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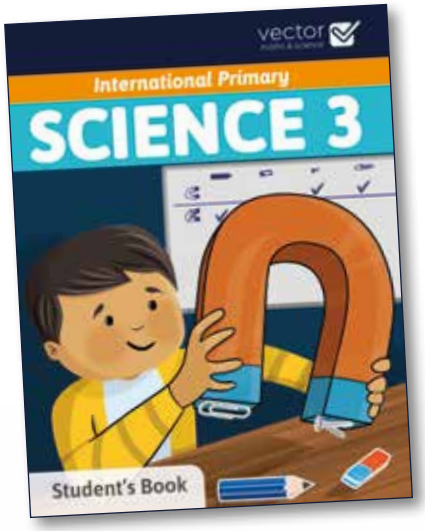
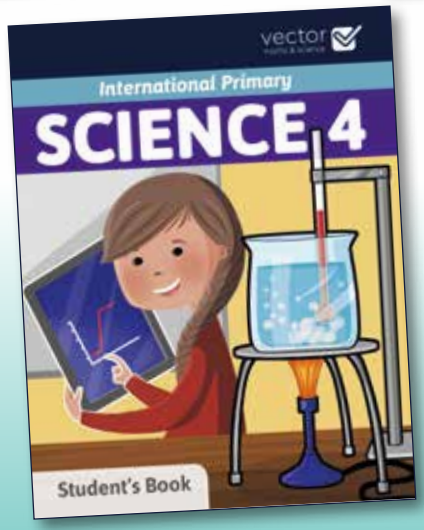
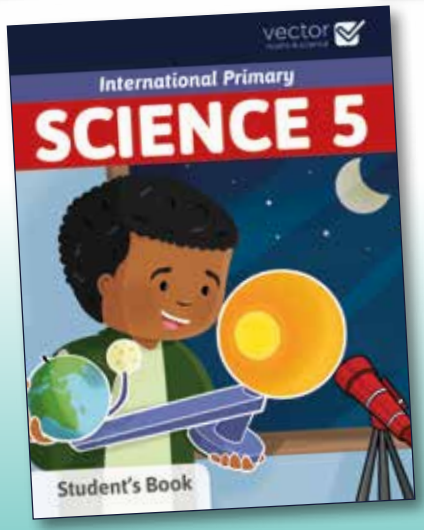
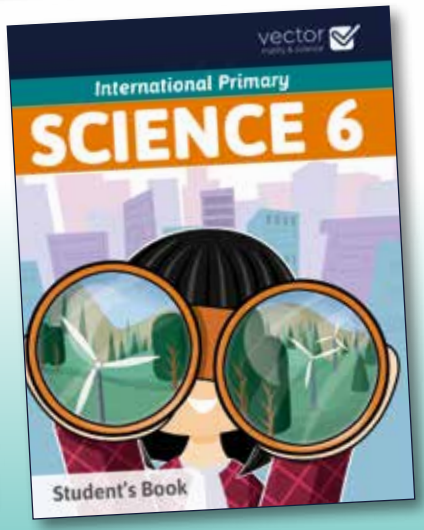
International Primary

SCIENCE









samplepages**catalogue**

Years 1 - 6

SCIENCE

worth exploring!

VECTOR International Primary Science is a brand new exciting series designed to engage students, spark their interest in scientific knowledge and equip them with the skills necessary to excel in the modern, ever-changing world.

6 LEVELS 1 2 3 4 5 6

VECTOR International Primary Science is an innovative six-level course for primary students. The framework is designed to provide a comprehensive set of progressive learning objectives for science and aims to systematically develop practical skills through scientific enquiry. These skills are useful in everyday life and are not limited to science lessons. The course is organised through the topic-based approach, thus allowing learners to investigate a variety of scientific topics in depth and encouraging them to ask questions, predict, observe, explore, explain, practise, and assess their understanding and abilities.

 Biology  Chemistry  Physics  Earth and Space

COURSE FEATURES • FOR STUDENTS:

- **Age-appropriate** learning objectives
- An integrated approach to the **gradual development of scientific enquiry skills**
- Lessons based on the teaching model of **Engage, Explore, Explain, Elaborate, Evaluate (5 Es Model)**
- A special emphasis on **vocabulary building** and **EAL (English as an Additional Language) support**
- A **Glossary** with definitions and pictures
- A **Materials section** with the necessary materials for each unit
- **Resources**, such as Resource Sheets and Resource Pictures
- A **Work like a scientist section** with the necessary scientific methods, procedures and tools for each level
- Activities encouraging **critical thinking** and **personal response**
- **Independent exploration and lab activities**
- **Homework activities**
- End of unit **review pages**
- Colourful, **high-quality pictures and visuals** that assist scientific knowledge
- Questions and activities that **challenge** students to extend and expand their knowledge into scientific concepts
- Extension of topics and ideas in **real-life contexts**
- **Unit maps** which organise and present the scientific concepts of each unit

COURSE FEATURES • FOR TEACHERS:

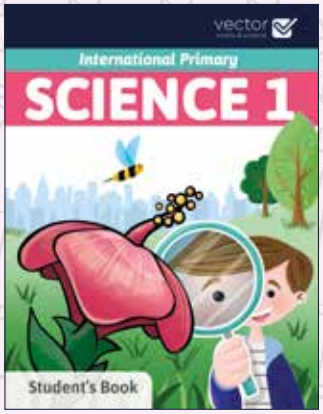
- **Learning objectives** identified and **scientific enquiry skills** developed in each lesson
- **Scientific background** information
- **Lists of student preconceptions** and guidance for detecting and reconstructing them
- Extensive and detailed **lesson plans** for all lessons and review sections; ideas and suggestions for teaching scientific enquiry; as well as differentiated activities and questions for students of basic or advanced performance
- **Guidance** for practical activities
- **EAL (English as an Additional Language) support**
- **Safety** warnings and guidelines
- Continuous **assessment support** by various means
- **Reminders** to facilitate the teaching procedure
- **Resources**, such as Worksheets, Resource Sheets, Resource Pictures, Language Focus activities and Assessment Sheets
- The **keys** for all the questions and activities in the Student's Book and the Workbook, as well as the keys for the Worksheets, the Language Focus activities and the Assessment Sheets
- **Cross-curriculum links**
- All sections of the Student's Book provided for teachers in an **easy-to-access form**
- **Optional activities** making the lesson more enjoyable and giving further practice

Components

Student's Digital Resources

Teacher's Digital Resources

FOR STUDENTS



FOR TEACHERS

SCIENCE 1 • Syllabus

SCIENCE 1

LEARNING OBJECTIVES

Unit 1- Humans and Animals

Lesson 1.1 What are the parts of your body?
- Identify the main external parts of the body.

Lesson 1.2 How are humans similar and different?
- Identify the similarities and differences between humans.

Lesson 1.3 How can you have a healthy diet?
- Recognise the importance of a healthy diet with the right type and amount of food and water.

Lesson 1.4 How do humans and animals sense the world around them?
- Examine how humans and animals become aware of the world around them through their senses.

Lesson 1.5 How do babies grow into adults?
- Relate humans and animals to their offspring.
- Discuss how offspring grow and change into adults.

Unit 2- Properties of Materials and their Uses

Lesson 2.1 What are objects made of?
- Identify common materials.
- Distinguish between an object and the material from which it is made.

Lesson 2.2 How do humans sense materials?
- Experiment with and discuss different materials using the senses.
- Recognise properties of different materials.

Lesson 2.3 How do humans use different materials?
- Recognise properties of different materials.
- Recognise uses of different materials according to their properties.

Lesson 2.4 How can you sort materials into groups?
- Recognise properties of different materials.
- Classify objects based on the properties of their materials.

Unit 3- Life Around You

Lesson 3.1 What are living things?
- Categorise humans, animals and plants as living things.
- Identify certain features that are common to all living things, e.g. moving, growing, needing food and water, etc.

Lesson 3.2 Is it living or non-living?
- Identify living and non-living things.
- Identify certain features that are common to all living things, e.g. moving, growing, needing food and water, etc.
- Identify that non-living things may show some of the features that are common to all living things, like moving, but not all of them.
- Explain that something must show all of the features of living things to be classified as a living thing.

Lesson 3.3 Where do plants and animals live?
- Relate different plants and animals to different environments.
- Identify the plants and animals that live in a local environment.
- Recognise that animals find what they need to survive in their local environment.

Unit 4- Forces and Movement

Lesson 4.1 How do things move?
- Identify and perform movements.

Lesson 4.2 How do pushes and pulls make things move?
- Identify pushes and pulls as forces.

Lesson 4.3 What can change how things move?
- Indicate that forces make things speed up, slow down or change direction.

Unit 5- Sensing Sounds

Lesson 5.1 What is a sound source?
- Recognise different sound sources.

Lesson 5.2 Is it a loud or a soft sound?
- Distinguish between loud and soft sounds.
- Recognise that loud sound can harm your ears.
- Recognise that some loud sounds are useful.

Lesson 5.3 How do you hear sounds?
- Recognise that sound must enter our ear in order for us to hear it.

Lesson 5.4 How does sound travel?
- Recognise that sound travels away from a source in all directions.
- Explore how sound becomes fainter as it travels away from the source.

Unit 6- How Plants Grow

Lesson 6.1 What are the parts of a plant?
- Identify the main parts of a plant either in real plants or in model plants.

Lesson 6.2 What does a plant need to grow?
- Experiment to deduce that light and water are essential for a plant's survival.

Lesson 6.3 How does a plant grow from a seed?
- Examine how seeds grow into (flowering) plants.

SCIENTIFIC ENQUIRY SKILLS

- Observe and collect evidence in order to answer a question.
- Ask questions and participate in discussions about how to search for answers.
- Predict outcomes.
- Decide what steps to take in order to answer a scientific question.
- Collect data through observation, investigation and measurement in order to answer questions.
- Make suggestions and follow instructions.
- Record the steps in a process or task.
- Compare and contrast.
- Compare results and/or observations with predictions.
- Model and share ideas in order to evaluate and expand on them.

SCIENCE 2

LEARNING OBJECTIVES

Unit 1- Light

Lesson 1.1 Is it a light source?
- Recognise different sources of light and classify the Sun as one of them.

Lesson 1.2 Can you see in the dark?
- Explain that darkness occurs when there is no light.
- Recognise that people need light in order to see things.
- Explain the uses of light sources.

Lesson 1.3 What are shadows?
- Be able to identify shadows.
- Explain how shadows are formed.

Unit 2- Electricity

Lesson 2.1 Does it work with electricity?
- Identify things that need electricity to work.
- Distinguish between devices that use batteries, mains electricity or both.

Lesson 2.2 How can you stay safe?
- Recognise the dangers of electricity.
- Examine ways to use electricity safely.

Lesson 2.3 What does a circuit need to work?
- Identify the components of a simple circuit, like batteries, wires and bulbs.
- Connect the components of a simple circuit to make it work.

Lesson 2.4 How do switches work?
- Explore how to use a switch in order to open or close a circuit.

Lesson 2.5 How do buzzers and motors work?
- Identify buzzers and motors as components of a circuit.
- Explore how a buzzer and a motor work in a circuit.

Unit 3- Testing Materials

Lesson 3.1 Which objects can you squash or twist?
- Explore and describe how squashing and twisting can change the shape of some objects.
- Explore how some objects can't change shape by squashing or twisting.

Lesson 3.2 Which objects can you bend or stretch?
- Explore and describe how bending and stretching can change the shape of some objects.
- Explore how some objects can't change shape by bending or stretching.
- Investigate how different materials stretch.

Lesson 3.3 Which objects are elastic?
- Identify and explore elastic objects.

Lesson 3.4 How do materials change when you heat or cool them?
- Explore and define the changes in some everyday materials when they are heated or cooled.

