**Scheme of work – Science Stage 2**

Cambridge Primary

# Introduction

This document is a scheme of work created by Cambridge International as a suggested plan of delivery for Cambridge Primary Science Stage 2. Learning objectives for the stage have been grouped into topic areas or ‘units’. These have then been arranged in a recommended teaching order but you are free to teach objectives in any order within a stage as your local requirements and resources dictate.

The scheme for Science has assumed a term length of 10 weeks, with three terms per stage and two units per term. An overview of the sequence, number and title of each unit for Stage 2 can be seen in the table below. The suggested percentage of teaching time to spend on each unit is provided at the beginning of each unit. You should decide on the amount of teaching time as necessary, to suit the pace of your learners and to fit the work comfortably into your own term times.

Where possible, several suggested activities have been given for each learning objective. Some are short introductory or revision activities, and some are more substantial learning activities. You need to choose a variety of activities that will meet the needs of your learners and cover all of the requirements of the learning objectives. Scientific Enquiry learning objectives can be taught in the context of any of the learning objectives from the other strands. Sample activities that particularly focus on a scientific enquiry have been included in each unit where relevant. It is recommended that you include a wide variety of scientific enquiry in your science teaching.

There is no obligation to follow the published Cambridge International scheme of work in order to deliver Cambridge Primary Science. It has been created solely to provide an illustration of how delivery mightbe planned over the six stages. A step-by-step guide to creating your own scheme of work and implementing Cambridge Primary in your school can be found in the Cambridge Primary Teacher Guide available on the Cambridge Primary support site. Blank templates are also available on the Cambridge Primary support site for you to use if you wish.

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| --- | --- | --- |
| Term 1 | Term 2 | Term 3 |
| Unit 2.1 Light and dark | Unit 2.3 Changing materials  | Unit 2.5 Day and night |
| Unit 2.2 Electricity  | Unit 2.4 Looking at rocks | Unit 2.6 Plants and animals around us |

# Unit 2.1 Light and dark

It is recommended that this unit takes approximately **60% of the term**.

In this unit, learners

* learn about different sources of light
* understand what darkness is
* recognise shadows.

## Scientific Enquiry work includes:

* using first hand experiences. e.g. observe melting ice
* talking about risks and how to avoid danger.

## Recommended vocabulary for this unit:

* light, dark
* source, Sun, star, torch, bulb.

