



Curriculum Framework

Cambridge Primary

Science 0097

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Cambridge Primary Progression Tests will be available from 2022.
Cambridge Primary Checkpoint tests will be available from 2023.



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1 Why choose this Curriculum Framework?

Key benefits

The Cambridge Primary Science curriculum supports your learners in developing life-long curiosity about the natural world and enables them to seek scientific explanations to the phenomena around them.

Learners develop a holistic approach to science by considering scientific thinking and practical skills alongside knowledge and understanding which is vital for explaining the world around us. This approach provides learners with the knowledge and skills they require to access and excel at science in later phases of education.

A unique feature of the Cambridge Primary Science curriculum is a strand called Science in Context which supports you in demonstrating the relevance of science to your learners. Improving learners' awareness of science in the world around them develops their sense that 'science is for me' and starts learners on a journey of connecting themselves to the subject.

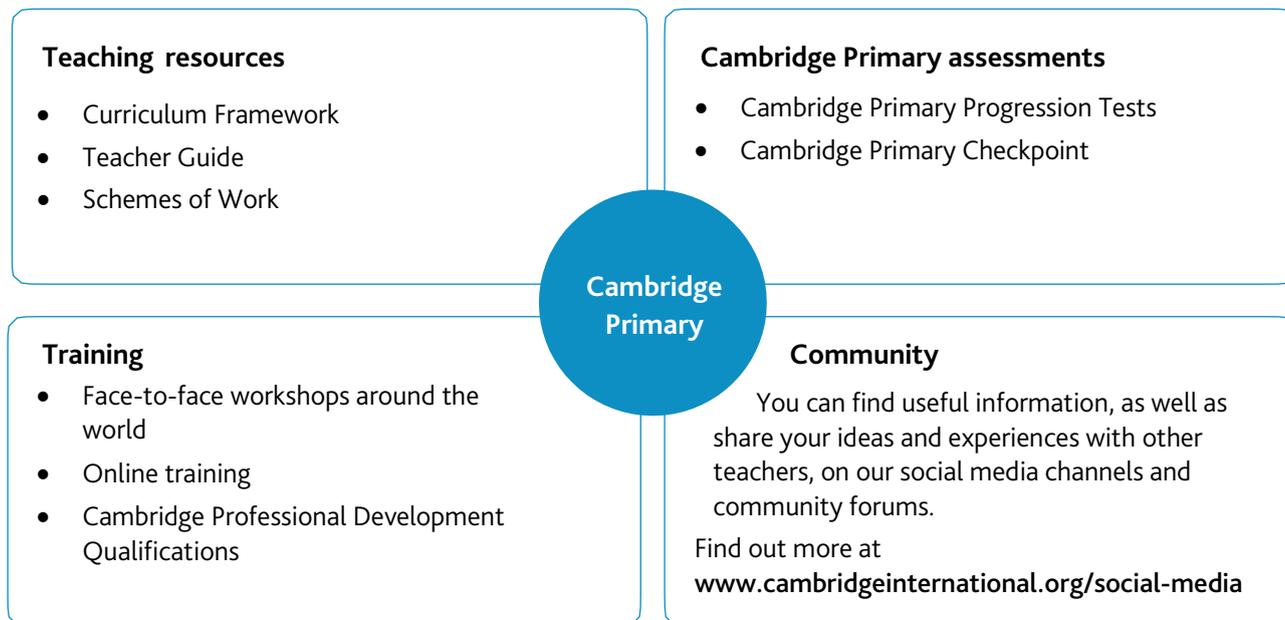
Alongside Science in Context, the whole structure of the *Cambridge Primary Science Curriculum Framework* is designed to support and enable effective teaching of science within and across the primary stages. You are provided with clearly sequenced strands of science skills and knowledge that will enable learners to describe, explain and investigate the world around them at an age appropriate level.

Learners will systematically develop their scientific knowledge through the strands Biology, Chemistry, Physics and Earth and Space while developing scientific practices through the Thinking and Working Scientifically strand. An understanding of science through these strands of study gives learners knowledge and skills to prepare them for the future and to make informed choices. This includes considering sustainability issues and meeting the challenges facing our environment.

Supporting teachers

We provide a wide range of practical resources, detailed guidance, innovative training and professional development so that you can give your learners the best possible experience of Cambridge Primary Science.

You will find most of these resources on the Cambridge Primary support site (<https://primary.cambridgeinternational.org>). Ask the Cambridge coordinator or exams officer in your school if you do not already have a log-in for this support site.



Progression through the Cambridge Pathway

We have designed Cambridge Primary Science to support learners to develop the skills required for success in their primary education and to progress to the next stage of the Cambridge Pathway. The *Curriculum Framework* is typically for learners aged 5 to 11, but it may be appropriate to use it for slightly different ages to suit your context.

You can download more information on progression from the Cambridge Primary support site.

Teaching time

For guidance, this *Curriculum Framework* is based on learners having the following number of hours for science shown in the table below. Your actual number of teaching hours may vary according to your context.

Stages	Suggested total number of hours per stage	Suggested hours of science per week
1–2	45	1.5
3–4	60	2
5–6	75	2.5

Assessment

We provide assessments designed to complement this *Curriculum Framework* for Stages 3 to 6. You can find more information on assessing Cambridge Primary Science on the Cambridge Primary support site.

The Science in Context strand will not be directly assessed by Cambridge International. You can find more information on assessing Cambridge Primary Science on the Cambridge Primary support site.

2 Curriculum overview

Aims

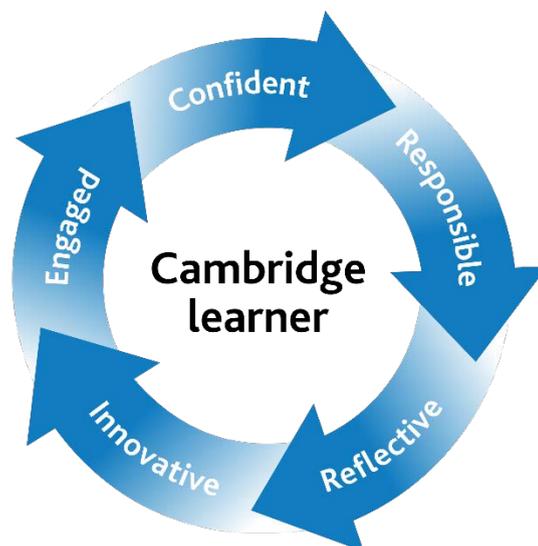
Following the Cambridge Primary programme helps learners to lay the foundations for lifelong learning, including:

- curiosity about the world around them and enthusiasm for learning
- knowledge, understanding and skills that can be applied in and across subjects
- effective and confident communication skills, including in English
- understanding of their personal and local context, as well as having global awareness.