Lesson 3.5 Which materials dissolve in water?
- Explore how some materials dissolve in water.

Unit 4- Properties of Materials and their Uses

Lesson 4.1 Natural or man-made materials?
- Identify natural and man-made materials.

Lesson 4.2 What types of rocks are there?
- Identify some types of rocks.

Lesson 4.3 How do people use rocks?
- Outline how different types of rocks are used.

Lesson 4.4 What can you find in soil?
- Explore the uses of soil.
- Discover what soil consists of.

Unit 5- The Sun and the Earth

Lesson 5.1 Does the Sun really move?
- Explore the apparent movement of the Sun in the sky.
- Discover how shadows change direction during the day.

Lesson 5.2 How do shadows change during the day?
- Discover how shadows change length during the day.

Lesson 5.3 How do day and night happen?
- Explore and explain how the day and night happen according to the scientific model of the Earth spinning.

Unit 6- Life and Environments

Lesson 6.1 Where do living things live?
- Recognise that environments have similarities and differences.
- Recognise that environmental conditions affect living things (plants and animals) that live in a specific environment.

Lesson 6.2 How do people harm the environment?
- Identify ways that humans harm the environment.

Lesson 6.3 How can people take care of the environment?
- Recognise and apply ways to take care of the environment.

Lesson 6.4 What's the weather like?
- Recognise different types of weather.
- Talk about the weather through observation.
- Record the weather.

Lesson 6.5 What are the four seasons?
- Name the four seasons and the types of weather that characterise them.
- Relate seasons with human and animal activities, as well as plant growth.

Lesson 6.6 Can people forecast the weather?
- Relate the weather forecast to human activities.
- Talk about the weather through observation.
- Record the weather.

SCIENTIFIC ENQUIRY SKILLS

- Observe and collect evidence in order to answer a scientific question.
- Use first-hand experience.
- Find information using simple sources.
- Ask questions and try to find a way to answer them.
- Make predictions before taking actions.
- Recognise that a test or comparison may be unfair.
- Suggest ways to collect evidence.
- Discuss dangers and decide on safety precautions.
- Observe and record.
- Be able to measure.
- Use different means to display observations.
- Compare and contrast.
- Recognise simple patterns and associations.
- Discuss or write about predictions, what finally happened and why.
- Revise and describe the steps of an investigation.

SCIENCE 3

LEARNING OBJECTIVES

Unit 1- Life Processes and Living Things

Lesson 1.1 How do living things feed and move?
- Recognise life processes of nutrition (water and food) and movement common to living things.

Lesson 1.2 How do living things reproduce?
- Recognise life process of reproduction common to living things.

Lesson 1.3 How do living things grow and respire?
- Recognise life processes of growth and respiration common to living things.

Lesson 1.4 How can you find out if something is living or non-living?
- Recognise life processes of sensitivity and excretion common to living things.
- Identify living and non-living things based on the seven life processes.

Lesson 1.5 How can we sort living things into groups?
- Sort animals according to one or more characteristics.
- Record and present the physical characteristics of humans.

Lesson 1.6 How can we sort vertebrates into groups?
- Recognise that vertebrates are animals with a backbone and invertebrates are animals without a backbone.
- Identify humans as vertebrates and mammals.
- Sort vertebrates into the five groups (mammals, birds, reptiles, amphibians and fish) according to their characteristics.

Unit 2- Properties and Uses of Materials

Lesson 2.1 What properties does a material have?
- Recognise properties of different materials.
- Recognise that objects made of the same material may have different properties.
- Investigate absorbent materials.

Lesson 2.2 How can we sort materials into groups?
- Sort materials according to their properties.

Lesson 2.3 Is it magnetic or not?
- Distinguish between magnetic and non-magnetic materials through experimentation.

Lesson 2.4 How do we use different materials?
- Explain why materials have different uses depending on their properties.

Unit 3- Growing Plants

Lesson 3.1 What are the parts of a plant?
- Recognise and name the parts of plants (roots, stem, leaves, flowers and fruit).
- Recognise that the same parts look different in different kinds of plants.

Lesson 3.2 Are all the parts of a plant important?
- Investigate whether leaves are necessary for a plant to grow.
- Investigate whether a healthy stem is necessary for a plant to grow.
- Investigate whether healthy roots are necessary for a plant to grow.
- Explore how flowers are not necessary for a plant to grow.

Lesson 3.3 How do we sort plants into groups?
- Sort plants in different ways.

Lesson 3.4 Do plants need water to grow?
- Investigate whether plants need water to grow.

Lesson 3.5 How do plants get water?
- Recognise that water is taken in through the roots.
- Explore how water is transported through the stem.
- Recognise that plants need roots to grow.

Lesson 3.6 Are light and temperature important for plants?
- Investigate whether plants need light to grow.
- Investigate whether plant growth is affected by temperature.

Lesson 3.7 Do plants have sensitivity?
- Explore how seeds grow roots towards the ground (positive gravitropism).
- Explore how plants grow towards the light (positive phototropism).

Unit 4- Forces

Lesson 4.1 How can forces change the movement of an object?
- Recognise that a force is either a push or a pull.
- Investigate how forces can change the movement of objects, either when they start or stop moving, or when they change direction.
- Investigate how forces can make an object move faster or more slowly.

Lesson 4.2 How can forces change the shape of an object?
- Examine how forces can change the shape of objects.

Lesson 4.3 How can you measure forces?
- Examine how forces can change the shape of objects.
- Measure forces with force meters.
- Recognise that forces are measured in newtons.

Lesson 4.4 What is friction?
- Recognise that there is a force of friction between two surfaces that slide or tend to slide across each other.
- Explore how the amount of friction depends on the types of the two surfaces.
- Recognise that friction can make an object start or stop moving, or change the object's direction.

Unit 5- Senses

Lesson 5.1 What is the sense of hearing?
- Recognise how humans and animals become aware of the world around them using the sense of hearing.
- Distinguish sounds and their sources.
- Investigate whether we hear better with one or two ears.

Lesson 5.2 What is the sense of sight?
- Recognise how humans and animals become aware of the world around them using the sense of sight.
- Explore the limitations of human eyesight.
- Discover that we see better with both eyes.

Lesson 5.3 What is the sense of touch?
- Recognise how humans and animals become aware of the world around them using the sense of touch.
- Investigate how the sense of touch can give us the wrong information.
- Explore the texture of different objects.

Lesson 5.4 What is the sense of smell?
- Recognise how humans and animals become aware of the world around them using the sense of smell.
- Identify different objects by their smell.

Lesson 5.5 What is the sense of taste?
- Recognise how humans and animals become aware of the world around them using the sense of taste.
- Distinguish between different tastes.
- Explore how the sense of smell affects the sense of taste.

Unit 6- Staying Healthy

Lesson 6.1 What are nutrients?
- Name food groups and the kinds of food that belong to them.
- Relate food groups to the nutrients they contain.

Lesson 6.2 How can you have a balanced diet?
- Recognise the importance of a balanced diet, with the right kinds and amounts of food and the importance of drinking water.

Lesson 6.3 How can you stay healthy?
- Recognise and discuss other healthy habits, including sleep, exercise, hygiene and mental health.

Lesson 6.4 What is an unhealthy diet?
- Recognise what constitutes an unhealthy diet and what the consequences are.
- Recognise that not all sugars and fats are unhealthy.

SCIENTIFIC ENQUIRY SKILLS

- Collect evidence using different means in order to answer a question or test an idea.
- Make suggestions about how to collect evidence and plan an investigation.
- Make predictions and share them.
- Suggest ways to collect evidence and plan a fair test with assistance.
- Make a test to answer a question.
- Make observations and comparisons of objects, living things and events.
- Use simple equipment to take measurements, and record observations in different ways.
- Use drawings, tables and charts to record and display results.
- Draw conclusions from results and try to explain them using scientific knowledge.
- Begin to recognise simple patterns in results and make generalisations from results.

SCIENCE 4

LEARNING OBJECTIVES

Unit 1- Humans and Animals

Lesson 1.1 What are skeletons?
- Recognise that humans and some animals have bony skeletons.
- Recognise the pattern of a bony skeleton in humans and some animals.
- Recognise that some animals do not have skeletons.

Lesson 1.2 What are the main bones of a skeleton?
- Recognise that bones have different shapes and sizes.
- Identify the skull, the ribs, the vertebrae and the thigh bone as some of the main bones of the human skeleton.
- Identify the spine as a main part of the human skeleton.
- Recognise that bones grow as we grow up.

Lesson 1.3 Why is the human skeleton important?
- Recognise some functions of the skeleton, including that it gives shape, supports the body, allows movement, and protects many organs of the body.

Lesson 1.4 How do muscles work?
- Recognise that humans and some animals have muscles attached to their bones.
- Examine how muscles work in pairs and that they contract to pull bones and move them.

Lesson 1.5 What are microorganisms?
- Recognise that microorganisms are living things that we can't see with the naked eye.
- Recognise that microorganisms are everywhere.
- Identify different types of microorganisms.
- Describe how some microorganisms are useful and some are harmful to humans.

Lesson 1.6 What are some illnesses and their symptoms?
- Identify symptoms of being unwell.
- Recognise that different types of illnesses have different symptoms.
- Describe how to protect oneself and others from germs.

Lesson 1.7 How can you feel better?
- Identify different types of medicines.
- Recognise ways to stay safe when taking medicines.

Unit 2- States of Matter

Lesson 2.1 What are the states of matter?
- Identify the three states of matter: solid, liquid and gas.
- Recognise that volume is a common property of matter.
- Identify the units of volume (cubic centimetres, cubic metres, millilitres, litres).
- Measure the volume of liquids and solids using measuring cylinders (or beakers).

Lesson 2.2 How are solids, liquids and gases different?
- Recognise that matter is made of particles.
- Identify how particles are arranged in solids, liquids and gases.
- Identify the properties of matter.
- Relate the different properties of matter to the particle model.
- Identify and explore some gases.

Lesson 2.3 What are melting and freezing?
- Explore the changes in materials which are heated or cooled.
- Recognise that melting is the process of a solid being heated and changing into a liquid.
- Recognise that freezing is the process of a liquid being cooled and changing into a solid.

Lesson 2.4 What are boiling and condensation?
- Recognise that boiling and evaporation are the processes through which a liquid changes into a gas.
- Recognise that condensation is the process through which a gas changes into a liquid.

Lesson 2.5 What are melting, boiling and freezing points?
- Explore the changes in materials which are heated or cooled.
- Recognise what the boiling point, melting point and freezing point are.
- Measure the boiling point, melting point and freezing point of water.
- Recognise that the melting point is the same as the freezing point.
- Recognise that different materials have different melting points.

Unit 3- Magnets

Lesson 3.1 What are magnets?
- Distinguish magnetic from non-magnetic materials.
- Investigate which magnet is stronger.

Lesson 3.2 Are all metals magnetic?
- Explore which metals are magnetic and which metals are not.

Lesson 3.3 How can two magnets attract or repel each other?
- Determine the poles of a bar magnet.
- Explore how like poles of magnets repel and unlike poles of magnets attract each other.
- Explore how a free turning magnet comes to rest in the north-south direction.

Lesson 3.4 How can you make a magnet?
- Explore two ways in which magnets can be made.
- Construct an electromagnet.

Unit 4- Life and Environments

Lesson 4.1 How can we identify animals and plants?
- Use identification keys.
- Design an identification key with help.
- Name some characteristics of dolphins and whales.

Lesson 4.2 How can we identify invertebrates?
- Use identification keys.
- Recognise that invertebrates are animals without a spine.