| Framework code | Learning objective | Suggested activities to choose from | Resources  | Comments  |
| --- | --- | --- | --- | --- |
| 2Pl12Ep2 | Identify different light sources including the SunUse first-hand experience e.g. observe melting ice  | In pairs learners talk about where light comes from. Listen to their responses.Introduce the term ‘light source’ for something that produces light. Talk about each light source mentioned e.g. the stars (including the Sun), lightning, firelight(flames), fireflies, oil lamps, candles, torches, electric lights Describe the Sun as Earth’s main light source.Give out a worksheet including pictures of light sources to be named. Leave spaces for learners to include more of their own ideas by drawing or writing.As a class discuss where the light comes from a light source. E.g. for a candle it comes from the flame, from a torch the bulb/filament. | Pictures (internet or books) of different light sources objects that are light sources.Fuels for artificial light sources include lamp oil, wax, batteries (cells), mains electricity.Worksheet of light sources to be named.A selection of light sources such as pictures (books or internet), models or actual examples e.g. story book, candle or lamp, matches, sand tray. | Visually impaired learners will need particular support during this unit – using any residual vision and sensing light sources as heat sources and via touch.Health and safety: All naked flames are best used in a sand tray e.g. baking tray filled with dry sand. Learners should be kept away from open flames.Misconception alert: some learners may identify the Moon as a source of light when in reality it reflects light form the Sun. Rather than explore reflection discuss how some objects look like they can be sources of light but aren’t e.g. a mirror when you shine a torch on it. Misconception alert: some learners may think light comes from their eyes which allows them to see. This needs to be challenged by having a light source (torch or electric bulb) and turning it off and on while they keep their eyes open.  |
| 2Pl22Ep2 | Know that darkness is the absence of lightUse first-hand experience e.g. observe melting ice  | Introduce a ‘black box’ to the learners. The black box is a test to find out what it is like in the dark. *How well or badly can you see objects in the dark?* Have learners look inside the box – can you see anything? Place a shiny object in the box – can the learners see it? Repeat this activity using different shiny objects. Repeat the activity with a small torch switched on and placed in the box.Learners then write about the objects used and what difference having the torch made to what could be seen.Conclude as a class that it is dark when there is no light.Discuss when it is ‘dark’ based on the learners’ experiences. Discuss what made it dark – having no source of light – and discuss what other sources of light there might have been if there wasn’t total darkness. Highlight to learners that if they can see a little, even just darker shapes there is some light present.  | Black painted boxes. A selection of different shiny objects.Torch.Pre-prepare a box, or some boxes, with lids, painted black on the inside. Make a small viewing hole in one of the shorter sides of the box (Shoe boxes are ideal). | Misconception alert: learners often have no experience of total darkness and sometimes say they can see in the dark because there is still a light source they haven’t identified present e.g. stars at night, street lights etc. which provide enough light to allow them to see. |
| 2Pl32Ep22Eo2 | Be able to identify shadowsUse first-hand experience e.g. observe melting ice Talk about risks and how to avoid danger | Take learners outside. Learners then stand with theirs backs to the Sun. Invite learners to observe their shadow.Play some shadow games with the learners: e.g. make the biggest and/or smallest shadow you can. Can you run away from your shadow? Describe/show exactly how you managed to do this. Have learners make a variety of shadows – where they observe their own shadow and the shadows made by their friends. Invite learners to make animal shapes, using their hands, to cast a shadow on a screen in the classroom. Try to make the shadows bigger and smaller. Discuss why this might happen – encourage learners to explain differences in sizes of shadows in relation to the distance of the object from the light source.Demonstrate making and using a shadow puppet. Learners can then make shadow puppets by cutting out shape outlines of people or animals, then attaching the them to narrow sticks or straws with sticky tape. Learners can explore how the shadow puppets block light based on their shape. Explain that shadows form when light is blocked or cannot get through a material. The light source might be the Sun, but it could be any other light source.Play a game using some everyday objects to make shadows. Make a worksheet which requires learners to identify which object is making a shadow.Conclude that shadows are made because the light from a light source shines on objects, including us, but the light cannot travel though the object. Light being blocked and not being able to reach a place makes a dark area, which we call a shadow. | A sunny day and space outside.Projector and screen.Card, sticky tape, scissors, sticks or straws.Everyday objects that make shadows.Light source.Worksheet. | Discuss the danger associated with looking directly at the Sun. Ensure learners are adequately protected from the effects of the sun e.g. hats, sunglasses and sunscreen. |

# Unit 2.2 Electricity

It is recommended that this unit takes approximately **40% of the term**.

In this unit, learners

* explore the concept of electricity and how it works in their everyday lives
* are introduced to hazards associated with electricity, including how to stay safe.

## Scientific Enquiry work includes:

* predicting what will happen before deciding what to do
* talking about risks and how to avoid danger
* making comparisons
* reviewing and explain what happened.

## Recommended vocabulary for this unit:

* electricity, electric
* battery/cell, circuit, bulb, wire, switch.