In Cambridge Primary Science, learners:

- build curiosity and fascination about the world to stimulate their interest about science
- first meet foundational scientific concepts, that then develop through the Cambridge Pathway
- develop their scientific skills so they can become increasingly independent when questioning and investigating phenomena
- begin to understand that scientific models are used to understand and explain phenomena
- recognise that scientific understanding changes over time
- link science to real world contexts that are personal, local, national and global, identifying the relevance of science to the modern world.

The Cambridge approach encourages learners to be:



Cambridge Primary Science supports learners to become:

Responsible – They are responsible for themselves and for working collaboratively with others when investigating science. They understand how the application of science can have impacts on others and on the environment. They appreciate the role science has in the modern world, including in their communities.

Innovative – They are able to use their scientific skills and understanding to adapt to new, unfamiliar and future challenges. They are flexible and critical thinkers when studying scientific phenomena.

Confident – They are secure in their scientific understanding of the world, confident in working with scientific information and ideas and ready to challenge their own thinking. They are able to present their findings and defend their conclusions as well as respect those of others.

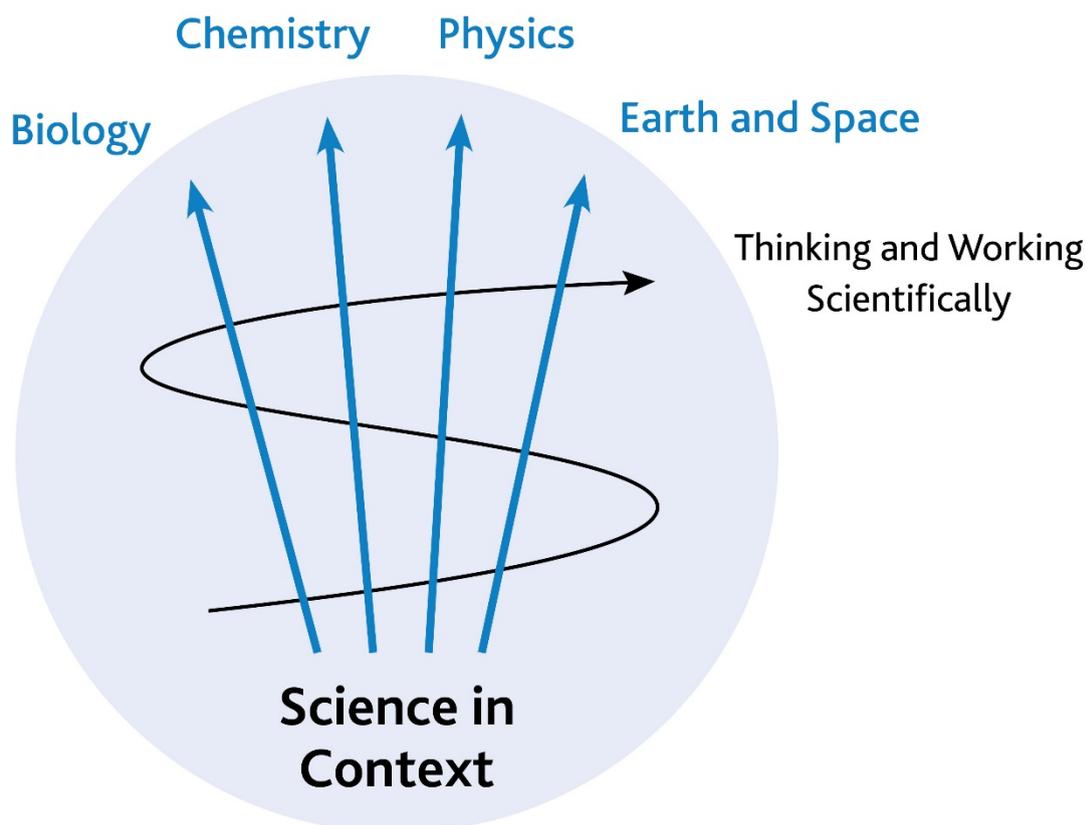
Engaged – They are curious and want to deepen their scientific understanding. They are keen to develop their ability to do science and are open to new ideas. They are able to use science to participate constructively in society and the economy by make informed choices involving science, at personal, local, national and global levels.

Reflective – They are reflective as scientists, able to review their understanding of the world and discover more. They are concerned with the process of science as well as the products of science and develop skills to allow them to investigate science independently.

Overview of the strands

This *Curriculum Framework* provides a comprehensive set of learning objectives for Cambridge Primary Science. These give a structure for teaching and learning and a reference against which learners' attainment and skills development can be checked.

We have divided the learning objectives into main areas called 'strands' which run through every stage. Each strand is further divided into 'sub-strands'. Sub-strands are based around the key concepts of each strand. Sub-strands help to identify progression and are useful when designing long-term plans, medium-term plans and other teaching resources.



In science there are three categories of strands all of which support learners in understanding and investigating natural phenomena and providing a foundation for developing future scientific skills, knowledge and attitudes:

1. A skill strand – Thinking and Working Scientifically
2. Content strands – Biology, Chemistry, Physics, and Earth and Space
3. A context strand – Science in Context

Thinking and Working Scientifically

This strand relates to the development of scientific skills and covers three core scientific approaches:

- **Models and representations:** Scientists use models and representations to represent objects, systems and processes. They help scientists explain and think about scientific ideas that are not visible or are abstract. Scientists can then use their models and representations to make predictions or to explain observations. Cambridge Primary Science includes learning objectives about models and representations because they are central to learners' understanding of science. They also prepare learners for the science they will encounter later in their education.
- **Scientific enquiry:** Learners need to develop scientific enquiry skills around the purpose and planning of experiments and investigations, evidence collection, analysis, making evaluations and conclusions. These skills enable learners to investigate the world around them and relate their scientific knowledge to observable and testable phenomena.
- **Practical work:** Learners require good skills of observation, measurement and equipment handling. These skills enable learners to collect accurate and reliable data within investigation work. The development of practical work and the skills associated with it supports the collection of data.

The content strands

Biology is the study of living things and how they interact with each other. Learners develop understanding about life processes including how the structure and development of living things allows them to maintain these processes.

Chemistry is the study of matter. Matter takes the form of materials that are made up of substances. Learners develop understanding of materials and substances, their properties and their physical and chemical changes.

Physics is the study of the interaction of matter and energy. Learners develop understanding about how heat and electrical current is transferred through matter, how light and sound behave, how magnets interact and how forces affect objects.