Lesson 4.3 Where do animals live?
- Recognise what a habitat is.
- Name different habitats.
- Discover that different animals live in different habitats.
- Recognise that an animal gets what it needs to survive (food, shelter, water) from its habitat.

Lesson 4.4 What are habitats like?
- Discover that different animals live in different habitats.
- Recognise that a habitat includes other animals, non-living things and environmental factors, e.g. the temperature.
- Recognise that some animals eat plants.
- Recognise that some animals eat other animals.

Lesson 4.5 How are animals suited to the environment they live in?
- Discover that different animals live in different habitats.
- Explain how an animal is suited to its environment.
- Explain how the adaptations of an animal help it survive in its environment.

Lesson 4.6 How do we affect the environment in good and bad ways?
- Describe how people's actions affect the environment in good and bad ways.
- Identify that people's actions contribute to the pollution of the environment more than natural phenomena do.
- Recognise that pollution affects the health of living things.

Lesson 4.7 Do pollutants stay in the environment for a long time?
- Observe that some materials, like plastic, decay very slowly.
- Discover that pollutants affect every part of the environment.

Lesson 4.8 How can we take care of the environment?
- Discover that when people reuse and recycle objects, they affect the environment in a good way.
- Discover that when people reduce waste, they affect the environment in a good way.

Unit 5- Electricity

Lesson 5.1 What are the components of a simple circuit?
- Identify the components of simple circuits, like cells, wires and bulbs, and recognise their functions.
- Connect the components of a simple circuit to make a complete circuit.
- Explore the effects of a break in a complete circuit.

Lesson 5.2 What is electric current?
- Recognise that an electric current is particles flowing in one direction around a circuit.
- Use a model to show how the electric current flows around a circuit.

Lesson 5.3 How can you break a circuit?
- Recognise that a circuit doesn't work when there is a break in it.
- Explore how to use a switch in order to open or close a circuit.
- Recognise things that can cause a break in a circuit.

Lesson 5.4 How can we use electricity safely?
- Examine ways to use electricity safely.
- Recognise the dangers of electricity.
- Investigate how an electric current flows through water.

Lesson 5.5 How can a circuit have more bulbs?
- Make complete circuits with more than one bulb.
- Recognise that in a series circuit with identical bulbs, all the bulbs shine equally brightly.
- Experiment to determine how adding more bulbs to a series circuit makes them shine less brightly.
- Explore how wherever there is a break in a series circuit the electric current will not flow.

Lesson 5.6 How can a circuit have more cells?
- Make complete circuits with more than one cell.
- Experiment to determine how adding more cells to a circuit can make the bulb shine more brightly or even blow.

Lesson 5.7 How do buzzers and motors work?
- Identify buzzers and motors as components of a circuit.
- Explore how a buzzer and a motor must be connected to a circuit in order to work.
- Identify how many 1.5 V cells must be used in a circuit to make a component work.

Unit 6- Sensing Sounds

Lesson 6.1 What are sounds?
- Demonstrate how a vibrating object makes sound.

Lesson 6.2 How do we hear sounds?
- Investigate how sound travels from the source to our ear through air.
- Recognise that the pinnae of the ears are useful for collecting sounds.

Lesson 6.3 How does sound travel through matter?
- Experiment to determine how sound travels through solids, liquids and gases.
- Explore how sound does not travel through a vacuum.

Lesson 6.4 What does sound travel through best?
- Investigate how sound travels best through solids, less well through liquids and worst through gases.
- Explore how sound travels through different solid materials.

Lesson 6.5 How can you change the loudness of sound?
- Identify soft and loud sounds.
- Investigate how the size of the vibration correlates with the volume of the sound.

Lesson 6.6 How can you measure the volume of sound?
- Identify the unit of sound volume (decibels).
- Measure sound volume with a sound level meter.

Lesson 6.7 How can we muffle sounds?
- Investigate how different materials can make sounds quieter.

Lesson 6.8 What is the pitch of sound?
- Relate the pitch of sound to how fast the vibration is.
- Differentiate pitch from loudness.

Lesson 6.9 How can you make a musical instrument?
- Identify how musical instruments make sound.

Lesson 6.10 How can you change the pitch in musical instruments?
- Find patterns between the pitch of a sound and features of the object that produced it.

SCIENTIFIC ENQUIRY SKILLS

- Collect evidence from diverse sources using different methods.
- Test ideas and predictions based on patterns, evidence and scientific knowledge.
- Propose questions for investigations, make predictions about them and discuss them.
- Create fair tests, and plan how to collect evidence using different methods.
- Decide what to measure, and select the appropriate apparatus.
- Make observations and comparisons.
- Take simple measurements, e.g. temperature, time and length, using appropriate apparatus.
- Start to recognise the necessity of repeated measurements.
- Use drawings, tables, and charts to record and display results.
- Distinguish patterns and trends in results and try to explain them.
- Explain evidence and results, use them to support or disprove predictions, and share the evidence and results with others.
- Relate evidence to scientific knowledge in different situations.

SCIENCE 5

LEARNING OBJECTIVES

Unit 1- Light

Lesson 1.1 How does light travel?
- Demonstrate that light travels in straight lines away from a light source.
- Describe how we see light sources when light enters our eyes.
- Use ray diagrams to show how light travels from the source to our eyes.

Lesson 1.2 How does light reflect off different surfaces?
- Recognise that light is reflected off different surfaces.
- Explore how the angle at which light hits a mirror is equal to the angle at which light reflects off the mirror.
- Draw ray diagrams to show how light is reflected off a mirror.
- Distinguish between regular reflection and diffuse reflection.

Lesson 1.3 How do we see things?
- Describe how we see an object when light travels from a source, reflects off the object and enters our eyes.
- Draw ray diagrams to show how light travels from the source to the object and into our eyes.

Lesson 1.4 Which surfaces reflect light well?
- Rank objects based on how well their surfaces reflect light.

Lesson 1.5 How do we see things in mirrors?
- Recognise that a mirror image is back to front.
- Identify the uses of mirrors.
- Apply the law of reflection to make a periscope.

Unit 2- States of Matter

Lesson 2.1 What are heat and temperature?
- Recognise that heat is a form of energy that flows from a warmer object or place to a cooler one because of their difference in temperature.
- Identify different uses of heat.
- Examine how heat can change the state of matter of a material.
- Recognise that temperature is a measure of how hot or cold a person, an object or a place is.
- Identify different scales that temperature is measured in.

Lesson 2.2 What is the boiling point?
- Recognise that water in a gaseous state is called water vapour and is part of the air around us.
- Discover that a liquid boils when its temperature reaches its boiling point.
- Recognise that the boiling point of pure water is 100 °C at sea level.
- Explain what happens to the particles of a liquid when it boils.
- Examine what factors affect the boiling point of a liquid and how they affect it.

Lesson 2.3 What is evaporation?
- Discover that evaporation happens when a liquid turns into a gas without boiling.
- Explain what happens to the particles of a liquid when it evaporates.
- Recognise different situations in real life in which evaporation takes place.

Lesson 2.4 What factors affect evaporation?
- Recognise that the rate of evaporation is a measure of how fast or slowly a liquid evaporates.
- Examine the factors that affect a liquid's rate of evaporation.
- Recognise that when scientists plan an investigation, they keep some factors the same and they change others to have correct and reliable results.

Lesson 2.5 What is left when a liquid evaporates from a solution?
- Recognise that the parts of a solution are the solute and the solvent.
- Describe what happens to the particles of a solid solute when it dissolves in a liquid solvent.
- Explore how when the solvent evaporates from a solution, the solid solutes are left in their solid state.

Lesson 2.6 What is condensation?
- Recognise that condensation happens when a gas turns into a liquid.
- Discover that evaporation is the reverse of condensation.
- Examine how water vapour contained in the air may condense when it meets a cold surface.
- Explain what happens to the particles of water vapour when it condenses.

Lesson 2.7 What is the melting point?
- Discover that a solid melts when its temperature reaches its melting point.
- Recognise that a liquid freezes when its temperature reaches its freezing point.
- Recognise that the melting point of ice is 0 °C which is also the freezing point of pure water.
- Explain what happens to the particles of a liquid when it freezes.
- Recognise that impurities can change the freezing point of water.

Lesson 2.8 What is the water cycle?
- Name some stages of the water cycle.
- Explore how evaporation, condensation and melting are some of the processes that take place in the water cycle.
- Recognise the importance of the water cycle for all living things.

Unit 3- The Life Cycle of Flowering Plants

Lesson 3.1 What are the functions of the parts of a flowering plant?
- Recall the parts of flowering plants (roots, stem, leaves, flowers and fruit).
- Describe the function or functions of each plant part.

Lesson 3.2 How do flowering plants reproduce?
- Recognise that flowering plants reproduce.
- Distinguish between the two ways flowering plants reproduce.

Lesson 3.3 Are seeds dispersed by wind and by water?
- Recognise that seeds can be dispersed by wind and by water.
- Explore how seeds can be dispersed by wind.
- Investigate how various factors, i.e. the wind speed, the release height of the seed and the weight of the seed, affect the dispersal distance of wind-dispersed seeds.

Lesson 3.4 Are seeds dispersed by explosion and by animals?
- Recognise that seeds can be dispersed by explosion, by animals and by humans.
- Sort seeds according to the four methods of dispersal.

Lesson 3.5 What are the parts of a flower?
- Recognise that flowering plants produce flowers which have male and female parts.
- Name the parts of a flower.
- Describe the function or functions of each flower part.
- Observe differences and similarities between various kinds of flowers.

Lesson 3.6 What are pollination and fertilisation?
- Recognise the process of pollination in flowering plants.
- Describe how pollen fertilises the egg cell to form a seed.
- Recognise how flower parts change into fruit parts after fertilisation.

Lesson 3.7 How are flowering plants pollinated?
- Recognise that flowers can be pollinated by animals, wind, water and humans.
- Investigate how different kinds of plants are pollinated by different kinds of pollinators.
- Recognise the importance of bees as pollinators.

Lesson 3.8 What is the life cycle of a flowering plant?
- Name the stages in the life cycle of a flowering plant, i.e. seed, germinating seed, seedling, young plant, adult plant, adult plant with flowers, adult plant with fruit.
- Describe the processes in the life cycle of a flowering plant, i.e. germination, growth, flower production, pollination, fertilisation, seed production and seed dispersal.
- Recognise the types of diagrams that show the stages and processes in the life cycle of flowering plants.

Unit 4- Investigating Plant Growth

Lesson 4.1 What is the structure of seeds?
- Name the parts of a seed and their functions.
- Recognise that there are dicotyledonous and monocotyledonous plants.
- Distinguish between dicotyledonous and monocotyledonous seeds.

Lesson 4.2 What do seeds need to germinate?
- Investigate how most seeds need air, water and warmth for germination, but not light.
- Recognise that seeds have a process that keeps them from germinating in an unsuitable environment, called dormancy.
- Recognise that when scientists plan an investigation, they use controls.

Lesson 4.3 What do plants need to grow?
- Describe how plants make their own food through the process of photosynthesis.
- Investigate whether plants need light and water to grow.
- Investigate whether plants need air to grow.
- Recognise that plants need the right temperature to grow.
- Recognise that there are plants that grow their roots in water.
- Describe how some plants can be grown without soil through the method of hydroponics.

Lesson 4.4 How does light affect plant growth?
- Investigate how plants grow when they receive different amounts of light.
- Recognise that not all plants need the same amount of light to grow.

Unit 5- The Earth in Space

Lesson 5.1 What are the Sun, the Earth and the Moon?
- Make a model of the Sun and the Earth, and compare their sizes.
- Explore how the Sun looks small in the sky because it is very far away from the Earth.
- Model the movement of the Moon around the Earth, and compare their sizes.