| Framework code | Learning objective | Suggested activities to choose from | Resources  | Comments  |
| --- | --- | --- | --- | --- |
| 2Pm12Eo62Eo9 | Recognise the components of simple circuits involving cells (batteries)Make comparisonsReview and explain what happened | Show the different circuit components available to learners. In groups, allow learners to handle the equipment. Ask them to try to fit a bulb into a bulb holder, a battery into a battery holder etc.Use this interactive activity.Split learners into groups and give each group 1 battery, 1 battery holder,1 bulb, 1 bulb holder and 2 wires. Ask them to make2 different circuits – one where the bulb lights up and another where it does not light up.Learners can draw pictures of their circuits.Conclude: *What do you need to make a bulb light up?*Show some pictures that have been prepared like a set of playing cards, with pictures of items that use electricity or don’t Place the cards in a pile, face down on the table. Learners take turns to choose a card and sort them, placing each card into uses electricity or doesn’t use electricity. Learners continue until all the cards have been placed and then they share their sorted piles with the class explaining their reasoning.Learners identify objects that use electricity around us and identify what they all have in common e.g. a power source, use of wires, create sound, light or movement etc. Learners can also play an online game.  | Circuitry equipment could include wires, bulbs and bulb holders, batteries/battery and battery/battery holders. [http://www.bbc.co.uk/bitesize/ks1/science/electricity/play/](http://www.bbc.co.uk/bitesize/ks1/science/electricity/play/%20)  | Learners should be told not to connect together the two ends of a battery with a connector. This is unlikely to be dangerous but learners can discuss why this should not be done - the energy of the battery will be wasted and nothing will happen. Misconception alert: Learners may think of batteries as a classic ‘battery’ with two ends when they can exist in many forms e.g. laptop batteries, mobile phone batteries, button batteries. (This can be a useful opportunity to warn learners of the dangers of eating batteries, especially button batteries.) |
| 2Pm22Ep5 | Know how a switch can be used to break a circuitPredict what will happen before deciding what to do  | Show learners a circuit with a bulb and a switch. Talk about how switches are used to controlling the light such as in a torch.Allow learners the opportunity to make a circuit with a switch to control a bulb.Set up a circuit with a bulb and a switch in it, but set it up so that there is a problem with it so that the bulb will not light up. E.g. a break in the circuit. Ask learners to predict what will happen when the switch is used; try it and see.*How can we make the bulb light up?* Invite learners to mend the circuit.Learners, in pairs, talk about things which have switches. Name some. Look at different examples of switches in the room e.g. torches, lights, computers, digital cameras. Prepare a worksheet that asks them to identify 3 different things that have a switch. Describe how each type of switch works.Discuss the source of electricity (the batteries) and how it is the movement of electricity from the battery to the bulb and back which makes it light up. Talk about the job the switch does in breaking the loop, and if broken the electricity doesn’t move.Describe how this process is the same for any electrical circuit – car headlights, a laptop, TV. | Circuitry equipment. | Switches can be pulled, pushed, pressed or slid to make them work. Use these words when describing different types of switches.Circuit diagrams using conventional symbols are not required at this stage. |
| 2Eo2 | Talk about risks and how to avoid danger | *How do we keep safe from electricity at home?* Ask learners to talk about this in pairs. Listen to their responses and ask how or why these suggestions keep us safe. Suggestions might include e.g. don’t use electrical items near water, avoid trailing cables etc.Explain that mains electricity is much more powerful than battery power. Consequences could be electric shock, burns or death. | The short video can be shown at:<http://www.bbc.co.uk/guides/z96ckqt> Area of classroom set up to show electrical hazards, or a picture of this. |  |