Earth and Space covers the study of the planet Earth, the wider Solar System and beyond. Learners develop understanding about the connections between the land, oceans, atmosphere and life of our planet. They investigate how the key cycles that shape our planet Earth are inextricably linked with the Solar System. Learners will also explore the Earth's formation, geology and climate.

Science in Context

This strand provides a framework of statements to help learners study and understand the learning objectives within the other five science strands in a context relevant to them. Learners recognise how the science curriculum relates to the real world by linking concepts and processes learned in the classroom to scientists and their work, science phenomena, and ideas and events relevant to their age and experience. In Stages 1 to 3, science activities should focus on learners' experiences and surroundings. In Stages 4 to 6, the science activities should draw on broader local contexts or elsewhere in the country and region.

Overview of teaching approaches

The Cambridge Primary Science curriculum offers great flexibility through its three strand categories approach: skills strand, content strand and context strand.

The three types of strands are designed to support each other in every stage of learning to provide learners with a holistic science education. For example, learners are able to develop the skills within *Thinking and Working Scientifically* while they learn the content within the four content strands which can be taught through contexts supported by the *Science in Context* strand.

Science is a practical subject and teaching of science should include opportunities for learners to observe and carry out practical work. You can find more information and ideas for teaching and learning activities, including how the three categories of strand work together, in the *Cambridge Primary Science Teacher Guide* and *Schemes of Work* available on the Primary support site (<https://primary.cambridgeinternational.org>).

The *Teacher Guide* will support you to plan and deliver lessons using effective teaching and learning approaches.

The *Scheme of Work* for each stage of Cambridge Primary Science contains:

- suggested units showing how the learning objectives in the *Curriculum Framework* can be grouped and ordered
- at least one suggested teaching activity for each learning objective
- a list of subject-specific language that will be useful for your learners
- common misconceptions
- sample lesson plans.

You do not need to use the ideas in the *Schemes of Work* to teach Cambridge Primary Science. They are designed to indicate the types of activities you might use, and the intended depth and breadth of each learning objective. These activities are not designed to fill all the teaching time for this stage. You should use other activities with a similar level of difficulty, for example, those from endorsed resources.

The *Teacher Guide* will support you to plan and deliver lessons using effective teaching and learning approaches.

We work with a range of publishers to provide high-quality endorsed resources to support our *Curriculum Frameworks*. In order to provide choice for Cambridge International Schools, we encourage publishers to develop resources with varying approaches. There is no requirement for endorsed textbooks to follow the teaching order suggested in the Cambridge Primary *Schemes of Work*. If a resource is endorsed, you can be confident that all the learning objectives are covered.

Health and safety

An essential part of this curriculum is that learners develop skills in scientific enquiry. This includes collecting primary data by experiment. Scientific experiments are engaging and provide opportunities for first-hand exploration of phenomena. However, they must, at all times, be conducted with the utmost respect for safety, specifically:

- It is the responsibility of the teacher in charge to adhere and conform to any national, regional and school regulation in place with respect to safety of scientific experimentation.
- It is the responsibility of the teacher in charge to make a risk assessment of the hazards involved with any particular class or individual when undertaking a scientific experiment that conforms to these regulations.

Cambridge International takes no responsibility for the management of safety for individual published experiments or for the management of safety for the undertaking of practical experiments in any given location. Cambridge International only endorses support material in relation to curriculum content and is not responsible for the safety of activities contained within it. The responsibility for the safety of all activities and experiments remains with the school.

Animal welfare and the use of animals in science

Throughout biology, learners study a variety of living things, including animals. As part of the University of Cambridge, Cambridge International shares the approach that good animal welfare and good science work together.

Learners should have opportunities to observe animals in their natural environment. This should be done responsibly and not in a way that could cause distress or harm to the animals or damage to the environment.

If living animals are brought into schools then the teacher must ensure that any national, regional and school regulations are followed regarding animal welfare. In all circumstances, the teacher responsible must ensure all animals have:

- a suitable environment, including being housed with, or apart from, other animals (as required for the species)
- a suitable diet
- the opportunity to exhibit normal behaviour patterns
- protection from pain, injury, suffering and disease.

There is no requirement for learners to participate in, or observe, animal dissections for Cambridge Primary. Although dissection can provide a valuable learning opportunity, some learners decide not to continue studying biology because they dislike animal dissection. Several alternatives are available to dissection (such as models and diagrams) which you should consider during your planning.

If you decide to include animal dissection then animal material should be obtained from premises licensed to sell them for human or pet consumption, or from a reputable biological supplier. This approach helps to ensure animal welfare standards and also decreases the risk from pathogens being present in the material. Neither you nor your learners should kill animals for dissection.

When used, fresh material should be kept at 5 °C or below until just before use. Frozen material should be defrosted slowly (at 5 °C) without direct heat. All fresh or defrosted material should be used within 2 days. Preserved animal materials should only be handled when wearing gloves and in a well-ventilated room.

The responsibility for ensuring the welfare of all animals studied in science remains with the school.

Teaching human reproduction

It is expected that schools will have their own sex education policy set within their national legislative framework and drawn up in consultation with parents. We are aware that these policies will be distinct and varied due to the diversity in tradition and culture found over our global network of schools. For this reason, the focus of the Cambridge Primary Science curriculum is factual and covers changes to the human body, in both males and females, during puberty and the structure of the human reproductive organs.

It does not address attitudes and values or personal and social skills as we expect each school to make a judgement on how these aspects of sex education are addressed within their wider curriculum framework obligations.

3 Learning objectives by stage

Overview of learning objectives

There are learning objectives for each of Stages 1 to 6. All the learning objectives in each stage provide clear progression from the previous stage and to the subsequent stage.

To enable effective progression in your teaching, you need to be familiar with the progression of skills across stages. This will help you to build on prior learning in every stage. The progression of learning objectives across Stages 1 to 6 is available on the Primary support site (<https://primary.cambridgeinternational.org>).

Learning objective codes

Each learning objective has a unique code, e.g. **5Bs.01**. These codes appear in the *Schemes of Work, Teacher Guide* and other Cambridge Primary resources. Each learning objective code includes:

- the stage number, e.g. **5Bs.01**
- a reporting code that appears in the feedback reports for tests and reflects the sub-strand titles, e.g. **5Bs.01**
- a number reflecting the order of the learning objectives in the sub-strand for the stage, e.g. **5Bs.01**.

Stage 1

Thinking and Working Scientifically

Scientific enquiry: purpose and planning

- **1TWSp.01** Ask questions about the world around us and talk about how to find answers.
- **1TWSp.02** Make predictions about what they think will happen.