Lesson 5.2 How do daytime and night-time happen?
- Recognise that the Earth rotates around its axis every 24 hours.
- Demonstrate and explain how daytime and night-time occur.

Lesson 5.3 Does the Sun actually move?
- Explore the apparent movement of the Sun in the sky.
- Discover how shadows change direction during the day.

Lesson 5.4 How does the Earth move around the Sun?
- Demonstrate how the Earth orbits the Sun while it rotates on its axis.
- Recognise that the Earth takes $365\frac{1}{4}$ days to complete a revolution around the Sun.

Lesson 5.5 How does the length of daylight change?
- Identify the pattern of how the length of daylight in a place changes throughout the year.
- Compare the length of daylight in different places on Earth.
- Relate the variation in hours of daylight to the Earth's tilted axis.

Lesson 5.6 What causes the seasons?
- Explain how the Earth's tilted axis and its revolution around the Sun cause the seasons.
- Relate the seasonal changes to the way the sunlight hits the different parts of the Earth and the amount of daylight.

Lesson 5.7 What is the solar system?
- Order the planets from the Sun.
- Model the size and distance of the planets from the Sun.
- Research the life and discoveries of scientists that developed models of the solar system.

Lesson 5.8 How do we explore space?
- Identify ways in which people can explore and study space without physically going there.
- Research the history of space exploration.

Unit 6- Shadows

Lesson 6.1 How much light passes through different materials?
- Compare materials based on how much light they allow to pass through them.
- Classify materials as transparent, translucent or opaque.

Lesson 6.2 How do we see colours?
- Explore how white light is separated into different colours and how different colours mix to make white light.
- Examine how transparent and translucent objects absorb colours and allow different colours to pass through them.
- Examine how opaque objects reflect and absorb different colours.
- Explain how we see the colour of transparent and opaque objects.

Lesson 6.3 What objects form a shadow?
- Explore how shadows are formed.

Lesson 6.4 How can we make a shadow change in size?
- Examine the factors that affect the size of a shadow.
- Demonstrate how an object forms shadows of different shapes.

Lesson 6.5 How do shadows change during the day?
- Examine how shadows change direction and length throughout the day.
- Relate the position of the Sun in the sky to the position and length of shadows.

Lesson 6.6 How can you measure light intensity?
- Identify the unit of light intensity (lux).
- Measure light intensity with a light meter.
- Examine how light intensity changes throughout the day.
- Recognise that light intensity is higher during the summer and lower during the winter.

SCIENTIFIC ENQUIRY SKILLS

- Recognise that scientists suggest new theories and explanations for phenomena by synthesising evidence with creative thinking.
- Test predictions through observations and measurements, and make links with previous knowledge.
- Make predictions based on scientific knowledge, and suggest ways to test them.
- Design a fair test using scientific knowledge.
- Collect adequate evidence to test an idea.
- Define factors that should be considered in a variety of contexts.
- Make relevant observations using different means.
- Take measurements, e.g. volume, temperature, time and length, using appropriate apparatus.
- Discuss and recognise the importance of repeated measurements and observations.
- Use drawings, tables, timelines, graphs and charts to record and display results.
- Determine whether predictions are supported by results.
- Start to evaluate repeated results.
- Identify patterns in data, and use them to make predictions and propose explanations using scientific knowledge.
- Interpret obtained data and results, and decide whether they are sufficient to draw conclusions.

SCIENCE 6

LEARNING OBJECTIVES

Unit 1- Body Systems

Lesson 1.1 What are the major body organs?
- Name the major organs of the body.
- Identify the positions of the major organs in the body.
- Recognise that inside our body are organs that work together to form systems.

Lesson 1.2 How does the nervous system work?
- Recognise the brain, the spinal cord and the nerves as parts of the nervous system.
- Identify the positions of the brain, the spinal cord and the nerves in the human body.
- Explore the three main parts of the brain and what they control.
- Describe how the parts of the nervous system work together in different situations.

Lesson 1.3 How does the circulatory system work?
- Recognise the heart, the blood vessels and the blood as parts of the circulatory system.
- Identify the position of the heart in the human body.
- Describe the circulation of the blood around the body.
- Measure the pulse rate.
- Examine how the pulse rate increases with exercise.
- Associate exercise and a healthy diet with a healthy heart and a properly working circulatory system.

Lesson 1.4 How does the respiratory system work?
- Recognise the lungs, the trachea and the nose as parts of the respiratory system.
- Identify the positions of the lungs, nose and trachea in the human body.
- Describe the functions of the respiratory system.
- Measure the breathing rate.
- Examine how the breathing rate increases with exercise.

Lesson 1.5 How does the digestive system work?
- Recognise the mouth, the oesophagus, the stomach, the small intestine and the large intestine as the parts of the digestive system.
- Identify the positions of the mouth, the oesophagus, the stomach, the small intestine and the large intestine in the human body.
- Describe the functions of the digestive system.
- Name some functions of the liver.

Lesson 1.6 What is the function of the kidneys in the excretory system?
- Recognise the kidneys as organs of the excretory system.
- Identify the position of the kidneys in the human body.
- Describe the functions of the kidneys.
- Explore how we can keep our kidneys healthy.

Unit 2- Reversible and Irreversible Changes in Materials

Lesson 2.1 What are reversible and irreversible changes?
- Recognise that changes in materials can be reversible or irreversible.
- Distinguish between reversible and irreversible changes.
- Recognise that most physical changes are reversible and most chemical changes are irreversible.
- Investigate how burning a candle is an irreversible change.
- Explain why some changes in everyday life are reversible or irreversible.

Lesson 2.2 How can different solids be mixed and separated?
- Recognise that mixtures in the solid state are formed when solid components are mixed and no chemical change occurs.
- Investigate different ways to separate the components in solid mixtures.
- Identify that solid components in mixtures can be separated by hand, by sieving and by using a magnet.

Lesson 2.3 What happens when we mix solids with liquids?
- Investigate solids that dissolve in water and others that don't.
- Recognise that soluble solids form solutions and insoluble solids form suspensions.
- Identify that solutions have a clear appearance and that suspensions have a cloudy appearance.
- Examine how some solids react when added to liquids.

Lesson 2.4 How do saturated solutions form?
- Recognise that a solution forms when a solid that is soluble in a solvent is added to the solvent and dissolves.
- Identify that a solution is made up of a solute and a solvent.
- Examine saturated solutions and how they are made.
- Investigate how the amount of a solute needed to make a saturated solution depends on what kind of substance is dissolved.

Lesson 2.5 Which factors affect the rate of dissolving?
- Recognise that the rate of dissolving is a measure of how fast a solute dissolves in a solvent.
- Investigate the factors that affect the rate of a solid solute dissolving in a liquid solvent.

Lesson 2.6 How can we separate solids from liquids?
- Recognise that pure substances are made of particles of one kind that are joined together, while mixtures are made of particles of more than one kind that are not joined together.
- Investigate how insoluble solids can be separated from liquids through filtering.
- Examine how we can separate soluble solids from a liquid through boiling and evaporation.

Unit 3- Feeding Relationships

Lesson 3.1 What are producers and consumers?
- Identify that producers make their own food through photosynthesis.
- Recognise that consumers are the animals that eat plants or other animals.
- Describe how plants use light energy from the Sun, water and carbon dioxide, to produce glucose and oxygen through the process of photosynthesis.
- Examine how light is necessary for the process of photosynthesis.
- Distinguish between producers and consumers.

Lesson 3.2 What are food chains?
- Recognise that there are feeding relationships in a habitat.
- Describe feeding relationships in a habitat using food chains.
- Identify that food chains always begin with producers.
- Create food chains.

Lesson 3.3 What are food webs?
- Distinguish between food webs and food chains.
- Describe more detailed feeding relationships in a habitat using food webs.
- Identify multiple food chains in a food web.
- Create food webs.

Lesson 3.4 What is a predator and what is a prey?
- Distinguish between predators and prey.
- Identify that some animals are both predators and prey.

Unit 4- Electricity

Lesson 4.1 What are circuit diagrams?
- Relate the components of a circuit to their symbols.
- Draw a circuit diagram from a circuit.
- Investigate how a switch can be placed anywhere in a simple circuit to break it.
- Investigate how to connect two cells together to make the circuit work.

Lesson 4.2 How do we measure the size of an electric current?
- Identify the unit of measurement for electric current (ampere).
- Measure electric current in a circuit with an ammeter.
- Explore how the size and the direction of an electric current is the same all around a simple circuit.

Lesson 4.3 How do the length and thickness of a wire affect the brightness of a bulb?
- Investigate how the length and thickness of a wire affect the electric current passing through the circuit.
- Relate the size of an electric current to how brightly the bulb shines in a simple circuit.

Lesson 4.4 How do we connect bulbs in a circuit?
- Distinguish between a series and a parallel circuit.
- Investigate how adding bulbs in series makes them shine less brightly.
- Recognise that bulbs connected in parallel shine equally brightly whether we add or remove bulbs.

Lesson 4.5 What happens when we add more cells in a circuit?
- Associate the brightness of a bulb with the number of cells connected to the circuit.
- Investigate how adding cells in series to a circuit increases the electric current.
- Compare the way a buzzer or a motor works depending on the voltage of the battery connected to the circuit.

Lesson 4.6 Do all materials allow an electric current to pass through them?
- Investigate which materials allow an electric current to pass through and which materials don't.
- Distinguish between electrical conductors and insulators.
- Investigate how an electric current doesn't pass through distilled water but it passes through water with salts dissolved in it.

Lesson 4.7 Are some metals better electrical conductors than others?
- Investigate which metals are good electrical conductors.
- Rank electrical conductors based on the electric current they conduct.
- Explain why some metals are not used as electrical conductors although they are good conductors.

Lesson 4.8 How do we use electricity safely?
- Investigate the effects of a short circuit.
- Apply knowledge of electrical conductors and insulators to use electricity safely.

Unit 5- Humans and the Environment

Lesson 5.1 What is the greenhouse effect?
- Recognise that the greenhouse effect is important for life.
- Investigate how the temperature of the atmosphere increases when the amount of carbon dioxide in the atmosphere increases.
- Identify that deforestation harms the environment.

Lesson 5.2 How do we pollute the atmosphere?
- Relate air pollution to the burning of fuels.
- Name ways to reduce air pollution.
- Describe how acid rain forms.
- Recognise that acid rain harms living things.
- Examine the effects of acid rain on limestone.

Lesson 5.3 How does our waste affect the environment?
- Describe how waste in landfill sites pollutes the environment.
- Identify recycling, reusing and composting as ways to reduce waste disposal.
- Recognise that plastic waste turns into microplastics that harm species that live in the sea.
- Indicate the positive effects of recycling.

Lesson 5.4 How do our activities affect the environment?
- Identify the negative effects of quarries and farms on the environment.
- Describe how different activities increase the carbon footprint.
- List ways to reduce the carbon footprint.
- Recognise how conservation areas protect different habitats.

Lesson 5.5 How do we use natural resources as energy sources?
- Identify coal, crude oil and natural gas as fossil fuels, and describe how each is extracted from the Earth.
- Sort natural resources into renewable and non-renewable resources.
- Research the advantages and disadvantages of using different renewable and non-renewable resources.
- List ways in which we can conserve energy and natural resources.

Unit 6- Forces

Lesson 6.1 What are mass and weight?
- Distinguish between mass and weight.
- Define weight as the force with which an object is attracted to the Earth or another celestial body as a result of gravity.
- Discover the relationship between mass and weight on Earth.
- Recognise that the size of the force of gravity increases as the masses of the objects increase and decreases as the distance between the objects increases.
- Explain why the planets orbit the Sun and the Moon orbits the Earth.

Lesson 6.2 What are the effects of forces?
- Investigate how forces affect the movement and the shape of objects.
- Experiment to determine how we can measure forces by the effect they have on the extension of a spring.