# Unit 2.3 Changing materials

It is recommended that this unit takes approximately **65% of the term.**

In this unit, learners

* distinguish between an object and the material from which it is made
* discuss ways materials can be changed by heating and cooling
* realise dangers and understand how to keep safe
* recognise melting and dissolving are different and that when a solid dissolves it is still there.

## Scientific Enquiry work includes:

* using first-hand experience
* asking questions and suggest ways to answer them
* predicting what will happen before deciding what to do
* recognising that a test or comparison may be unfair
* making suggestions for collecting evidence
* talking about risks and how to avoid danger
* making and recording observations
* talking about predictions (orally and in text), the outcomes and why this happened
* reviewing and explaining what happened
* making comparisons.

## Recommended vocabulary for this unit:

* materials, natural, man-made
* squash, shape, change, bend, twist, stretch
* solid, liquid
* cool, heat, melt, solidify
* dissolve.

| Framework code | Learning objective | Suggested activities to choose from | Resources  | Comments  |
| --- | --- | --- | --- | --- |
| 2Cc1 2Ep22Ep5 2Eo32Eo9 | Know how the shapes of some materials can be changed by squashing, bending, twisting and/or stretchingUse first-hand experiencePredict what will happen before deciding what to do Make and record observationsReview and explain what happened | Ask learners to make different movements and shapes with their bodies e.g. squash yourself flat against the wall/ bend over and touch your toes/twist the top half of your body/stretch and make yourself the tallest you can be. *Can we change the shape of other things? Can we change the shape of materials?* Learners can use modelling material to experiment how to change its shape. Have learners try squashing, bending, twisting and stretching it into different shapes. Learners can then show the different shapes made by applying each of these techniques.**Science Enquiry activity***Does everything change its shape when squashed?* *What might it be difficult to change the shape of just by squashing, bending, stretching or twisting?*Give groups or pairs of learners 3 different objects to squash and stretch to find out what happens to the object. Learners should make predictions before carrying out the test. Once the test has been carried out discuss the results with the learners and talk about the best way to record their work.**Science Enquiry activity***Does everything return to its original shape after stretching?* Pull on a spring (it stretched). *What will happen to it when you let go?* It will return to its original shape.In pairs, learners think of examples of other things that return to their original shape after stretching. Discuss their responses as a class, which might include suggestions such as elastic bands, balloons. Have a range of other objects for them to try investigate.  | Large indoor space e.g. gymnasium.Modelling materials.Elastic bands, bath sponges and soft balls, pieces of fabric, a banana or plantain, rocks.Elastic bands, springs, balloons bath sponges and soft balls, pieces of fabric, a banana or plantain, rocks. | Include the terms‘squash/bend/twist/stretch’ in your commands. Make sure learners are wearing appropriate footwear and clothing for these activities. |
| 2Cc22Ep22Ep5 2Eo22Eo32Eo8 2Eo9 | Explore and describe the way some everyday materials change when they are heated or cooledUse first-hand experiencePredict what will happen before deciding what to do Talk about risks and how to avoid dangerMake and record observationsTalk about predictions (orally and in text), the outcomes and why this happenedReview and explain what happened | Have a tray containing some items and discuss each item in turn with the learners:* Chocolate: place some in a warm place, or ask learners to hold a piece for and see what happens.
* Butter: leave some butter in a warm place – what happens?
* Candles: observe a burning candle. Discuss how to do this safely.
* Plasticine/moulding clay – leave somewhere warm and somewhere cold. What difference do we notice?

