Cambridge Assessment International Education

Teacher Guide

Cambridge Primary

Science 0846

Cambridge Pathway

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Contents

1 Introduction

Welcome to the Teacher Guide for Cambridge Primary Science. This guide is designed to provide a suggested approach to the implementation and management of Cambridge Primary Science in your school.

It offers:

- an introduction to the Cambridge Primary Science Curriculum Framework
- step-by-step guidance on the planning process
- advice and guidance on creating an inclusive interdisciplinary cross-curricular learning environment
- suggested strategies for implementing formative assessment and integrating this into your lesson planning
- advice and guidance on monitoring learning
- advice and guidance on effective classroom practice and creating a positive learning environment
- advice and guidance on using digital technologies for teaching and learning
- advice and guidance on resources
- information about Cambridge Primary Progression Tests and Cambridge Primary Checkpoint
- guidance on support and training available from Cambridge International.

Schools new to teaching a Cambridge programme will find that all sections of the Teacher Guide are relevant to them. It provides a step-by-step guide through the process of implementing Cambridge Primary Science.

Existing Cambridge schools may be more familiar with certain aspects covered in this guide, especially if they already deliver other Cambridge subjects. This guide is written so that schools can make use of the sections most relevant to them.

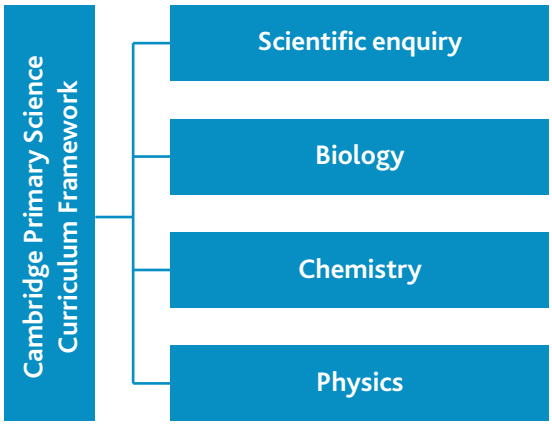
This Teacher Guide should be read together with the Cambridge Primary Science Curriculum Framework and accompanying schemes of work. The schemes of work include possible teaching order for each stage of the curriculum and suggested activities to use with your learners.

2 Introduction to Cambridge Primary Science

2.1 Curriculum Framework

The Curriculum Framework document 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' development of knowledge, skills and understanding can be checked.

The learning objectives are divided into four main areas called 'strands', which run through every stage: Scientific enquiry, Biology, Chemistry and Physics.



The Curriculum Framework has been designed to provide balanced coverage of the fundamental skills, knowledge and understanding of Science at this level.

The learning objectives in Biology, Chemistry and Physics focus on the knowledge and understanding that learners need to develop in these areas of science.

The Scientific enquiry strand is designed to underpin all of the content areas. It includes the skills learners need to be able to consider ideas, plan investigative work, collect results, use equipment and analyse and evaluate evidence. It also introduces learners to some main themes in the history of science, in particular that scientific knowledge and understanding develops over time.

Scientific enquiry should be integrated into most lessons. This will give learners many opportunities to develop how they think and work scientifically. This means that a scientific enquiry learning objective can be encountered several times over a stage in different contexts e.g. firstly alongside biology content, and then again together with chemistry content.

It may be appropriate to introduce this framework at slightly different ages to suit your own particular circumstances.

2.2 Progression in Cambridge Primary Science

The Curriculum Framework is a planning tool that enables knowledge, understanding and skills to be developed by revisiting and engaging with skills and topics at deeper levels and in different contexts. The learning objectives in the Curriculum Framework have been designed to support learners' progression through the different stages. The sub-strands divide the content areas into more specific and measurable targets for teaching and learning.