Lesson 6.3 How do forces act?
- Draw arrows to represent forces.
- Identify the direction in which forces act.
- Describe the interaction between two objects, identifying the force pair acting between them.
- Recognise that forces in a force pair act on different objects.
- Experiment to determine how forces in the same pair have equal size and opposite direction.

Lesson 6.4 How do forces affect movement?
- Differentiate between balanced and unbalanced forces.
- Describe the effects of balanced and unbalanced forces on the movement of an object.
- Examine how the size of the force exerted on an object affects its movement.

Lesson 6.5 How does energy change?
- Recognise that whenever a force is acting on an object causing it to move, work is done.
- Identify how energy and work are related.
- Differentiate potential energy from kinetic energy.
- Identify the factors that affect the potential energy and kinetic energy of an object.
- Describe how energy changes in everyday situations.

Lesson 6.6 What are the effects of friction?
- Investigate the effects of friction.
- Describe how friction can be useful and how it can be a problem in everyday situations.

Lesson 6.7 What factors affect friction?
- Examine the factors that affect friction between two surfaces that slide across each other.
- Identify that the surface area of an object sliding on a surface does not affect the amount of friction.

Lesson 6.8 How can we reduce and increase friction?
- Investigate how rollers and lubricants can reduce friction.
- Describe everyday situations where friction needs to be increased or reduced.

Lesson 6.9 What is air resistance?
- Demonstrate that all objects, regardless of their mass, fall to the ground at the same rate when there is no air.
- Recognise that there is air resistance acting on objects that move through air.
- Identify the factors that affect air resistance.
- Examine how the surface area affects the air resistance acting on an object.

SCIENTIFIC ENQUIRY SKILLS

- Examine how scientists developed new theories and explanations for phenomena by synthesising evidence with creative thinking.
- Test ideas and predictions by collecting evidence and data during an investigation.
- Design investigations in order to test ideas.
- Make predictions based on scientific knowledge.
- Decide what evidence to collect during an investigation and collect adequate evidence.
- Define factors in different contexts.
- Select the appropriate equipment to use for an investigation.
- Make relevant observations and measurements using apparatus.
- Decide when it is necessary to repeat observations or measurements to make results more reliable.
- Use bar charts, line graphs and tables to record and display results.
- Compare observations, measurements or results.
- Evaluate repeated observations and results.
- Recognise patterns in results and identify results that the pattern does not apply to.
- Draw conclusions from results and use them to make other predictions.
- Explain predictions based on scientific knowledge, evaluate these explanations and share them.
- Determine if and how obtained evidence supports predictions.

vocabulary list of the keywords of each lesson

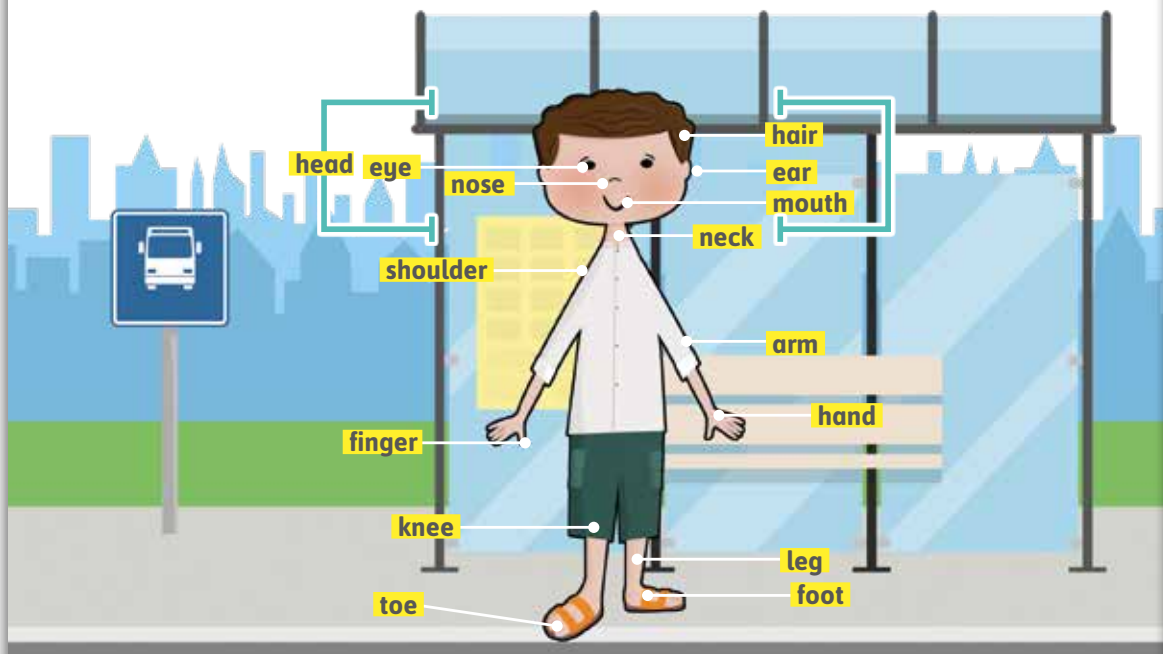
an introduction of each lesson without revealing all the scientific concepts

1 Humans and Animals

1.1 What are the parts of your body?

Keywords *arm body ear eye finger foot hair hand head knee leg model mouth name neck nose shoulder toe*

Let's think Your body has many parts.



A Why do you need each part of your body?

4

visuals and high-resolution pictures facilitate the understanding of scientific knowledge

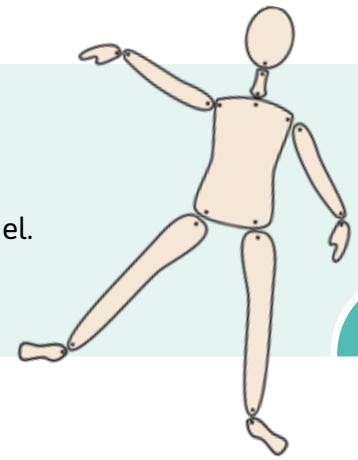
activities that encourage critical thinking and personal response, and incorporate topics and ideas in real-life contexts

B

The children are wearing a raincoat, a helmet, a hat and sunglasses, a woolly hat, a scarf and gloves. On which parts of the body are they wearing them? Why?

Let's explore!

- Make a model of the body.
- Draw the parts of the head on your model.
- Name the parts of your model.



inquiry-based exploration activities, in which students work either independently or in small groups

Fun fact

People have lines on the ends of their fingers.

extension and application of knowledge in real-life contexts

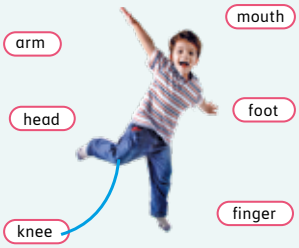
Your body has many parts.

a description of important concepts and ideas presented in the lesson, used for evaluation

The Review activities help students consolidate their knowledge, and help teachers assess the students' progress.

1 Review

1. Draw lines, as in the example.



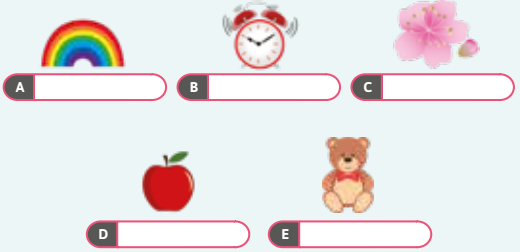
2. How are you and your partner similar? How are you different?

3. Complete the column of the table with the numbers (1-9) for the kinds of food.

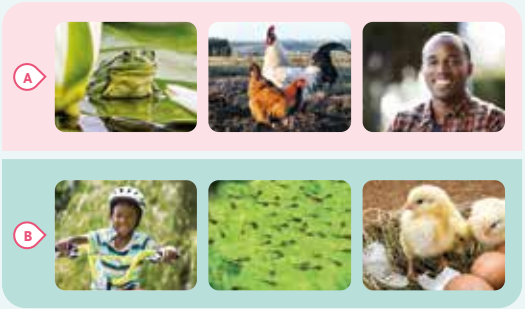
Bread, rice, cereal, potatoes, spaghetti	
Meat, fish, eggs, beans	
Milk, cheese, yoghurt	
Fruit and vegetables	
Oils and spreads	

4. Complete A-E with the words in the box.

hearing sight smell taste touch



5. Draw lines to match the young with their parents.



The steps of the scientific method, procedures and tools are presented at the back of the book so that students can follow them to conduct investigations.

Work like a scientist

Steps of the scientific method

Scientists study different things, like animals, plants, materials, and phenomena. You can do the same to find out about the world around you.

1. Look and ask a question

Luna is looking at her mother watering the plants and has a question.

2. Guess what will happen

Luna tells Yin what she thinks the answer to the question is.

3. Make a plan

Luna and Yin make a plan to find out the answer to the question. The girls also have a list with the materials they will use. They also think about what to do.

4. Do the test

Luna and Yin look at the plants and draw what they see.

5. Talk about what you found

Luna and Yin compare their drawings and talk about what they found.

The materials needed for the activities of each unit are presented at the back of the book, listed with pictures.

Materials

Unit 1 Humans and Animals


A3 white card


banana


cardboard box


cinnamon sticks


coloured pencils


glue


onions


paper fasteners


pebbles


pencil


rice


scissors

Unit 2 Properties of Materials and their Uses


aluminium foil


Blu-Tack


bottle


bowl of water


coloured pencils


gloves


glue


magnifying glass

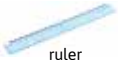

paper towel


plastic bag

plastic cup


play dough


rope


ruler


scarf


scissors


spinning top


sticky tape


teddy bear


towel

The key scientific terms with definitions or pictures that help students visualise vocabulary are presented at the back of the book. The additional vocabulary items included in lessons are marked with an asterisk*.

Glossary

adult a fully-grown person or animal 12

alarm a device that warns us of danger 44

ambulance* a big van that takes people to hospital when they are very ill 49

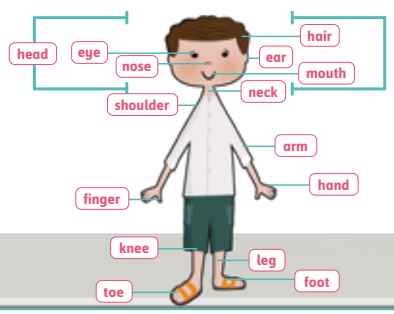
animal a living thing that is not a person or plant 26

ask to make a question 7

baby a very young child or animal 12

body the whole of a person 4

The parts of the human body



caterpillar* a small, long animal with many legs that eats the leaves of plants and grows into a butterfly 12

cocoon* something that some insects make so that they are safe as they grow into adults 17

column* a part of a table where people put numbers, words, etc. 14

compare to see how things are similar or different 8

container* an object such as a box or a bottle, that we use to carry or store something 45

cotton towel* a piece of material we use to dry something or someone 18

count to see how many things, people, etc. there are 49

dark* without light 55

desert a large, hot, dry area with sand or rocks and few plants 30

diet the kinds of food that humans and animals eat 9

different not the same 6

direction the place towards which something or someone is moving 38

do the test to do something to see what will happen 21

drill* a tool that we use to make a hole in the ground 50

ear protectors* something that you put on your ears to keep them safe from a loud sound 45

environment the place where people, animals and plants live, which gives them a home, food and water 30

explore to look at something carefully to learn more about it 18

fabric a soft flexible material that we use to make clothes and other things 17

far not near 48

faster moving more quickly 38

fawn* a young deer 12

find out to learn something 11

flexible changing shape easily; bending easily but without breaking 22

Practice activities to support and expand students' knowledge and help them develop scientific enquiry skills are provided.