Discuss how some materials get softer in heat and harder in cold. Introduce the word ‘melt’ for when something solid becomes liquid when it is heated to its melting temperature. With the learners look at how chocolate changes when it is used to coat fruit. Melt some chocolate in a bowl. Prepare small pieces of fruit on skewers for learners to dip in and leave to cool. *What happened to the chocolate? Why did it change? How did it change?* Once the chocolate has been used, e.g. the fruit has been dipped, leave it to cool. Once cool discuss what has happened to the chocolate. Highlight it has become colder and has returned to a solid.Discuss the changes observed solid – liquid – solid. Have the learners name some other examples of melting and solidifying and say where and when you have seen it e.g. ice-cubes melting in a drink. **Science Enquiry activity***How do materials change when they are heated?* In groups, give learners something made from plastic, something made from metal and 3 things that they think will melt. Arrange their selection on a metal tray and chose a good location to leave it in. The learners describe why it is a good location e.g. it will get warm in the sun, it will get warm near a heater/radiatorLearners predict what they think will happen to each item on the tray.Ask learners to draw before and after pictures to show what happened over the course of a lesson/day/week (the exact length of time the items are left should be agreed with the learners).Conclude: Review the predictions from the learners as a class and discuss which were correct. * The metal and plastic got warm, but did not change shape.
* The chocolate/wax/ice-cube became softer and/or melted.
* Discuss how metal may become soft or melt if it became hot enough.

Discuss how we keep things cool at home e.g. refrigerators, freezers, cellars, in the shade, in water, cool box etc.  | Chocolate, butter, candle, safety matches, sand tray.Chocolate bowl, heat source,selection of fruits, washed and cut into bite-sized pieces, skewers or forks, paper towels or plates.Items that will change when heated (piece of chocolate/wax/ice cube) and items made from plastic and metal. Metal tray. | Make sure that the candle is set up at a distance from learners.Adhere to school policy for food preparation/handling and check food allergies.Misconception alert: heating something won’t always lead to melting and cooling won’t always lead to solidifying. All materials will undergo a physical and/or state change if heated/cooled enough.  |
| 2Cc32Ep22Ep42Ep62Eo12Eo32Eo6 | Recognise that some materials can dissolve in waterUse first-hand experienceAsk questions and suggest ways to answer them Recognise that a test or comparison may be unfairMake suggestions for collecting evidenceMake and record observationsMake comparisons | In pairs, learners can talk about what happens when you put sugar in water. Demonstrate sugar (or salt) being added to water as an example. Discuss with the learners what questions they have about that process. *What could they do to test their ideas?* Discuss their ideas, and if possible allow them to carry out their own tests. Discuss how it looks like the substance has disappeared but it is still there. We can check it is there by weighing the water before adding the sugar, weighing the sugar then weighing the water with sugar. Introduce the term ’dissolve’ to describe when a solid is mixed with a liquid but can’t be seen. **Science Enquiry activity**Explore with the learners what happens when a range of materials e.g. salt, instant coffee, sugar, flour, powder paint, chalk, sand, glass bead, marbles, or plaster of Paris, are added to water.Discuss how to make it a fair test as a class – use the same volume of water each time, the same amount of solid and they may suggest making the same number of stirs. To support this thinking, you can ask learners to suggest their own way of collecting evidence for this investigation. Group the solids according to what happens, recording their results in a table with two columns headed ‘Substance’ and ‘Dissolve ( or x)’.Conclude: *Which solids dissolved? And which didn’t?* *What else changes even if the solid did dissolve?* E.g. colour, transparency.Talk about how some materials dissolve more readily. Make comparisons between the solids. **Extension activity**Look at the effect temperature can have on dissolving by having warm water, room temperature water and cold water. Add salt or sugar to each and look at how quickly the solid dissolved. Discuss the warmer a liquid the quicker a solid (that will dissolve in the liquid) will dissolve. | Weighing scales, sugar, water.Solids e.g. salt, sugar, sand, flour, oil, plastic or paper cups, stirrers or teaspoons, water, jugs.Worksheet. | Misconception alert: do not describe the sugar as having disappeared – it is still in the water, although it cannot be seen. This is a common misconception.  |
| 2Cp2 | Know that some materials occur naturally and others are man-made | Check prior learning by giving pairs of learners a selection of different materials to be grouped as natural or man-made. The pairs decide on their groups and then discuss their groupings with the class. Discuss what learners think about the term ‘natural’ and ‘man-made’. Highlight how man-made materials are not found in nature (either from the Earth or from living things) but are made by humans using natural resources – we change natural materials. Discuss the difference between objects and materials and how we can use natural and man-made materials to make the objects we use. Look for examples of objects that use natural materials, objects that use man-made materials, and objects that use both. Provide a worksheet for learners to draw or write examples of natural and man-made materials.Make a collage from either natural or man-made materials only.  | Selection of natural materials e.g.: wood, wool, sand, clay, sponge, some metals e.g. gold, silver, copper, iron, ice, water, sugar, milk, leather, oil, rocksMan-made materials: e.g. paper, plastic, glass, brick, some metals e.g. steel is man-made as it is an alloy and doesn’t exist in nature. Paper, magnifying glasses, drawing paper and pencils.Worksheet.Natural or man-made items. Glue. | Misconception alert: explain that all objects are made from materials and that we can describe different characteristics of them by looking and investigating. Scientists use the word material to mean ‘the stuff that something is made of’. Objects can be made of more than one material. Everything is made of materials/stuff. |