The table shows some examples of how development of knowledge, understanding and skills can be traced through the Curriculum Framework:

Strand	Stage 1	Stage 6
Scientific enquiry: Plan investigative work	Make predictions	Make predictions using scientific knowledge and understanding
Biology: Humans and animals	Recognise and name the main external parts of the body	Describe the main functions of the major organs of the body
Chemistry: Materials	Use senses to explore and talk about different materials	Observe, describe, record and begin to explain changes that occur when some solids are added to water
Physics: Forces	Recognise that when things speed up, slow down or change direction, there is a cause	Recognise friction (including air resistance) as a force which can affect the speed at which objects move and which sometimes stops things moving

2.3 Schemes of work

As well as the support provided in this guide, a set of medium-term plans ('schemes of work') are available on the Cambridge Primary support site to help you get started. The schemes of work provide a sequence of activities that ensure coverage of the Cambridge Primary Science curriculum at each stage. The activities are arranged into teaching units based around topics and themes. The schemes of work should be considered as the starting point in your planning process rather than a rigid structure. They are not compulsory, so use them as working documents and amend them to meet the needs of your learners and to fit your context.

2.4 Scientific enquiry and practical skills

There is significant overlap between scientific enquiry and practical skills in science.

Scientific enquiry is a process that begins when learners try to make sense of an experience or answer a question using evidence and scientific understanding. Scientific investigations are an important way to develop these enquiry skills.

Practical skills include good observation, measurement and equipment handling skills so that learners can collect accurate and reliable data. These practical skills are developed when learners are given frequent first-hand experience of using equipment. Practical work is a term that is used to describe hands-on science activities.

Often learners will develop scientific enquiry and practical skills at the same time. However there are good reasons to focus on either scientific enquiry or practical skills in an activity.

Practical skills can be developed separately from scientific enquiry. For example, when learning how to use equipment or follow a practical procedure. In these situations, learners are likely to be directed by a set of written or pictorial instructions or shown what to do rather than planning what to do themselves. Teacher demonstrations are a valuable way to draw learners' attention to the most important observations or steps within the activity. For example, in Stage 3, you could wish to demonstrate how to set up an investigation to monitor how temperature affects plant growth.

Teacher demonstrations can also be used to develop enquiry skills. For example, learners could develop their prediction or analysis skills while observing a demonstration.

A science investigation is led by learners and involves many scientific enquiry skills. Learners need to consider the purpose of the investigation, make a plan, do the investigation and analyse their results. Often they will use equipment to make measurements or observations but they might also collect data from secondary sources. Investigations therefore require a wide range of scientific skills, knowledge and understanding. You will need to teach your learners the parts of the science investigation process explicitly, including the practical skills they will need.

At all times, you should be clear about the purpose of the scientific enquiry and/or practical work you decide to use with your learners. Although practical work is engaging for learners, this should not be the only reason for doing it. Scientific enquiry and practical work should develop learners' knowledge and understanding of the natural world, their ability to use equipment or follow a procedure, or develop their understanding of an approach to scientific enquiry.

3 Planning

3.1 Getting started

This section will look at the process of planning, to assist you with developing your learners' knowledge, understanding and skills across and within the stages.

We will start by identifying **what** you need to plan:

- the knowledge, understanding and skills your learners need to learn and develop
- progression and continuity of skills and content
- the best order in which to teach the learning objectives
- detailed lessons, led by learning objectives.

And **why** you need to plan:

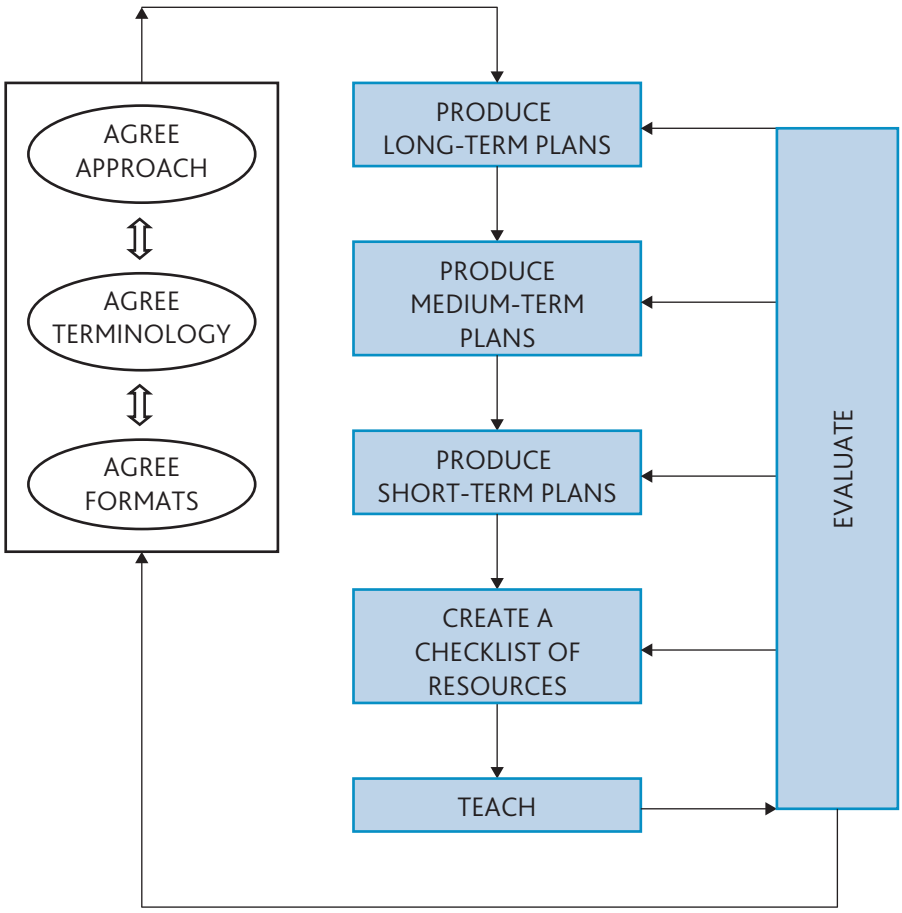
- to ensure that appropriate knowledge, understanding and skills are learned and developed according to your learners' needs
- to ensure consistency across different groups of learners and different teachers
- to be clear about what can be assessed and methods of assessment and feedback
- to ensure a variety of teaching approaches are used to meet different learners' needs
- to ensure a positive and inclusive learning environment
- to ensure all necessary resources are available before starting to deliver the lesson(s).

The following sub-sections lay out a step-by-step guide to the planning process, including how you can build in flexibility to allow you to adapt coverage, teaching style and timing to suit you and to meet your learners' needs.

3.2 A consistent approach

Firstly, you need to download the Cambridge Primary Science Curriculum Framework from **https://primary.cambridgeinternational.org/curriculum-frameworks** and familiarise yourself with the coverage and structure of the programme. We would suggest working with colleagues at your school to coordinate a consistent approach and support learners' progression from Stage 1 to Stage 6. You can do this in three clear stages (long-term, medium-term and short-term), but first it is worth getting all the teachers who are going to be teaching Cambridge Primary Science together.

Have a look at the diagram below. Start by thinking about the decisions in the white box: approach, terminology and formats.



Approach: The general approach to delivering Cambridge Primary Science will largely be decided by discussion with colleagues and management. Your school will decide how frequently this subject will be taught in your timetable, how long for and by which teachers. The suggested long-term plan in the scheme of work will need to be discussed, reviewed and agreed with colleagues across the whole school.

Terminology: Everyone involved in teaching Cambridge Primary Science needs to understand the terminology used so that, for example, 'long-term' plan means the same to all. This is true whatever the overall approach within a school.

Formats: It is not essential that you all use the same documentation for planning but it is very helpful for communication and common understanding of the curriculum requirements. Templates for all stages are available for Cambridge schools at **https://primary.cambridgeinternational.org/support-materials/planning**. We recommend all those who are teaching Cambridge Primary Science use the same template.

Evaluation: Perhaps the most important box is the 'Evaluation' stage. It is always a good idea to check how well something works. The diagram shows that this can be for any stage of planning. If there is a problem with a lesson, it is often assumed that there is something wrong with the lesson plan. This can be true but sometimes it may be because the medium- or long-term plan that is being used needs changing in some way. The white box decisions may also need to be revisited. You should expect to adapt how you teach the Cambridge Primary Science curriculum as you find out what works well with your learners.

3.3 Description of the planning stages

Long-term planning involves considering the curriculum for a particular stage and planning coverage of the curriculum throughout the year. This includes taking account of holidays, school events and possible visits to enhance the learning process. It also requires pre-planning in terms of required resources, whether these are shared, limited or need buying in. Outdoor learning is valuable for several areas of science (e.g. when learning about living things in the environment) and should be scheduled when the weather is suitable for taking learners outside.