Carrying out scientific enquiry

- **1TWSc.01** Sort and group objects, materials and living things based on observations of the similarities and differences between them.
- **1TWSc.02** Use given equipment appropriately.
- **1TWSc.03** Take measurements in non-standard units.
- **1TWSc.04** Follow instructions safely when doing practical work.
- **1TWSc.05** Collect and record observations and/or measurements by annotating images and completing simple tables.

Scientific enquiry: analysis, evaluation and conclusions

- **1TWSa.01** Describe what happened during an enquiry and if it matched predictions.

Biology

Structure and function

- **1Bs.01** Recognise and name the major parts of familiar flowering plants (limited to roots, leaves, stems and flowers).
- **1Bs.02** Identify the senses (limited to sight, hearing, taste, smell and touch) and what they detect, linking each to the correct body part.
- **1Bs.03** Recognise and name the major external parts of the human body.

Life processes

- **1Bp.01** Identify living things and things that have never been alive.
- **1Bp.02** Know that animals, including humans, need air, water and suitable food to survive.
- **1Bp.03** Know that plants need light and water to survive.
- **1Bp.04** Describe how humans are similar to and different from each other.

Chemistry

Materials and their structure

- **1Cm.01** Identify, name, describe, sort and group common materials, including wood, plastic, metal, glass, rock, paper and fabric.
- **1Cm.02** Understand the difference between an object and a material.

Properties of materials

- **1Cp.01** Understand that all materials have a variety of properties.
- **1Cp.02** Describe common materials in terms of their properties.

Changes to materials

- **1Cc.01** Describe how materials can be changed by physical action, e.g. stretching, compressing, bending and twisting.

Physics

Forces and energy

- **1Pf.01** Explore, talk about and describe the movement of familiar objects.
- **1Pf.02** Describe pushes and pulls as forces.
- **1Pf.03** Explore that some objects float and some sink.

Light and sound

- **1Ps.01** Identify different sources of sound.
- **1Ps.02** Explore that as sound travels from a source it becomes quieter.

Electricity and magnetism

- **1Pe.01** Identify things that require electricity to work.
- **1Pe.02** Explore, talk about and describe what happens when magnets approach and touch different materials.

Earth and Space

Planet Earth

- **1ESp.01** Know that Earth is mostly covered in water.
- **1ESp.02** Describe land as being made of rock and soil.

Earth in space

- **1ESs.01** Know that Earth is the planet on which we live.
- **1ESs.02** Describe the Sun as a source of heat and light, and as one of many stars.

Science in Context

- **1SIC.01** Talk about how some of the scientific knowledge and thinking now was different in the past.
- **1SIC.02** Talk about how science explains how objects they use, or know about, work.
- **1SIC.03** Know that everyone uses science and identify people who use science professionally.
- **1SIC.04** Talk about how science helps us understand our effect on the world around us.

Stage 2

Thinking and Working Scientifically

Models and representations

- **2TWSm.01** Know that a model represents an object or idea in a clear way.
- **2TWSm.02** Make and use a physical model of a familiar system or idea.
- **2TWSm.03** Describe the difference between a diagram and a picture.

Scientific enquiry: purpose and planning

- **2TWSp.01** Ask questions about the world around us and talk about how to find answers.
- **2TWSp.02** Make predictions about what they think will happen.

Carrying out scientific enquiry

- **2TWSc.01** Sort and group objects, materials and living things based on observations of the similarities and differences between them.
- **2TWSc.02** Use given equipment appropriately.
- **2TWSc.03** Take measurements in non-standard units.
- **2TWSc.04** Follow instructions safely when doing practical work.
- **2TWSc.05** Use a given secondary information source to find an answer to a question.
- **2TWSc.06** Collect and record observations and/or measurements by annotating images and completing simple tables.

Scientific enquiry: analysis, evaluation and conclusions

- **2TWSa.01** Describe what happened during an enquiry and if it matched their predictions.
- **2TWSa.02** Identify simple patterns in results, e.g. increasing and decreasing patterns.
- **2TWSa.03** Present and interpret results using tables and block graphs.

Biology

Structure and function

- **2Bs.01** Compare how animals, including humans, are similar and different in their external body parts and skin covering.
- **2Bs.02** Identify the different types of human teeth, explain how they are suited to their functions and describe how to care for teeth.

Life processes

- **2Bp.01** Know that humans need to manage diet, maintain hygiene and move regularly to be healthy.
- **2Bp.02** Describe what illness is and describe the common signs of illness in humans.
- **2Bp.03** Describe how the offspring of animals, including humans, change as they become older.
- **2Bp.04** Know that animals, including humans, produce offspring that have a combination of features from their parents.

Ecosystems

- **2Be.01** Know that an environment in which a plant or animal naturally lives is its habitat.
- **2Be.02** Know that different habitats contain different plants and animals.
- **2Be.03** Identify similarities and differences between local environments in terms of hot, cold, dry, wet, many plants, few plants, many animals and few animals.

Chemistry

Materials and their structure

- **2Cm.01** Understand that some materials occur naturally and others are manufactured.

Properties of materials

- **2Cp.01** Describe a property as a characteristic of a material and understand that materials can have more than one property.
- **2Cp.02** Explain why materials are chosen for specific purposes on the basis of their properties.
- **2Cp.03** Know that materials can be tested to determine their properties.

Changes to materials

- **2Cc.01** Know that some changes can turn a material into a different material.

Physics

Forces and energy

- **2Pf.01** Know that forces can change the movement of an object.
- **2Pf.02** Know that forces can change the shape of an object.
- **2Pf.03** Recognise that things will only speed up, slow down or change direction when something else causes them to do so.

Light and sound

- **2Ps.01** Know that there are many light sources, including the Sun.
- **2Ps.02** Know that darkness is the absence of light.

Electricity and magnetism

- **2Pe.01** Identify how we use electricity and describe how to be safe with it.
- **2Pe.02** Recognise the components of simple circuits (limited to cells, wires and lamps).
- **2Pe.03** Explore the construction of simple series circuits (limited to cells, wires and lamps).

Earth and Space

Planet Earth

- **2ESp.01** Describe and compare different types of rock.
- **2ESp.02** Know rocks are extracted from the Earth in different ways, including from quarries, mines and riverbeds.
- **2ESp.03** Know that human activity can affect the environment.

Earth in space

- **2ESs.01** Describe the apparent movement of the Sun during the day.