# Unit 2.4 Looking at rocks

It is recommended that this unit takes approximately **35% of the term.**

In this unit, learners

* learn that underneath all surfaces is rock, which they may not be able to see
* learn there are different types of rock with different characteristics
* understand rocks are formed in three key ways.

## Scientific Enquiry work includes:

* using first-hand experiences
* using simple information sources.
* making suggestions for collecting evidence
* making and recording observations.

## Recommended vocabulary for this unit:

* rock, stone, soil, sand, granite, slate, marble
* natural, man-made
* igneous, metamorphic, sedimentary.

| Framework code | Learning objective | Suggested activities to choose from | Resources | Comments  |
| --- | --- | --- | --- | --- |
| 2Cp12Ep22Ep32Eo12Eo3 | Recognise some types of rocks and the uses of different rocksUse first-hand experiencesUse simple information sources Make suggestions for collecting evidenceMake and record observations | Show the learners some rock samples. Learners can look at them closely (if available use magnifying glasses). Have the names of rocks and key descriptive words on a set of labels. Learners match the rock sample to the name and description. As a class, discuss the characteristics of the different rocks – colour, texture, weight/mass, describe what they see in the rocks. Ask learners to describe what they see. *What does the rock look like, feel like?*Set up a permanent display of rocks for the learners to handle during this unit of work. Make sure that it is accessible within the classroom. Invite learners to bring in samples of rocks they find.Hide rock samples in a bag and ask the learners questions so that they can guess which particular rock you are talking about. Identify the rock from photographs or an actual sample. Name as many as possible.Take a class walk around the school site where learners are looking for different types of rock. Notice what they are used for and where, including the walls of the building, the roof, footpaths etc. Learners can take photographs as a reminder. Prompt learners to suggest and choose their own sources of evidence. Learners could show on a map of the school where they found different uses of rocks.Look at photographs of rocks and their uses. Learners identify the different rocks and how they are used. Add the photographs to the classroom display. | Rock samples, magnifying glasses.Display space.Map of the school.Photos of different types of rock – internet access or reference books. | In English the word 'stone' is sometimes used instead of 'rock'. Within science lessons use the word rock. There are various rock samples available (depending on locality). Try to choose a range of different types.  |
| 2Cp22Ep3 | Know that some materials occur naturally and others are man-madeUse simple information sources | Look at a piece of concrete or aggregate or brick - describe it as an example of man-made material by humans to replace natural rock. Compare it with a naturally-occurring rock sample. Ask the learners to look at it using a magnifying glass and to describe it in terms of colour, weight/mass, texture etc.Discuss with the learners natural vs man-made building materials. Learners can look at the use of rocks and man-made alternatives for building through secondary sources and making notes and/or presenting about them.  | Concrete or aggregate sample or photograph – internet or reference book.Magnifying glasses.Rock samples.Photos, internet or books on building materials. |  |
| 2Cp1 | Recognise some types of rocks and the uses of different rocks | Discuss how rocks can be grouped into three forms; igneous, metamorphic and sedimentary. Learners look at samples of each type of rock and describe how they are different. Share findings as a class and come up with key indicators for each type of rock, cross-referencing with other information sources.Model rock formation using chocolate. Learners can do this once it has been modelled, if appropriate. Sedimentary: Place grated chocolate in layers, one white, one dark, one milk in a strong clear plastic cup lined with two layers of cling film. Cover the top with cling film and press down/apply pressure (could lay a book on the chocolate for a length of time) - remove from the container and unwrap. What can you see? Draw attention to the layers. Discuss how when sand etc. is pressed down it forms layers this is sedimentary rock. Metamorphic:Take the sedimentary rock and wrap it piece in cling film. Roll it into a ball and squeeze for a while. Talk about how heat is being applied. Unwrap and cut the ball in half - what can you see? Discuss how rocks that are changed become metamorphic. Igneous:Melt the metamorphic chocolate ‘rock’ and mix well. Discuss with learners how it is now a liquid. Show images/video of volcanoes and lava/magma and talk about how rock under the Earth is so hot it is liquid. Tip the molten chocolate out onto a tray and let cool – like a lava flow. Discuss as it cools how when liquid rock reaches the surface of the Earth (or under the sea) it cools and solidifies. Look at the cool chocolate ‘rock’ and talk about what it looks like compared to the other two. Igneous rock is formed in the same way – it is liquid rock that has solidified.  | Samples of igneous, metamorphic and sedimentary rocks to look at. Information sources on rock types e.g. books and internet. Grated white, milk and dark chocolate, plastic cups, cling film, glass bowl, water, heat plate/way of melting the chocolate (adult only), tray, plastic knives, chopping boards or cutting surfaces.Rock samples.Water, droppers, containers for rocks – plates or plastic lids or paint palettes.Timers – internet or mechanical. | Health and safety: Ensure that the chocolate used is nut free and check allergies before giving to leaners. |