1 Humans and Animals

1.1 What are the parts of your body?

1. Read about a funny person and draw him. Then colour him in.

He has:
- a big head
- small eyes
- a big mouth
- a big nose
- big ears
- a short neck
- curly hair
- short arms
- big hands
- long fingers
- long legs
- small feet

2. Find and circle the words, as in the example.

body knee neck finger toe shoulder

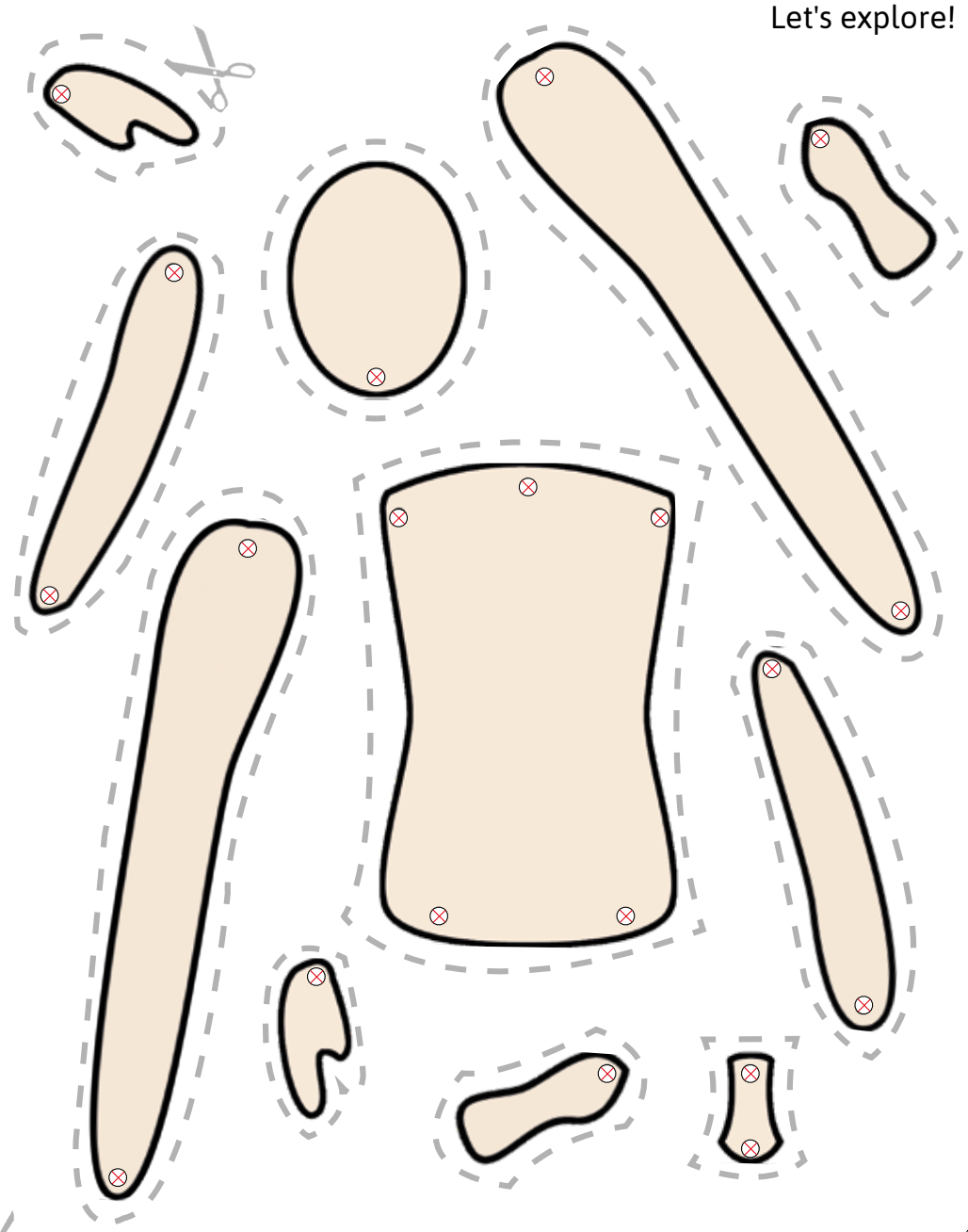
x	k	n	e	e	r	n	s	t
f	i	n	g	e	r	e	w	o
b	o	d	y	f	e	c	q	e
p	h	z	y	i	p	k	e	d
p	s	h	o	u	l	d	e	r

6

Cut-out pictures for activities or assessment are also provided at the back of the Workbook.

1.1 What are the parts of your body?

Resource Pictures
Let's explore!



31

learning objectives are identified and scientific enquiry skills are developed in each lesson

links with other science lessons and different school subjects

materials and resources that are needed for the lesson

list of student preconceptions about the specific topic

extensive and detailed lesson plan with ideas and suggestions about how to conduct the lesson and develop scientific enquiry skills

guidance about how to detect students' prior knowledge and experiences by asking appropriate questions

keys to all the activities and questions are given

notes for the teacher which focus on safety issues

1.1 What are the parts of your body?

Learning Objectives

- Identify the main external parts of the body.

Scientific Enquiry Skills

- Observe and collect evidence in order to answer a question.
- Make suggestions and follow instructions.
- Model and share ideas in order to evaluate and expand on them.

Cross Curriculum Links (CCL)

- The Let's explore section can be linked with the school subject of design and technology, as Ss are asked to make a model of the human body.

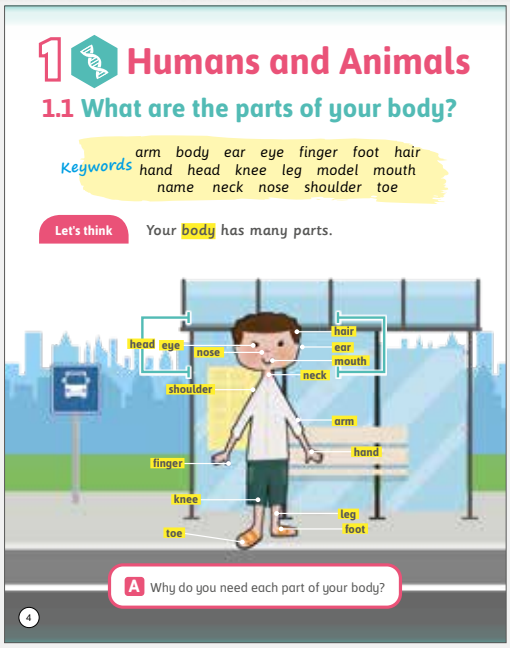
Materials and Resources

> RS a, RS b, RS c, RPs Let's explore!

> Let's explore!: coloured pencils (or crayons), paper fasteners (10 per S), scissors

Common Student Preconceptions

1. Ss may have never thought about the purpose of different external parts of the body.
2. Ss may confuse parts of the body, for example, hands-arms, legs-feet, etc.



LESSON PLAN

Keywords

- For the presentation of the keywords, see the guidelines in the TB map.

> arm > body > ear > eye > finger > foot > hair > hand > head > knee > leg > model > mouth > name > neck > nose > shoulder > toe

Let's think

- Read the text to provide Ss with useful information on the topic of the lesson.

A

- Draw Ss' attention to the picture, and ask them to say what they see (Enzo is standing at a bus stop.).
- Starting from his head, read each word aloud and encourage Ss to point to each part of Enzo's body.
- Then, read each word aloud again and encourage Ss to point to each part of their body.
- Ask Ss the question.
- Ask Ss questions, like ***Do you need your hands to write?*** (Yes.), ***Do you need your nose to walk?*** (No, I need my nose to smell.). This will help **lower-performing Ss**.
- Encourage Ss to name other parts of the body and things they can do with each part. This will challenge **higher-performing Ss**.

Suggested answers:
I need my hands to write; I need my legs to walk; I need my eyes to see; I need my nose to smell.

B

- Draw Ss attention to pictures A-D, and ask them to say what they see (A. A girl is holding an umbrella and wearing a raincoat, while it is raining., B. A boy is riding a bike and wearing a helmet., C. A girl is wearing sunglasses and a hat on a sunny day., D. A girl is wearing a woolly hat, a scarf and gloves on a snowy day.).
- Read the text aloud and ask Ss the question.
- Ask Ss more questions, e.g. ***What else do you wear on your body and where do you wear them?*** (I wear trousers on my legs, I wear shoes on my feet.).

The child in picture A is wearing a raincoat on her body to stay dry in the rain; the boy in picture B is wearing a helmet on his head to protect his head; the girl in picture C is wearing sunglasses and a hat on her head to protect her eyes and head from the Sun; the girl in picture D is wearing a woolly hat on her head to protect her head and ears from the cold. She is also wearing gloves on her hands and a scarf round her neck, for the same reason.

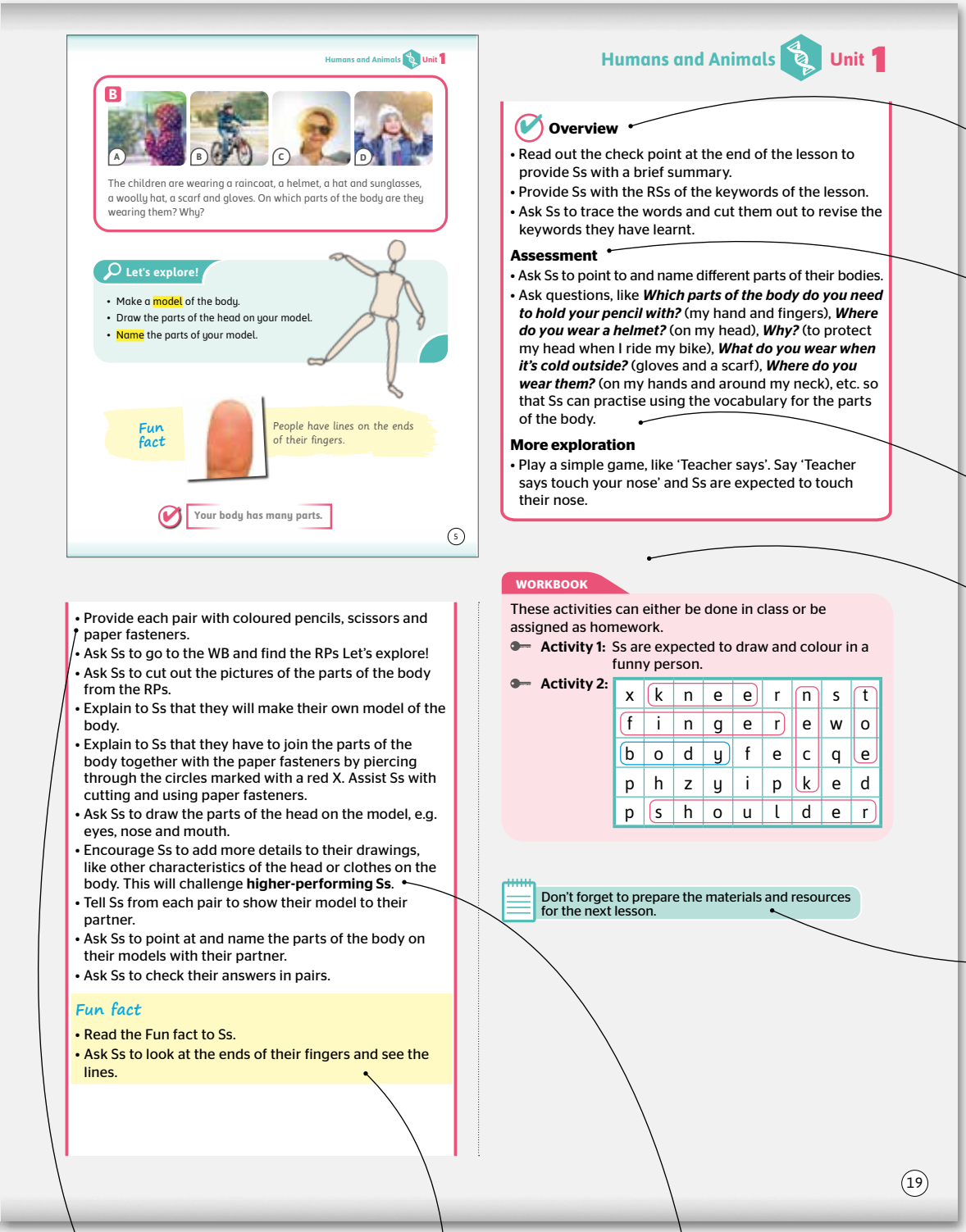
Let's explore! CCL: design and technology

- Before you begin the Let's explore! activity, read the following guideline carefully, and explain it to Ss in order to keep them safe.