Science in Context

- **2SIC.01** Talk about how some of the scientific knowledge and thinking now was different in the past.
- **2SIC.02** Talk about how science explains how objects they use, or know about, work.
- **2SIC.03** Know that everyone uses science and identify people who use science professionally.
- **2SIC.04** Talk about how science helps us understand our effect on the world around us.

Stage 3

Thinking and Working Scientifically

Models and representations

- **3TWSm.01** Know that there are different types of models in science, including diagrams and physical models that we can touch.
- **3TWSm.02** Make and use physical models.
- **3TWSm.03** Draw a diagram to represent a real world situation and/or scientific idea.

Scientific enquiry: purpose and planning

- **3TWSp.01** Ask scientific questions that can be investigated.
- **3TWSp.02** Know that there are five main types of scientific enquiry (research, fair testing, observing over time, identifying and classifying, and pattern seeking).
- **3TWSp.03** Make a prediction describing some possible outcomes of an enquiry.
- **3TWSp.04** Identify risks and explain how to stay safe during practical work.

Carrying out scientific enquiry

- **3TWSc.01** Use observations and tests to sort, group and classify objects.
- **3TWSc.02** Choose equipment from a provided selection and use it appropriately.
- **3TWSc.03** Take measurements in standard units, describing the advantage of standard units over non-standard units.
- **3TWSc.04** Carry out practical work safely.
- **3TWSc.05** Use secondary information sources to research an answer to a question.
- **3TWSc.06** Collect and record observations and/or measurements in tables and diagrams.

Scientific enquiry: analysis, evaluation and conclusions

- **3TWSa.01** Identify whether results support, or do not support, a prediction.
- **3TWSa.02** Describe simple patterns in results.
- **3TWSa.03** Make a conclusion from results and relate it to the scientific question being investigated.
- **3TWSa.04** Present and interpret results using tables and bar charts.

Biology

Structure and function

- **3Bs.01** Describe the function of the major parts of flowering plants (limited to roots, leaves, stems and flowers).
- **3Bs.02** Identify the distinguishing features of different groups of animals, including fish, reptiles, mammals, birds, amphibians and insects.
- **3Bs.03** Identify some of the important organs in humans (limited to brain, heart, stomach, intestine and lungs) and describe their functions.

Life processes

- **3Bp.01** Describe differences between things that are living, that were once alive and that have never lived.
- **3Bp.02** Know that life processes common to plants and animals include nutrition, growth, movement and reproduction.
- **3Bp.03** Know that plants need appropriate conditions, including temperature, light and water, to be healthy.
- **3Bp.04** Describe and compare how the offspring of different animals grow into adults, including humans, birds, frogs and butterflies.

Ecosystems

- **3Be.01** Identify and describe simple food chains, where plants are producers and animals are consumers of plants and/or other animals.

Chemistry**Materials and their structure**

- **3Cm.01** Know that materials can be solids, liquids or gases.
- **3Cm.02** Understand that a mixture contains two or more materials, where the materials can be physically separated.

Properties of materials

- **3Cp.01** Describe differences in the properties of solids and liquids.
- **3Cp.02** Understand that materials, generally, retain their properties within a mixture.
- **3Cp.03** Describe how to separate solid/solid mixtures based on the physical properties of the solids (processes involving dissolving are not required).
- **3Cp.04** Describe how to separate a mixture of an insoluble solid and a liquid.

Changes to materials

- **3Cc.01** Know that when a solid dissolves in a liquid the solid is still present, and this is an example of mixing.

Physics**Forces and energy**

- **3Pf.01** Know that forces can be measured with a forcemeter.
- **3Pf.02** Know that gravity on Earth is a force that pulls towards the centre of the Earth.
- **3Pf.03** Know that friction is a force created between surfaces when they move against each other and it makes this movement harder.
- **3Pf.04** Describe how smooth and rough surfaces can generate different amounts of friction.

Light and sound

- **3Ps.01** Investigate how light can pass through some materials and is blocked by others, and use the terms transparent, translucent and opaque.
- **3Ps.02** Know that shadows are formed when light from a source is blocked by an object.
- **3Ps.03** Investigate how the size of a shadow is affected by the position of the object and the position of the light source.

Electricity and magnetism

- **3Pe.01** Describe magnets as having a north pole and a south pole.
- **3Pe.02** Describe how magnets interact when near each other, using the terms repel and attract.
- **3Pe.03** Investigate how some materials are magnetic but many are not.

Earth and Space

Planet Earth

- **3ESp.01** Know that planet Earth is the source of all the materials we use and that many useful materials, including oil, natural gas and metals, come from or are found in rocks.
- **3ESp.02** Know that fossils are impressions, or remains, of things that were once alive.

Earth in space

- **3ESs.01** Describe the regular change in the position and appearance of the Moon.
- **3ESs.02** Describe the relative movement of the Earth and Moon.
- **3ESs.03** Describe the Earth, Sun and Moon as approximately spherical.

Science in Context

- **3SIC.01** Talk about how some of the scientific knowledge and thinking now was different in the past.
- **3SIC.02** Talk about how science explains how objects they use, or know about, work.
- **3SIC.03** Know that everyone uses science and identify people who use science professionally.
- **3SIC.04** Talk about how science helps us understand our effect on the world around us.

Stage 4

Thinking and Working Scientifically

Models and representations

- **4TWSm.01** Know that models are not fully representative of a real world situation and/or scientific idea.
- **4TWSm.02** Use models to show relationships, quantities or scale.
- **4TWSm.03** Draw a diagram to represent a real world situation and/or scientific idea.

Scientific enquiry: purpose and planning

- **4TWSp.01** Ask scientific questions that can be investigated.
- **4TWSp.02** Know that there are five main types of scientific enquiry (research, fair testing, observing over time, identifying and classifying, and pattern seeking).
- **4TWSp.03** Make a prediction describing some possible outcomes of an enquiry.
- **4TWSp.04** Identify variables that need to be taken into account when doing a fair test.
- **4TWSp.05** Identify risks and explain how to stay safe during practical work.

Carrying out scientific enquiry

- **4TWSc.01** Use observations and tests to sort, group and classify objects.
- **4TWSc.02** Use keys to identify objects, materials and living things.
- **4TWSc.03** Choose equipment from a provided selection and use it appropriately.
- **4TWSc.04** Describe how repeated measurements and/or observations can give more reliable data.
- **4TWSc.05** Take measurements in standard units, describing the advantage of standard units over non-standard units.
- **4TWSc.06** Carry out practical work safely.
- **4TWSc.07** Use secondary information sources to research an answer to a question.
- **4TWSc.08** Collect and record observations and/or measurements in tables and diagrams.