# Unit 2.5 Day and night

It is recommended that this unit takes approximately **30% of the term.**

In this unit, learners

* learn about how shadows can change during the day
* find out about why and how we have day and night.

## Scientific Enquiry work includes:

* talking about risks and how to avoid danger
* making and recording observations
* identifying simple patterns and associations.

## Recommended vocabulary for this unit:

* light, dark, shadow
* day, night
* Sun, star, Moon, Earth, spin.

| Framework code | Learning objective | Suggested activities to choose from | Resources  | Comments  |
| --- | --- | --- | --- | --- |
| 2Pb12Eo22Eo32Eo7 | Explore how the Sun *appears* to move during the day and how shadows change Talk about risks and how to avoid dangerMake and record observationsIdentify simple patterns and associations  |  Invite learners, in pairs, to answer the question *What do you know about the Sun?*Share ideas as a class.Watch some video clips of the Sun.Look or go outside and notice where the Sun appears in the sky. As a class, track the Sun periodically throughout the day e.g. when the school day begins, at lunchtime and again before home time. Ask the learners to observe where the Sun is in the sky when they wake up in the morning and before they go to sleep at night. Stickers could be placed on a window each time the Sun is observed throughout the day.Ask the learners to write or draw to show where the Sun appears in the sky at different times of day. As learners shouldn’t look directly at the sun, marking the general position, rather than the exact position, is acceptable. Refer back to work on shadows in the light and dark unit earlier in this stage. *How can shadows be made or changed?*Demonstrate, using a volunteer learner, how to draw around someone’s shadow. Working in pairs, each learner draws around their partner’s shadow. Re-visit the same place at regular intervals throughout the day, making sure learners stand in exactly the same spot and observe the changes in position and size of their shadow. Have one learner in the pair draw around the shadow of their partner with a different coloured chalk each time and measure the length of the shadows. Talk about what changed and if anything else was changing during the day. Discuss the position of the sun and link the changing position of the sun in the sky to the changing position of the shadow. Learners can make sundials by inserting a pencil or short stick into the hole in an empty cotton reel. They then place the sun dial outside or indoors on a large sheet of paper in a sunny position so that the shadow of the pencil or stick can be seen on the paper. Learners mark the position of the top of the shadow at regular intervals, e.g. every hour, and write the time next to the mark.*What pattern emerges?* Learners, with support, compare the time with the length of the shadow and can predict the next measurement they will be taking.Talk about sunrise and sunset with the learners and what appears to happen to the Sun – at sunrise it appears in the east. At sunset it disappears below the horizon in the west.Remind the learners that the Sun is at its highest in the sky at midday (noon). Talk about how shadows appear at noon compared to during the rest of the day.  | Access to the internet.Playground or open space.Stickers.Coloured chalks, rulers.Digital camera.Pencils and paper or workbooks.Cotton reels, pencils or short sticks, paper and pencils. | Health and safety: Remind learners never to look directly into the sun without eye protection as this will damage their eyes.Misconception alert: Some learners will think that the Sun actually ‘gets up’ in the morning and ‘goes to bed’ at sunset. Or will think the sun disappears at night and then reappears. This can be addressed when looking at the Earth’s spin. |
| 2Pb2 | Model how the spin of the Earth leads to day and night e.g. with different sized balls and a torch | Show a video clip of the earth rotating on its axis.Have a large ball (size of a football) for the Earth. Have a torch to represent the Sun. Move the Sun and discuss with the class how this can explain day and night – we see the Sun move. Suggest to learners another way of looking at it: Keeping the torch in one place, held by a learner maybe, have the ball and talk about how one side has lots of light and the other is in shadow. Which side is day? Which side is night? Then turn the ball on a vertical axis and show how the ‘spin’ of the Earth moves different parts of the ball into day and night. Have a small figure and stick it/hold it to the surface of the ball and discuss how the figure moves from day to night, to day. Learners can explore this themselves using figures, balls and torches. Have a learner stand in the middle of the room and be the Earth. Use a torch to represent the Sun. Show how if the sun moves the learner will see the Sun move across the sky. Keeping the torch in one place, have the learner rotate on the spot (spin on their axis) and talk about how their view of the sun changes. Learners can repeat this in pairs with one being the Earth and one being the Sun (with the torch) Discuss with learners how we can’t tell from Earth but this is how we get day and night. Learners can look at Google Earth *In which countries is it day? How do we know when it is night?* Rotate the virtual Earth and identify the changes between day and night as the Earth rotates. Identify when different places are in day and night.  | <http://www.bbc.co.uk/guides/ztdnyrd>Balls, torches and figures.Access to Google Earth <https://www.google.co.uk/intl/en_uk/earth/>  |  |

# Unit 2.6 Plants and animals around us

It is recommended that this unit takes approximately **70% of the term.**

In this unit, learners

* learn about plants and animals in their immediate environment
* learn how differences between places very close to each other contain a different range of plants and animals
* consider how to treat living things and the environment with care and sensitivity
* investigate the weather in their local environment.

## Scientific Enquiry work includes:

* collecting evidence by making observations when trying to answer a science question
* using first-hand experience e.g. observing melting ice
* using simple information sources
* talking about risks and how to avoid danger
* making and recording observations
* taking simple measurements
* using a variety of ways to tell others what happened
* making comparisons
* identifying simple patterns and associations.

## Recommended vocabulary for this unit:

* animal, plant, habitat, environment, adapt
* dry, damp, wet, cold, warm, hot, dark, shady, light
* reuse, recycle, waste
* weather, rain, sun, wind, snow, ice, cloudy, temperature
* survey.

| Framework code | Learning objective | Suggested activities to choose from | Resources  | Comments  |
| --- | --- | --- | --- | --- |
| 2Be12Ep12Eo22Eo32Eo62Eo7 | Identify similarities and differences between local environments and know about some of the ways in which these affect the animals and plants that are found there Collect evidence by making observations when trying to answer a science questionTalk about risks and how to avoid dangerMake and record observationsMake comparisonIdentify simple patterns and associations | Introduce the word ‘habitat’ as the place where things live. Avoid using the word ‘home’. Discuss different types of habitats – ponds, under rocks, on a tree etc. *What types of creatures can we find in these places? Why do they live here?*Agree words that can be used to describe habitats e.g. wet, dry, light, dark, hot, warm, cold etc.**Scientific Enquiry activity**Go on a class walk around the school grounds and allocate two different habitats to different groups of learners. Ask them to write, draw or take photographs to describe* the habitat
* any plants or animals they find.