> *Ss should be careful when using scissors.*

- Divide Ss into pairs.
- Tell Ss to look at the picture of the model of the body in the SB and name its parts.

18



aspects of formative and summative evaluation of students' learning

questions and activities which help teachers assess students' knowledge and acquired skills after the enquiry process

optional activities for extension of the acquired knowledge

keys to the activities in the Workbook

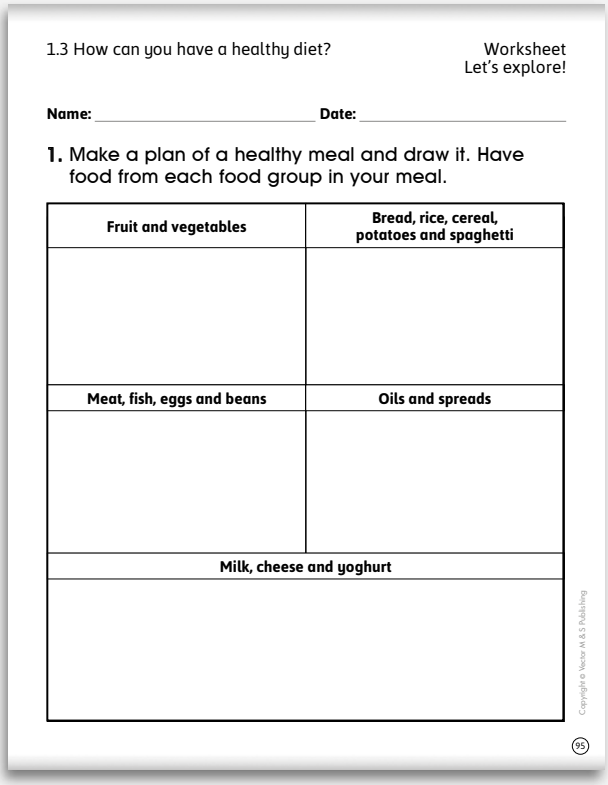
reminders to facilitate the teaching procedure

guidance for the practical activities and development of scientific enquiry skills

extension and application of the acquired knowledge in real-life contexts

differentiated questions or activities providing students with necessary assistance or challenging them

Supportive material for class activities is also provided.



1.3 How can you have a healthy diet? Worksheet
Let's explore!

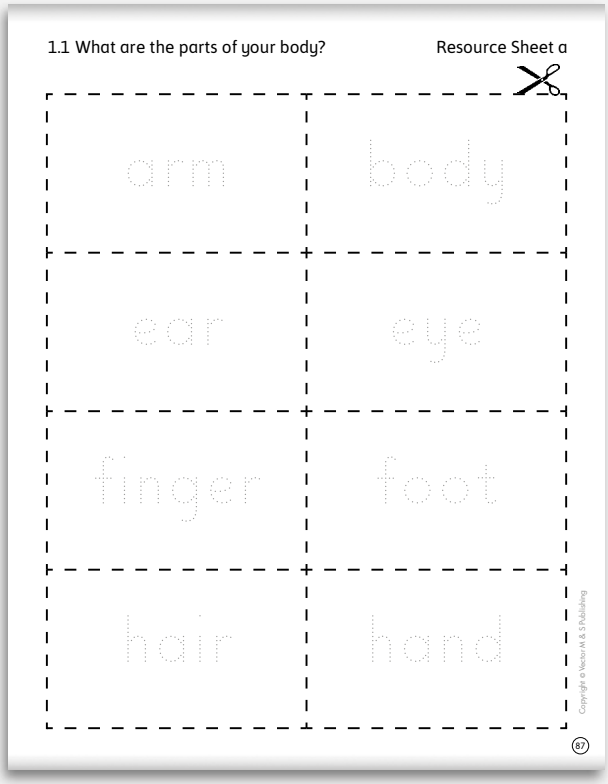
Name: _____ **Date:** _____

1. Make a plan of a healthy meal and draw it. Have food from each food group in your meal.

Fruit and vegetables	Bread, rice, cereal, potatoes and spaghetti
Meat, fish, eggs and beans	**Oils and spreads**
Milk, cheese and yoghurt	

95

Resource Sheets to recycle and revise the keywords of each unit are also provided.



1.1 What are the parts of your body? Resource Sheet a

arm	body
ear	eye
finger	foot
hair	hand

87

3 Testing Materials

3.1 Which objects can you squash or twist?

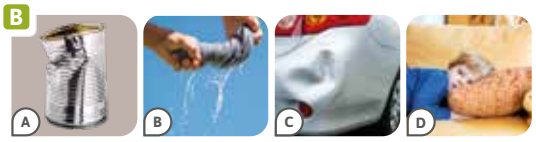
Keywords shape squash twist

Let's think

You can make objects from different materials. You can change the shape of objects when you squash or twist them.

A 1. What are the children twisting?
2. What are the children squashing?

B



1. Which objects are squashed? Which objects are twisted?
2. Can you change the shape of these objects with your hands?

Let's explore!

- Look at the objects you have.
- Can you change their shape? How?
- Do the test to find out.
- Talk about what you found.

Fun fact

When some metals get very hot, we can change their shape with tools.

- You can change the shape of some objects when you squash or twist them.
- It is not easy to change the shape of some objects with your hands.
- Some objects do not keep their new shape when you stop squashing or twisting them.

3 Testing Materials

3.1 Which objects can you squash or twist?

1. Draw what the objects will look like.

	Before	After
Squash		
Twist		

2. Is it squashed or twisted? Match. Write 1 or 2 in the boxes.

1. squashed 2. twisted

4 Forces

4.1 How can forces change the movement of an object?

Keywords force pull push

Let's think

A force can be a push or a pull on an object. We use forces every day, but we cannot see them. We only see what they do. Forces can change the movement of an object.

A Who is pushing and who is pulling the sledge?

Let's explore!

- Do magnets push or pull magnetic materials?
- Plan a test to find out.
- Do the test and record your results.
- Explain what happened.

Does the magnet push or pull magnetic materials? A

44

Forces Unit 4

B

How do forces change the movement of the balls?

Let's explore!

- How can you change the movement of a ball?
- Make a plan.
- Make the ball start moving, stop moving and change direction.
- How will the size of the force affect the movement of the ball?
- Record your results.
- Discuss what happened.

What happens when you use a force on an object? B

Science in action

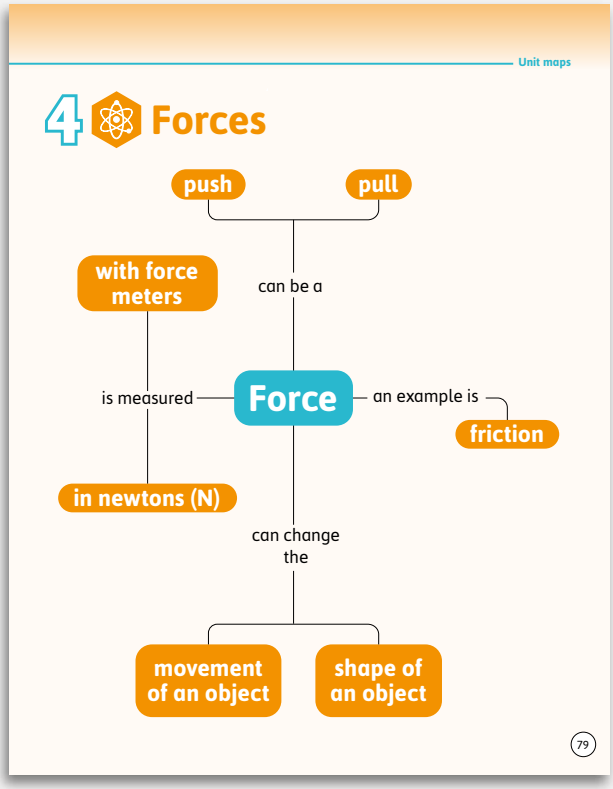
1. What is moving the sailing boat?
2. What makes the waterwheel turn?

- A force can be a push or a pull.
- Forces can make objects start and stop moving.
- Forces can make objects change direction.

45

SCIENCE 3 • Student's Book • Sample page

Visual tools which organise and present the scientific concepts of each unit are provided.



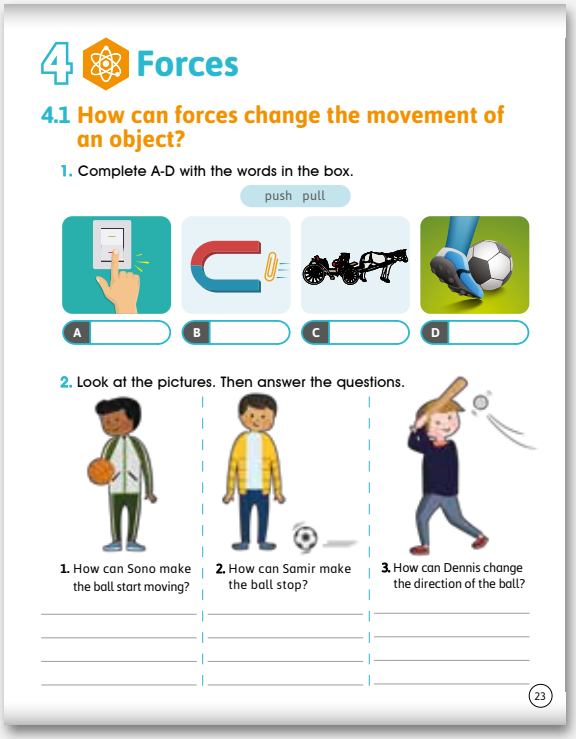
Unit maps

4 Forces

push
pull
with force meters
can be a
is measured
Force
an example is
friction
in newtons (N)
can change the
movement of an object
shape of an object

79

Practice activities to support and expand students' knowledge and help them develop scientific enquiry skills are provided.



4 Forces

4.1 How can forces change the movement of an object?

1. Complete A-D with the words in the box.

push pull

A B C D

2. Look at the pictures. Then answer the questions.

1. How can Sono make the ball start moving?

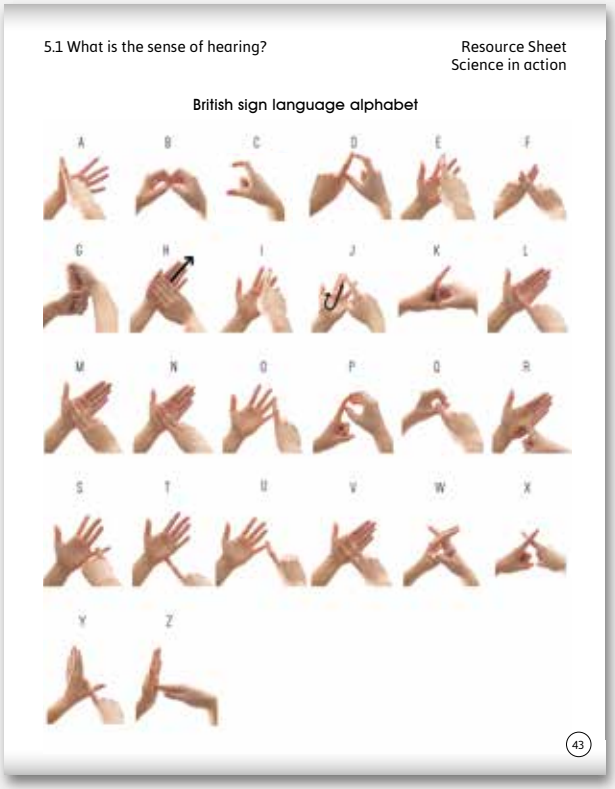
2. How can Samir make the ball stop?