Scientific enquiry: analysis, evaluation and conclusions

- **4TWSa.01** Identify whether results support, or do not support, a prediction.
- **4TWSa.02** Describe simple patterns in results.
- **4TWSa.03** Make a conclusion from results and relate it to the scientific question being investigated.
- **4TWSa.04** Present and interpret results using tables, bar charts and dot plots.

Biology

Structure and function

- **4Bs.01** Identify some of the important bones in the human body (limited to skull, jaw, rib cage, hip, spine, leg bones and arm bones).
- **4Bs.02** Know that bones move because pairs of muscles that are attached to them contract and relax.
- **4Bs.03** Describe some of the important functions of skeletons (limited to protecting and supporting organs, enabling movement and giving shape to the body).
- **4Bs.04** Know that some animals have an exoskeleton.
- **4Bs.05** Identify vertebrates as animals with a backbone and invertebrates as animals without a backbone.

Life processes

- **4Bp.01** Know that medicines can be used to treat some illnesses, and describe how to use them safely.
- **4Bp.02** Know that plants and animals can have infectious diseases, and vaccinations can prevent some infectious diseases of animals.
- **4Bp.03** Know that plants and animals need energy to grow, live and be healthy, and plants get their energy from light while animals get their energy from eating plants or other animals.
- **4Bp.04** Describe the importance of movement in maintaining human health.

Ecosystems

- **4Be.01** Know that different animals are found in, and suited to, different habitats.
- **4Be.02** Know plants and animals can survive in environments other than their habitats.
- **4Be.03** Describe food chains as being made of producers and consumers, and classify consumers as herbivores, omnivores, carnivores, predators and/or prey.

Chemistry**Materials and their structure**

- **4Cm.01** Describe the particle model for solids and liquids.
- **4Cm.02** Understand the difference between materials, substances and particles.
- **4Cm.03** Know that particles are in constant motion, even when in a solid.

Properties of materials

- **4Cp.01** Use the particle model to explain the properties of solids and liquids.
- **4Cp.02** Describe and explain how some solids can behave like liquids (e.g. powders), referring to the particle model.

Changes to materials

- **4Cc.01** Describe solidification/freezing and melting, using the particle model to describe the change of state.
- **4Cc.02** Understand that the change of state of a substance is a physical process.
- **4Cc.03** Know that some substances will react with another substance to produce one or more new substances and this is called a chemical reaction.

Physics**Forces and energy**

- **4Pf.01** Know that energy is present in all matter and in sound, light and heat.
- **4Pf.02** Know that energy cannot be made, lost, used up or destroyed but it can be transferred.
- **4Pf.03** Know that energy is required for any movement or action to happen.
- **4Pf.04** Know that not all energy is transferred from one object to another, but often some energy during a process can be transferred to the surrounding environment and this can be detected as sound, light or temperature increase.

Light and sound

- **4Ps.01** Know that light travels in straight lines and this can be represented with ray diagrams.
- **4Ps.02** Know that light can reflect off surfaces.
- **4Ps.03** Describe how objects which are not light sources are seen.

Electricity and magnetism

- **4Pe.01** Know that an electrical device will not work if there is a break in the circuit.
- **4Pe.02** Describe how a simple switch is used to open and close a circuit.
- **4Pe.03** Describe how changing the number or type of components in a series circuit can make a lamp brighter or dimmer.
- **4Pe.04** Know some materials are good electrical conductors, especially metals, and some are good electrical insulators.

Earth and Space**Planet Earth**

- **4ESp.01** Describe the model of the structure of the Earth which includes a core, a mantle and a crust.
- **4ESp.02** Describe common features of volcanoes and know they are found at breaks in the Earth's crust.
- **4ESp.03** Know that the Earth's crust moves and when parts move suddenly this is called an earthquake.

Earth in space

- **4ESs.01** Explain why the spinning of the Earth on its axis leads to the apparent movement of the Sun, night and day, and changes in shadows.
- **4ESs.02** Name the planets in the Solar System.
- **4ESs.03** Know that the Sun is at the centre of the Solar System.
- **4ESs.04** Know that planetary systems can contain stars, planets, asteroids and comets.

Science in Context

- **4SIC.01** Describe how scientific knowledge and understanding changes over time through the use of evidence gained by enquiry.
- **4SIC.02** Describe how science is used in their local area.
- **4SIC.03** Use science to support points when discussing issues, situations or actions.
- **4SIC.04** Identify people who use science, including professionally, in their area and describe how they use science.
- **4SIC.05** Discuss how the use of science and technology can have positive and negative environmental effects on their local area.

Stage 5

Thinking and Working Scientifically

Models and representations

- **5TWSm.01** Know that a model presents an object, process or idea in a way that shows some of the important features.
- **5TWSm.02** Use models, including diagrams, to represent and describe scientific phenomena and ideas.

Scientific enquiry: purpose and planning

- **5TWSp.01** Ask scientific questions and select appropriate scientific enquiries to use.
- **5TWSp.02** Know the features of the five main types of scientific enquiry.
- **5TWSp.03** Make predictions, referring to relevant scientific knowledge and understanding within familiar and unfamiliar contexts.
- **5TWSp.04** Plan fair test investigations, identifying the independent, dependent and control variables.
- **5TWSp.05** Describe risks when planning practical work and consider how to minimise them.

Carrying out scientific enquiry

- **5TWSc.01** Sort, group and classify objects, materials and living things through testing, observation and using secondary information.
- **5TWSc.02** Complete a key based on easily observed differences.
- **5TWSc.03** Choose equipment to carry out an investigation and use it appropriately.
- **5TWSc.04** Decide when observations and measurements need to be repeated to give more reliable data.
- **5TWSc.05** Take appropriately accurate measurements.
- **5TWSc.06** Carry out practical work safely.
- **5TWSc.07** Use a range of secondary information sources to research and select relevant evidence to answer questions.
- **5TWSc.08** Collect and record observations and/or measurements in tables and diagrams appropriate to the type of scientific enquiry.

Scientific enquiry: analysis, evaluation and conclusions

- **5TWSa.01** Describe the accuracy of predictions, based on results.
- **5TWSa.02** Describe patterns in results, including identifying any anomalous results.
- **5TWSa.03** Make a conclusion from results informed by scientific understanding.
- **5TWSa.04** Suggest how an investigation could be improved and explain any proposed changes.
- **5TWSa.05** Present and interpret results using tables, bar charts, dot plots and line graphs.