Return to the classroom and share findings.Learners write and/or draw to show what they have found, and where. Use a map of the school to collate the results from the class.As a class consider animals from around the world and their different habitats – think about their adapted features for living where they do e.g. a camel in the desert, a shark in the ocean etc.Discuss features of the animals the learners found in the school. Identify ways that they are adapted for their habitat (e.g. camouflage, ability to keep warm or cold).Identify features of plants that show how they are adapted to growing in their particular habitat e.g. plants that grow in desert conditions have thorns to avoid being eaten by animals and thick stems or leaves to store water.Write or draw about a few plants or animals to explain their features which allow them to survive in their particular habitat. | Pictures of different habitats.Clipboards, pencils, paper, digital cameras, plastic gloves.This may be done as separate activities, one looking for plants and one for animals.Map of school grounds.Pictures (internet or books).Pictures (internet or books).Pictures (internet or books). | Wear plastic gloves and wash hands well after handling animals or plants.If learners approach open sources of water e.g. ponds, make sure they remain safe and are aware how to keep safe.Emphasise the importance of not picking or eating any fruit, berries or flowers. Ensure hands are washed after handling plants. |
| 2Be22Eo22Eo32Eo42Eo5 | Understand ways to care for the environmentSecondary sources can be used Talk about risks and how to avoid dangerMake and record observationsTake simple measurementsUse a variety of ways to tell others what happened | Introduce the idea that around the world, some environments are being spoiled or destroyed. Make a class list of ways in which this could happen. Discuss each suggestion made e.g. wasting fuel or energy, wasting water, leaving litter, pollution.Learners write about a particular threatened environment, naming animals and plants that live there and how it is being destroyed.Provide a picture for learners to use to identify things that are damaging to the environment. Learners circle the examples found in the picture.Alternatively, learners draw pictures of examples of things that can damage the environment. Share pictures with the class.Talk about ways in which they can show they care for the environment.Reuse and recyclingShow a range of items that can be reused. Discuss with learners why it is good to use things again rather than throw them away (this can include not needed to make new things and avoiding problems like landfill).Then show learners a range of items that can be recycled and find out if the learners are familiar with the word ‘recycling’. Talk about how they know if something can be recycled or not.**Scientific Enquiry activity**Learners can conduct a survey around school to find out what is reused, what is recycled and what is thrown away. Learners can note the type of waste, where it is being produced and what happens to it.Different groups of learners could answer different questions e.g.:* *What waste do we reuse?*
* *What waste do we recycle?*
* *Do we throw away things we could reuse?*
* *Do we throw away things we could recycle?*

Learners present their results, e.g. in a bar chart. Ask questions about the bar chart e.g. *Which thing in school can we recycle the most? Are there things that we could recycle, but don’t? etc.*Think about how to encourage more recycling in school. *What needs to be done to make it happen?* Water useIn pairs, small groups and as a class learners discuss: *How can we save water? Is water being wasted around school?* Look around school for signs of dripping taps etc. Discuss possible uses for recycled water e.g. garden use, flushing toilets.**Scientific Enquiry activity**Investigate how much water would be lost from a dripping tap by collecting drops of water for e.g. a minute (use a jug of water and a dropper to demonstrate).Learners investigate how many drops a small container e.g. an eggcup would hold.They can then find out how many egg cups would fill a jug and how many jugs would fill a bucket etc. Together work out how much water could be saved in an hour, a morning, a day if a tap wasn’t dripping.Demonstrate by showing the learners these amounts of water – if you try counting the numbers of drops, the numbers will be too big for the learners to understand. Make posters to encourage other learners not to waste water. Use some of the information gathered in the previous lesson. Include ideas of how to use waste water. | Flipchart and markers or whiteboard.Paper, pencils.Picture – internet or books, pencils or pens.Items that can be reused e.g. clothes, food container, toy that the learners would have outgrown, paper that is printed on one side.Water, jugs, droppers, timer.Egg cup, jug, bucket. | Explain the dangers of broken glass, contamination from discarded items. |
| 2Be32Ep22Ep3 | Observe and talk about their observation of the weather, recording their reports of weather dataUse first- hand experience e.g. observe melting iceUse simple information sources | In pairs talk about *What is the weather like today?* Discuss recent weather patterns and what you expect the weather to be like in the next few weeks.Watch a television weather report. Identify ‘weather words’ and make a list of essential vocabulary for classroom display.In small groups, learners make a presentation of a weather report for where you live or another country in the world as if it is a weather report on television. **Scientific Enquiry activity**Observe and record weather daily over a week. Use known or create weather symbols to complete the chart for the week. Use a thermometer to measure temperature and an anemometer to measure wind speed if one is available. Discuss what the weather chart shows and any interesting findings.Compare results with a school in another (contrasting) country, or with published information about the weather in another country. | Television link or internet access, flipchart and markers or whiteboard, weather symbols.Poster or flipchart paper, markers, weather symbols, thermometer/s, anemometer (measures wind speed).Information about the weather in a contrasting place. |  |