You will need to manage a balance in your coverage of each of the strands. For science, it is important that learners have multiple opportunities to develop their scientific enquiry skills. Where possible, it is helpful for learners to see how different areas of science link together and support each other (e.g. learning about properties of materials in chemistry and conductors/insulators in physics).

Medium-term planning usually covers a term or unit of work. The schemes of work provided by Cambridge International serve as the medium-term plans and are based on the premise of two units per term, and a school year of three terms of ten weeks. Over time, you will be able to adapt the units and the best order in which to teach them according to resources and available teaching and learning time, and in the light of your learners' needs.

If this is the first time you are teaching this curriculum, you can use the units in our suggested order in the schemes of work as an initial starting point for your planning. Do not expect your plan to be perfect first time – start with an estimate of how long you think learners will need to develop the knowledge, understanding and skills targeted. Then adjust your plans as you go along in response to the needs of your learners. You are the best judge of the capabilities of your learners and how long it will take them to develop the understanding and skills required, based on their existing strengths.

Short-term planning is a plan for a particular lesson. This is a detailed working document and is led by the learning objectives for that lesson.

It provides:

- essential information for all adults involved in the teaching and considers the learning needs of all learners, to create an inclusive learning environment
- continuity in the absence of regular teaching staff
- an outline of resources, timings, and teaching and learning activities.

The real value of a short-term plan is that it influences next steps in the light of the learners' responses to the learning opportunities previously presented.

The steps of the planning process (1–6) outlined in the following diagram are divided into three logical phases that form the sub-sections of this section of the guide:

Phase 1 – Creating a long-term plan (steps 1–3)

Phase 2 – Creating a medium-term plan (step 4)

Phase 3 – Creating a short-term plan (steps 5–6)

The six steps of the process are dealt with in each related sub-section.

3.4 The planning process

Phase 1: Creating a long-term plan

Step 1: Teaching time

Find out:
- How many hours are there to teach the subject?
- How is the teaching time divided?
- How many lessons will each week and term/semester contain?

Step 2: Approach

Think about:
- How will you structure the teaching and learning?

Step 3: Ordering the teaching

- Look at the Curriculum Framework.
- Decide which content/skills will be covered in each term within each stage.
- Consider the interconnections between the content.

Phase 2: Creating a medium-term plan

Step 4: Creating units

- Group learning objectives into topics and themes creating a logical, progressive sequence of learning for the stage.
- Rearrange learning objectives as necessary for learners' needs, timing, pace, local context and appeal.
- Make sure that opportunities for scientific enquiry and practical work are included in each unit.
- Organise the number of units to match the time available from Step 1.
- Identify and adapt suitable teaching and learning activities and resources to deliver the learning objectives.

Phase 3: Creating a short-term plan (lesson plan)

Step 5: Creating a lesson plan

- Identify what you are going to teach and how you are going to teach it.
- Identify and adapt opportunities for formative assessment and giving feedback to learners.

Step 6: Evaluating the lesson and the planning

- Amend your scheme of work and lesson plans to best meet the needs of your learners and the local context.
- Amend the lesson plan for your next lesson to reflect the learning that has taken place during this lesson.

3.5 Creating a long-term plan

Step 1: Teaching time

First, you need to establish the length and number of semesters or terms available and the number of lessons that will fit into each.

Step 2: Approach

Next, you will need to decide the overall approach you want to take to the teaching structure of the subject.

Here are a few helpful prompts:

- Do I have a preferred way of working?
- What is the availability of Primary Science resources in my school (are they shared)?
- How can I ensure that I cover the whole curriculum for the stage during the year?
- How will I provide opportunities for developing scientific enquiry and practical skills?
- How can I sensibly group learning objectives from the curriculum framework to incorporate them into meaningful units of study?

Step 3: Ordering the teaching

Next, consider how you will order the teaching of the learning objectives across the year. Think about:

- the order of learning to create progression
- bringing the different strands together into a logical whole to make learning meaningful.

You can see examples of how the Cambridge Primary Science curriculum content has been organised across terms and a suggested teaching order of the learning objectives, in the long-term plan found in the schemes of work.

3.6 Creating a medium-term plan

Step 4: Creating units

Next, you need to organise your learning objectives for each term into groups based around topics and themes.