Biology

Structure and function

- **5Bs.01** Know that not all plants produce flowers.
- **5Bs.02** Identify the parts of a flower (limited to petals, sepals, anthers, filaments, stamens, stigma, style, carpel, and ovary).
- **5Bs.03** Describe the functions of the parts of a flower (limited to petals, anthers, stigma and ovary).
- **5Bs.04** Describe the human digestive system, including the functions of the organs involved (limited to mouth, oesophagus, stomach, small intestine, large intestine and anus), and know that many vertebrates have a similar digestive system.

Life processes

- **5Bp.01** Know that animals, including humans, need an adequate, balanced diet in order to be healthy.
- **5Bp.02** Know the stages in the life cycle of a flowering plant.
- **5Bp.03** Describe how flowering plants reproduce by pollination, fruit and seed production, and seed dispersal.
- **5Bp.04** Describe seed germination and know that seeds, in general, require water and an appropriate temperature to germinate.

Ecosystems

- **5Be.01** Describe how plants and animals are adapted to environments that are hot, cold, wet and/or dry.
- **5Be.02** Describe how flowering plants are adapted to attract pollinators and promote seed dispersal.
- **5Be.03** Describe the common adaptations of predator and prey animals.

Chemistry**Materials and their structure**

- **5Cm.01** Use the particle model to describe solid, liquids (including solutions) and gases.
- **5Cm.02** Understand that substances can be gaseous and know the common gases at room temperature (limited to oxygen, carbon dioxide, water (vapour), nitrogen and hydrogen).

Properties of materials

- **5Cp.01** Know that the ability of a solid to dissolve and the ability of a liquid to act as a solvent are properties of the solid and liquid.
- **5Cp.02** Know the main properties of water (limited to boiling point, melting point, expands when it solidifies, and its ability to dissolve a range of substances) and know that water acts differently from many other substances.

Changes to materials

- **5Cc.01** Describe the processes of evaporation and condensation, using the particle model and relating the processes to changes in temperature.
- **5Cc.02** Understand that dissolving is a reversible process and investigate how to separate the solvent and solute after a solution is formed.
- **5Cc.03** Investigate and describe the process of dissolving, and relate it to mixing.

Physics**Forces and energy**

- **5Pf.01** Identify a range of forces (limited to gravity, applied forces, normal forces, upthrust, friction, air resistance and water resistance).
- **5Pf.02** Know that an object may have multiple forces acting upon it, even when at rest.
- **5Pf.03** Use force diagrams to show the name and direction of forces acting on an object.

Light and sound

- **5Ps.01** Investigate how sounds are made by vibrating sources.
- **5Ps.02** Describe sounds in terms of high or low pitch and loud or quiet volume.
- **5Ps.03** Investigate how to change the volume and pitch of sounds.

Electricity and magnetism

- **5Pe.01** Know the difference between a magnet and a magnetic material.
- **5Pe.02** Know that forces act over a distance between magnets, and between a magnet and a magnetic material.
- **5Pe.03** Know that magnets can have different magnetic strengths.

Earth and Space

Planet Earth

- **5ESp.01** Know that the Earth is surrounded by a layer of air called the atmosphere, which is a mixture of different gases (including nitrogen, carbon dioxide and oxygen).
- **5ESp.02** Understand that most water on Earth is not pure and has dissolved substances in it.
- **5ESp.03** Understand that pollution is the introduction of substances by humans that harm the environment and identify examples of pollution.

Cycles on Earth

- **5ESc.01** Describe the water cycle (limited to evaporation, condensation and precipitation).

Earth in space

- **5ESs.01** Describe the orbit of the Earth around the Sun (limited to slight ellipse, anticlockwise direction and the duration).
- **5ESs.02** Describe how the tilt of the Earth can create different seasons in different places.
- **5ESs.03** Know that a satellite is an object in space that orbits a larger object and a moon is a natural satellite that orbits a planet.

Science in Context

- **5SIC.01** Describe how scientific knowledge and understanding changes over time through the use of evidence gained by enquiry.
- **5SIC.02** Describe how science is used in their local area.
- **5SIC.03** Use science to support points when discussing issues, situations or actions.
- **5SIC.04** Identify people who use science, including professionally, in their area and describe how they use science.
- **5SIC.05** Discuss how the use of science and technology can have positive and negative environmental effects on their local area.

Stage 6

Thinking and Working Scientifically

Models and representations

- **6TWSm.01** Describe how a model can help us understand and describe scientific phenomena and ideas.
- **6TWSm.02** Use models, including diagrams, to represent and describe scientific phenomena and ideas.

Scientific enquiry: purpose and planning

- **6TWSp.01** Ask scientific questions and select appropriate scientific enquiries to use.
- **6TWSp.02** Know the features of the five main types of scientific enquiry.
- **6TWSp.03** Make predictions, referring to relevant scientific knowledge and understanding within familiar and unfamiliar contexts.
- **6TWSp.04** Plan fair test investigations, identifying the independent, dependent and control variables.
- **6TWSp.05** Describe risks when planning practical work and consider how to minimise them.

Carrying out scientific enquiry

- **6TWSc.01** Sort, group and classify objects, materials and living things through testing, observation and using secondary information.
- **6TWSc.02** Complete a key based on easily observed differences.
- **6TWSc.03** Choose equipment to carry out an investigation and use it appropriately.
- **6TWSc.04** Decide when observations and measurements need to be repeated to give more reliable data.
- **6TWSc.05** Take appropriately accurate measurements.
- **6TWSc.06** Carry out practical work safely.
- **6TWSc.07** Use a range of secondary information sources to research and select relevant evidence to answer questions.
- **6TWSc.08** Collect and record observations and/or measurements in tables and diagrams appropriate to the type of scientific enquiry.

Scientific enquiry: analysis, evaluation and conclusions

- **6TWSa.01** Describe the accuracy of predictions, based on results.
- **6TWSa.02** Describe patterns in results, including identifying any anomalous results.
- **6TWSa.03** Make a conclusion from results informed by scientific understanding.
- **6TWSa.04** Suggest how an investigation could be improved and explain any proposed changes.
- **6TWSa.05** Present and interpret results using tables, bar charts, dot plots, line graphs and scatter graphs.

Biology

Structure and function

- **6Bs.01** Describe the human circulatory system in terms of the heart pumping blood through arteries, capillaries and veins, describe its function (limited to transporting oxygen, nutrients and waste) and know that many vertebrates have a similar circulatory system.
- **6Bs.02** Describe the human respiratory system in terms of oxygen from the air moving into the blood in the lungs and know that many vertebrates have a similar respiratory system.
- **6Bs.03** Name the parts of the human reproductive system.