3. How can Dennis change the direction of the ball?

23

Sample page • Workbook • SCIENCE 3

Resource Sheets which are used to initiate a discussion in the class based on various topics are provided at the back of the Workbook.



5.1 What is the sense of hearing?

Resource Sheet
Science in action

British sign language alphabet

43

vocabulary list of the keywords of each lesson

an introduction of each lesson without revealing all the scientific concepts

activities that encourage critical thinking and personal response and incorporate topics and ideas in real-life contexts

inquiry-based exploration activities, in which students work either independently or in small groups

1 Humans and Animals

1.1 What are skeletons?

Keywords *bone conclusion pattern skeleton structure support vertebrate*

Let's think

Humans and some animals have bones inside their bodies. You can feel some of these bones through your skin.

A

1. Where do you think you have bones in your body?
2. Touch your arms and head. What do they feel like?
3. Who do you think has more bones: an adult or a baby?

Let's explore!

- Make a model of the human body.
- Where do you think you have bones in your body? How can you find out where your bones are?
- Explore the bones you can feel in your body.
- Draw the bones in your model.
- Does your partner's model have bones in the same places? Compare the models.
- Compare your model to your classmates' models. What's your conclusion?

? Can you see a pattern in the models?

6

B

A human skeleton

B cat skeleton

C jellyfish

visuals and high-resolution pictures to facilitate the understanding of scientific knowledge

Bones are hard, strong and not heavy. The human skeleton is the structure of the bones inside the body. The skeleton supports the body and gives it a shape. Most vertebrates have skeletons made of bones. Not all animals have skeletons. Jellyfish have very soft bodies. There is fluid inside the body of a jellyfish, which gives it its shape. Name animals with skeletons made of bones.

How can you make your bones stronger?

expansion of students' knowledge of scientific concepts

Science in action

The body of a baby has about 300 bones. The body of an adult has 206 bones. What do you think happens to some of the bones that a baby has as it grows up?

extension and application of knowledge in real-life contexts

- **The skeleton is the structure of the bones inside a human's or an animal's body.**
- **Not all animals have skeletons.**
- **Some animals have skeletons made of bones.**
- **A skeleton supports the body and gives it its shape.**

a description of important concepts and ideas presented in the lesson, used for evaluation

1 Humans and Animals

1.1 What are skeletons?

1. Match. Write **1-3** in the boxes.

1. human 2. frog 3. elephant


A


B


C

2. Read the sentences. Write **Yes** or **No**.

1. Bones are heavy. _____
2. The structure of the bones inside the body of an animal is the skeleton. _____
3. Human skeletons have patterns. _____
4. All animals have skeletons. _____
5. An adult person has more bones than a baby. _____

3. Complete the sentences with the words in the box.

skin bones vertebrates

1. Humans and some animals have _____ inside their bodies.
2. You can feel some of these bones through your _____.
3. Most _____ have skeletons made of bones.

8

Activities that focus on the development of the vocabulary of each unit, as well as activities for the assessment and evaluation of the knowledge students have acquired are also provided.

Unit 1: Body Systems — Language Focus

Name: _____ **Date:** _____

1. Unscramble the letters to find the major organs of the body. The first letter of each word is given.

1. r b i a n — b_____
2. a h r t e — h_____
3. e s i n n t e i s t — i_____
4. y s k d i n e — k_____
5. g u l n s — l_____
6. h s t a c m o — s_____
7. e v r l i — l_____

2. Complete the sentences with the words/phrases in the box.

air sacs break down breath blood carry control digestive juices blood vessels spinal cord trachea

1. One function of the kidneys is to _____ the amount of water in the blood.
2. The stomach mixes food with _____ forming a liquid mixture that moves to the small intestine where nutrients from food _____ further.
3. The _____ is a part of the circulatory system that flows through _____.
4. With every _____, air flows from the nose through the _____ to the lungs, where it fills the _____.
5. There are nerves that _____ messages from the sense organs to the brain.
6. The _____ contains nerves that connect the different organs and parts of the body to the brain.

2

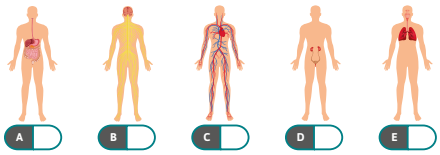
Unit 1: Body Systems — Assessment Sheet

Name: _____ **Date:** _____

Total score / 35

1. What are the body systems? Match. Write **1-5** in the boxes.

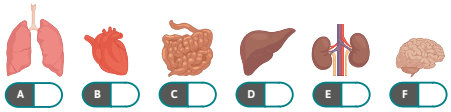
1. excretory system **2.** respiratory system **3.** digestive system **4.** circulatory system **5.** nervous system


A B C D E

Score / 5

2. Match the organs with their function. Write **1-6** in the boxes.

1. They remove urea and other waste products from the blood.
2. They remove carbon dioxide from the body.
3. It pumps the blood around the body.
4. It controls our thoughts and emotions, our speech and movement.
5. It breaks down harmful substances.
6. It breaks down nutrients from food and absorbs them.


A B C D E F

Score / 6

2

5.2 How do daytime and night-time happen?

Keywords anticlockwise axis day daytime globe night-time rotate rotation tilt

Let's think A day has some hours of daytime and some hours of night-time. One day has 24 hours.

A

Why do you think daytime and night-time happen?

B

The globe is a model of the Earth. The globe has a stick through its centre. It shows the Earth's axis. The Earth's axis is an imaginary line through the Earth between the North Pole and the South Pole. The Earth's axis doesn't stand up straight. It is tilted. The Earth rotates on its axis from the west to the east in an anticlockwise direction. How long does it take for the Earth to complete a rotation?

Let's explore!

- Demonstrate how daytime and night-time happen.
- Record your observations.
- Discuss and draw a conclusion.

How do daytime and night-time happen?

Emma, who lives in England, wants to call her friend Yin, who lives in Japan. Is evening in England a good time to call Yin?

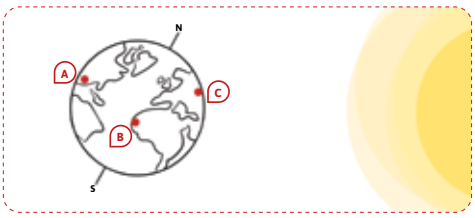
Science in action

How will the day change if the Earth completes a rotation on its axis in 8 hours and how will it change if the Earth completes a rotation in 40 hours?

- The Earth rotates from the west to the east on its axis.
- The Earth completes one rotation in 24 hours.
- Daytime and night-time happen because the Earth rotates on its axis.

5.2 How do daytime and night-time happen?

1. Look at the picture of the Sun and the Earth. Colour in the part of the Earth that has night-time with the colour black, and draw an arrow (→) to show how the Earth rotates on its axis. Then answer the questions.



1. What time of the day do you think it is in country A? Circle. **morning / midnight**

2. What time of the day do you think it is in country B? Circle. **morning / evening**

3. What time of the day do you think it is in country C? Circle. **midnight / noon**

2. Complete the sentences with the words in the box.

axis globe hours rotation

1. Earth's _____ causes daytime and night-time.

2. The _____ is a model of the Earth.

3. The Earth rotates on its _____.

4. The Earth completes one rotation in 24 _____.

Science projects, which help students be more creative and use all the knowledge they have obtained from the unit in an investigation, construction, etc., are provided at the end of every unit in the Workbook at higher levels. Instructions for each Project are included at the end of the corresponding unit in the TB.

Unit 5 My Physics Project

Why do planets that are further away from the Sun take more time to complete one revolution around the Sun?

Read the materials, the steps and the notes below, which will help you investigate why planets that are further away from the Sun take more time to complete one revolution around the Sun.

Materials

straw (1 item), string (50 cm; 1 piece), washers (2 items)

Steps

1. Tie one end of the string to one washer. Take the other end of the string, push it through the straw until it comes out of the other end of the straw.
2. Tie this end of the string to the other washer.
3. Hold the straw with one hand, and pull the string until the washer that is at the bottom touches the straw.
4. Keep holding the straw and start spinning the washer that is at the top of the string. Continue spinning until it has a movement in steady orbit. While the washer at the top is spinning, slowly pull down the washer at the bottom with your other hand.
5. Observe how the movement of the spinning washer changes as its orbit becomes shorter.
6. Look in books or on the Internet, and collect data about the distance of the planets from the Sun, how fast they move around the Sun, and the time they take to complete one revolution around the Sun.
7. Compare your observations to the data you collected.

Notes

- Make sure you have a lot of space around you.
- Remember to complete your Worksheet during the investigation.

45

prior knowledge which will help students understand the scientific concept that will be presented in the lesson

2.2 How can different solids be mixed and separated?

Keywords mix mixture separate sieve

Let's think

When we mix solid materials, mixtures in the solid state form. There are several ways in which we can separate solid mixtures and get each solid material back.

A

How can you collect only the black beans from the mixture?

Let's explore!

- Investigate how you can separate different solid mixtures.
- What are the components of the mixtures that you have?
- Do the test and record your observations.
- Are there any mixtures that you cannot separate?
- Discuss and draw a conclusion.

What are some ways of separating solid mixtures?

Not all metals are attracted by magnets.

B

When solid materials are mixed and no chemical change happens, a mixture is formed. Since no chemical change happens, the materials mixed are not joined together to form a new substance, and this means that we can separate each solid material out.

We can separate solid mixtures by hand, by sieving, or by using a magnet. When the pieces of a solid component are large in size, we can usually collect them from a mixture with our hands. Sieves can be used to separate solid components of a mixture that have different sizes. Sieves can have holes that are smaller or bigger in size, and they hold inside them those solids which are too big to pass through the holes. Magnets can also be used to separate solids, because they attract only magnetic materials.

How can you separate the solid components of each mixture?

Science in action

Soil is a mixture of different components. Gardeners sometimes need to remove the rocks and the lumps of soil from the soil before they grow plants in it. How do they separate the rocks and lumps of soil from the soil?

- **Solid mixtures form when we mix solid materials and no chemical change happens.**
- **The materials in a mixture are not joined together, so we can separate them and get them back.**
- **We can separate solid mixtures by hand, by sieving, and by using a magnet.**

2.2 How can different solids be mixed and separated?

1. Read the sentences. Write **Yes** or **No**.

1. Solid mixtures are formed when we mix solid materials and a chemical change takes place. _____
2. Solid mixtures can be separated. _____
3. When we want to separate magnetic from non-magnetic materials, we use a sieve. _____
4. The solids in a mixture are not joined together. _____

2. Look at the picture. Then answer the questions.

1. What are the metal objects in the mixture? How can you separate them? Explain your answer.

_____

_____

_____

_____

2. How will you separate the solid components of the mixture?

_____

_____

_____

_____

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SCIENCE

worth exploring!

6 LEVELS

1 2 3 4 5 6

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