plants on Earth produce flowers. Flowers are often brightly colored or produce odors to attract insects and other animals for pollination. Once pollination occurs, a flower may develop into a fruit. A fruit holds and often protects the seeds from which new plants will grow.

Try This!

Go into your schoolyard and observe flowering plants. Make some notes about the similarities and differences between the flowers.



The flowers, fruits and seeds of different plants can look very different. If you look very closely at a sunflower, you will notice it is made up of many smaller flowers. Each small flower develops into a hard fruit containing the seed.

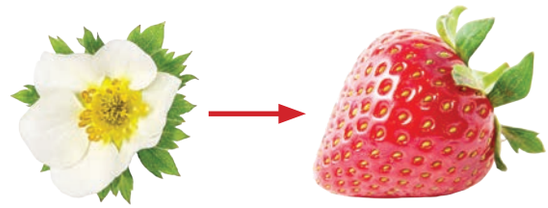
A white strawberry flower develops into a bright red fruit. The seeds are attached to the outside of the fruit.

Some plants, such as oak trees produce hard fruits. Others, such as papaya trees, produce fleshy fruits.

▲ *sunflower seeds*

AB Activity 2.6

▼ *Papayas are fleshy fruits.*



▲ *Strawberries have seeds on the outside of the fruit.*

◀ *Acorns are hard fruits produced by oak trees.*

Classifying Plants

There is a great diversity of plants around us. To organize and better understand plants, we can classify them into groups. They may be classified by their appearance, habitat or how they reproduce. Scientists classify plants into two main groups – non-flowering plants and flowering plants.

Non-flowering Plants

As the name suggests, **non-flowering** plants do not produce flowers. Common types of non-flowering plants include mosses, ferns and conifers.

▲ *cones on a conifer*

▼ *fern*

▼ *moss*

▶ *fern spores*

Non-flowering plants reproduce in different ways. Mosses and ferns reproduce from spores. Conifers have cones that hold the seeds from which new conifers can grow.

AB **Activity 2.7**

Amazing Fact!

The tallest plant in the world is a type of giant conifer, the sequoia tree, found in California, USA. They can reach heights of almost 100 meters!

▼ *sequoia trees*

Flowering Plants

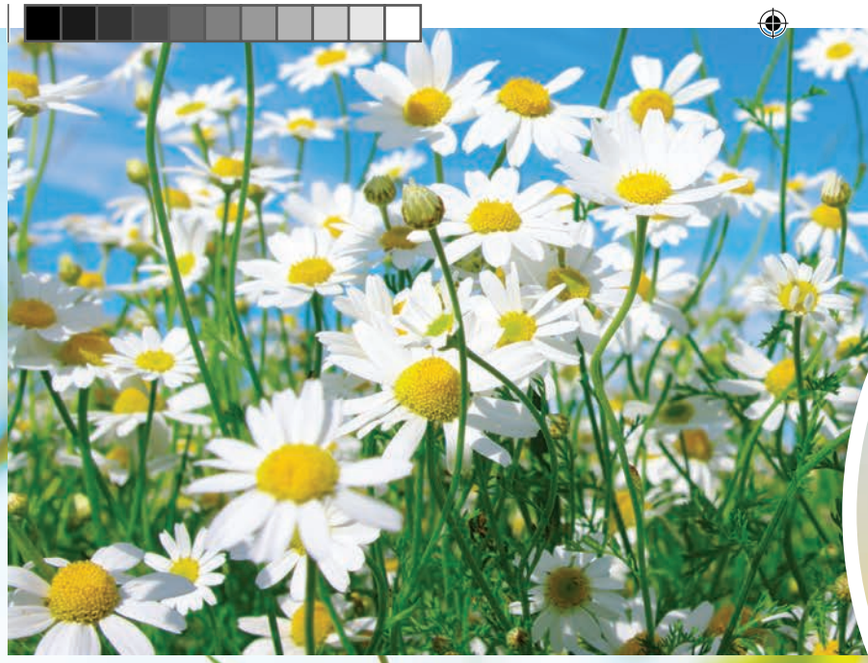
More than 80 percent of the plants on Earth are flowering plants. **Flowering plants** produce flowers and fruits. They reproduce from seeds.

Flowers contain a sticky powder called **pollen**. To make seeds, pollen needs to move from one part of a flower to another. This process is called **pollination**. Pollination is often done by animals called pollinators.

To attract pollinators, many flowering plants produce flowers that are brightly colored, have a strong smell or contain a sweet liquid called nectar.

Amazing Fact!

So far, scientists have named and classified more than 300,000 different kinds of flowering plants. Many more flowering plants have yet to be discovered.



▲ *white daisies*

▲ *Brightly colored flowers attract pollinators like bees and other insects.*

Try This!

In small groups, observe the flowering plants in your schoolyard. Identify and record the pollinators you observe.

A Closer Look

Seed Germination

Flowering plants reproduce from seeds. Inside a seed are all the things needed for the seed to grow into a new plant.

The outer covering of a seed is called a **seed coat**. The seed coat protects the seed and keeps it from drying out. Inside the seed coat is a tiny plant, called an **embryo**. A tiny root, called a **radicle**, is attached to the embryo. Surrounding the embryo are **seed leaves**.

Parts of a Seed