Here are some questions to consider:

- What do my learners already know?
- What skills do I need to teach?
- What knowledge do I need to teach?
- Is there a logical order of teaching for these objectives?
- How long will my class need for learning to happen?
- Do I need to adapt the order of teaching to meet my learners' needs, timing, pace, local context, appeal?
- What activities can I use to support the learning of the intended learning objectives?
- What resources in school are available? What purchases are required?

Each scheme of work (medium-term plan) available from the Cambridge Primary support site contains:

- An **overview** of the stage, giving a suggested teaching order of units for each term. For Cambridge Primary Science, there are six units for each stage.

Each unit contains:

- The **learning objectives** related to the topic or theme of the unit, arranged in a logical and progressive teaching order.
- The **framework codes** of the learning objectives from the Curriculum Framework.
- **Suggested activities** to deliver the learning objectives. Teaching and learning activities have been designed so that learners are actively engaged in their own learning. More information about teaching approaches can be found in Section 4 of this Teacher Guide.
- Information about **suggested resources**.

The relevant scheme of work should be downloaded for your use. In addition, all learners will need access to age appropriate resources to support scientific enquiry and practical work. Specific resources are suggested in the schemes of work.

If internet sites are to be used, then you must check these before the lesson and make sure that all learners know how to use online resources safely and responsibly. More information on eSafety is in Section 5.1 of this Teacher Guide.

3.7 Creating a short-term plan (lesson plan)

Step 5: Creating a lesson plan

Short-term plans are for use in the classroom when teaching lessons. Producing lesson plans for single lessons is particularly useful when first working with the Cambridge Primary Science curriculum. You can use the blank template provided on the Cambridge Primary support site or your school may have its own.

The different components that we recommend you consider when planning each lesson are:

- Clear information about date/class/teacher
- Title of the unit and skills being covered
- Timing for each part of the lesson
- Learning objectives and success criteria
- Summary of the planned activities
- A risk assessment for any practical work
- Expectations for learner outputs
- Any specific groupings or instructions for pair/individual work
- Resources required for the activities
- Any opportunities for learners to demonstrate achievement of learning objectives

Good planning makes for successful teaching and an enjoyable learning experience. However, plans should be flexible enough to be adapted. For example, your learners might be ready to move on more quickly than you anticipated. Alternatively, they might need more time and support on a particular concept or activity.

Step 6: Evaluating the lesson and the planning

Remember that your plans are a working document. You will need to be responsive to your learners and adapt your teaching as required. Here are a few things to consider regarding the creation and maintenance of lesson plans:

- Teachers need to keep in touch with learners' needs and ensure that learning is of good quality and that progress is made.
- 'Over-planning' can lead to inflexibility if a teacher feels they must follow their lesson plan in order to demonstrate their intentions have been met rather than focussing on learners' needs. For example, it may be more useful to work on a misconception which has arisen or to progress a learner's idea, which has been offered during a lesson. Sometimes lessons need to speed up; on other occasions it may be necessary to revisit an aspect of learning.
- Teachers must be prepared to amend plans from lesson to lesson.
- If learners' work is poor or they have struggled during the lesson, it might be sensible to revisit the work and not rush on to the next objective. Teachers must be cautious, when revisiting anything that has led to learners struggling, not to repeat the same process but to consider alternative strategies or ways of supporting depth of learning.
- Plans should not just 'sit' in a neat folder. A good set of plans may have notes written all over them to show what went well and what might need adjustment for next time.

There is a need to try and keep 'on track' or keep up with planned work, but you should not stick so firmly to your plans that you cannot follow an idea that is unplanned. Quite often, excellent lessons result when something happens to stop the planned lesson – a local or national event, an individual brings something into school – and the learners are interested. You should feel that you can use these stimuli to develop any of the skills. Learning takes place when learners are motivated and enthusiastic.

Although 'unplanned' activities should not lead the teaching, it may be possible to revisit both short- and medium-term plans to see if any learning objectives have been met. In this way, a certain amount of flexibility can be allowed.

3.8 Collaborative planning

Discussions with your colleagues about the curriculum not only deepen your own knowledge and understanding, but also build a good network of teachers who understand it and are able to deliver it in a motivating way, each bringing different strengths from their areas of specific knowledge and experience. For example, there may be opportunities for cross-curricula links such as using developing writing skills when doing science, using scientific problems in mathematics and considering the history of a scientific concept.