Life processes

- **6Bp.01** Describe the physical changes that take place during puberty in humans.
- **6Bp.02** Know that some diseases can be caused by infection with viruses, bacteria, parasites or fungi that can be passed from one host to another.
- **6Bp.03** Describe how good hygiene can control the spread of diseases transmitted in water, food and body fluids, and describe ways to avoid being bitten by insect vectors.
- **6Bp.04** Know that humans have defence mechanisms against infectious diseases, including skin, stomach acid and mucus.

Ecosystems

- **6Be.01** Interpret food webs and identify food chains within them.
- **6Be.02** Know that some substances can be toxic and damage living things, and that these substances can move through a food chain/web.
- **6Be.03** Identify the energy source of a food chain/web and describe how energy is transferred through a food chain/web.

Chemistry**Properties of materials**

- **6Cp.01** Know that the temperature at which a substance changes state is a property of the substance.
- **6Cp.02** Know that gases have properties, including mass.
- **6Cp.03** Understand that electrical conductivity and thermal conductivity are properties of a substance.

Changes to materials

- **6Cc.01** Identify and describe physical changes that are reversible.
- **6Cc.02** Describe how temperature affects solids dissolving in liquids and relate it to the particle model.
- **6Cc.03** Describe the difference between boiling and evaporation.
- **6Cc.04** Understand that chemical reactions involve substances, called reactants, interacting to form new substances, called products.
- **6Cc.05** Observe and describe the evidence that a chemical reaction has taken place (limited to a gas being produced, colour change and change in temperature).

Physics**Forces and energy**

- **6Pf.01** Describe the difference between mass, measured in kilograms (kg), and weight, measured in newtons (N)
- **6Pf.02** Describe the effect of gravity and know that when gravity changes, the weight of an object changes but the mass does not.
- **6Pf.03** Use force diagrams to show the name, size and direction of forces acting on an object.
- **6Pf.04** Describe the effect of different forces on an object at rest and in motion.
- **6Pf.05** Recognise that the mass and shape of an object can affect if it floats or sinks.

Light and sound

- **6Ps.01** Describe how a ray of light changes direction when it is reflected from a plane mirror.
- **6Ps.02** Describe how a ray of light changes direction when it travels through different mediums and know that this is called refraction.

Electricity and magnetism

- **6Pe.01** Use diagrams and conventional symbols to represent, make and compare circuits that include cells, switches, lamps and buzzers.
- **6Pe.02** Make simple circuits and compare the brightness of lamps in series and parallel circuits.

Earth and Space

Planet Earth

- **6ESp.01** Know that rocks can be classified as metamorphic, igneous and sedimentary, and describe the identifying features of each type of rock.
- **6ESp.02** Describe the way fossils can form in sedimentary rocks.
- **6ESp.03** Know that there are different types of soils and they can be classified based on their clay, sand and organic content.
- **6ESp.04** Know that soil composition can change, which can support, or hinder, plant growth.

Cycles on Earth

- **6ESc.01** Describe the rock cycle and the formation of metamorphic, igneous and sedimentary rocks in terms of solidification, erosion, sedimentation, burial, metamorphism and melting.

Earth in space

- **6ESs.01** Describe the relative position and movement of the planets, the Moon and the Sun in the Solar System.
- **6ESs.02** Observe and describe the changes in the appearance of the Moon over its monthly cycle.

Science in Context

- **6SIC.01** Describe how scientific knowledge and understanding changes over time through the use of evidence gained by enquiry.
- **6SIC.02** Describe how science is used in their local area.
- **6SIC.03** Use science to support points when discussing issues, situations or actions.
- **6SIC.04** Identify people who use science, including professionally, in their area and describe how they use science.
- **6SIC.05** Discuss how the use of science and technology can have positive and negative environmental effects on their local area.

4 Glossary

This glossary is provided to support your understanding of the content of this *Curriculum Framework*. The definitions are intended to be sufficient to guide an informed reader.

Diagram – a scientific representation of a concept, experiment or observation.

Experiment – a specific procedure carried out to support, disprove or validate a scientific prediction. Experiments are often part of a wider investigation but not always.

Investigation – a method of acquiring scientific knowledge based on a starting question. A scientific investigation often involves experiments but not always, e.g. using secondary sources of information to carry out a literature review.

Learning objective – statements from the *Curriculum Framework* of the expectations of knowledge, understanding and skills that learners will develop; they provide a structure for teaching and learning, and a reference against which to check learners' ability and skills development.

Material – a type of substance or common mixture of substances. For example, wood is a material, although it is made of a mixture of substances. Metal is often a material type, although there are many metals.

Mixture – a sample which contains more than one substance or material.

Model – demonstrate scientific understanding of a concept through the use of a scientific model. For example, making a paper skeleton models a human skeleton and how the different bones are arranged. Drawing multiple diagrams of particles in a solid demonstrates understanding of how particles in a solid behave.

Object – a visible and tangible item composed of one or more materials and/or substances.

Representation – a way of showing scientific understanding of phenomena by means of diagrams, equations (word or symbol) or other models.

Scheme of Work – support materials for each stage of Cambridge Primary Science. Each *Scheme of Work* contains a suggested long-term plan, a medium-term plan with suggested activities and sample short-term (lesson) plans.

Strand – a collection of learning objectives in the *Curriculum Framework* that forms an area of learning.

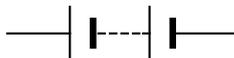
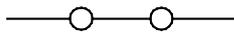
Substance – matter which is composed of a single thing. For example, oxygen is a substance, but air is a mixture. Iron is a substance, but steel is made of iron mixed with other substances; steel is therefore a material and not a single substance.

Teacher Guide – the document providing support in using the *Curriculum Framework* to plan and deliver lessons using effective teaching and learning approaches.

5 Appendix

Electrical symbols

Learners are expected to be able to recall and use the standard electrical symbols listed below.

Battery of cells		Junction of conductors	
Buzzer		Lamp	
Cell		Open Switch	
Closed Switch		Wire	

Units for physical quantities

By the end of Stage 6, learners should be familiar with the following multipliers: m milli, c centi, k kilo and be able to give the units of measurement for the following physical quantities:

Quantity	Expected units
Length (used for length, height and width)	mm, cm, m, km
Area	cm ² , m ²
Volume	ml, l, cm ³ , m ³
Weight	N
Mass	g, kg
Time	s, min, h
Force	N
Gravity	N/kg
Temperature	°C

When using units of measurement in science ensure the ones used have been taught in mathematics before application in science by cross-referencing with either the Cambridge Primary Mathematics curriculum or your own school Mathematics curriculum.

Where units are specific to science, e.g. newtons, ensure time is given to introduce learners to these units when they are first taught.

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