Finding common planning time is not always easy. School leaders can provide opportunities for teachers to meet to share ideas and plan collaboratively. You may be fortunate enough to already have some common planning time in school or you may need to organise some common planning time. You might also collaborate with colleagues using technology such as email, a virtual learning environment or social media.

4 Teaching approaches

This section considers some of the different teaching approaches that you may choose so that your learners' understanding and skills develop throughout the year.

4.1 Active learning

Active learning is about learners being engaged in their learning rather than passively listening and making notes. Instead, they should take part in a variety of activities that involve thinking hard.

Active learning can be done by learners in class or out of class, by working individually, in pairs, in small groups or as a whole class. It can be done either with or without the use of digital technologies. It may involve moving, but it does not need to. The important thing is that learners are engaged in their own learning and have responsibility for their progress.

In Cambridge Primary Science, learners need to be provided with opportunities to develop knowledge, understanding and skills. This include asking questions, making predictions, analysing results and applying concepts to new situations. These are all examples of active learning.

Useful principles for active learning include:

- identifying prior learning and building on this
- using a variety of individual, pair and group work
- promoting high-quality talk
- using success criteria so that learners are responsible for their own progress
- encouraging regular self-reflection and peer feedback.

The best learning will happen when you create an environment where everyone is comfortable and familiar with routines and expectations. Learners will respond to all kinds of activities if the atmosphere is one that encourages them to participate fully in developing their learning.

4.2 Developing success criteria

Learning objectives tell learners what they should know, understand and be able to do. Success criteria help you and your learners know when a learning objective has been achieved. By having clear success criteria, learners are engaged in their learning because they know what is expected. They have clear goals and can push themselves to achieve the learning objectives.

Success criteria can be expressed in different ways, moving from simple statements from the teacher (What I'm looking for …) and questions learners ask themselves:

- How will I know I have done this? to more precisely worded questions which focus on different aspects of the success criteria
- Why is … important?
- How would you ...?

It is often helpful to display the success criteria and the learning objectives throughout the lesson to help maintain focus and help learners work independently. For example, if success criteria are in the form of 'steps', learners can check their 'success' by following the pathway created by the 'steps'. However, this is not the only approach and sometimes it may be more engaging to 'reveal' the objective and success criteria at other points in the lesson.

This is because the nature of scientific learning is also about the surprises that cause learners to experience 'aha' moments; the wonder and the amazement; for example, the moment a phenomena is observed, realising a prediction was wrong and finding out why and seeing the links between different science concepts.

Learners have a clearer understanding of their learning if they share in the creation of the success criteria, perhaps through whole or group discussion or by discussion with talk partners.

One way to generate success criteria with learners is to use samples of work perhaps from the previous year or by creating a classroom culture where every learner, over time, is expected to share with the rest of the class something they are particularly proud of.

- Select two pieces of work – one that has met the requirements, and one that does not quite include all of them.
- Ask learners to discuss with a partner what they like about the work and what could be improved.
- Feedback comments can be collected and the learners can decide which are the most important things to think about when doing the task. In this way success criteria are produced.

Once learners are used to the routine of producing success criteria, it can happen often, although not necessarily for all tasks. You may be concerned that there will not be enough time in lessons to do this. However, you will quickly discover that time is no longer wasted on repeating the task instructions because the learners now all understand what they have to do and are keen to get on and complete the task.

Learning objectives and success criteria may be limited to one lesson or be spread over a series of lessons. There may also be several success criteria for one learning objective. For example, the learning objective 6Be1 *Explore how humans have positive and negative effects on the environment e.g. loss of species, protection of habitats* encompasses several success criteria, such as identifying the positive and negative effects of humans on the environment, identifying the causes of those effects and identifying the consequences of those effects.

Giving success criteria a central role in lessons and allowing learners to produce them:

- helps learners to gain a deeper understanding of what to do
- gives learners ownership of the criteria so that they can create a successful 'product'
- gives learners a basis for self-evaluation and peer-evaluation
- enables learners to become active learners.

4.3 Giving formative feedback

As you observe learners using the success criteria, you will have many opportunities to identify how their knowledge, understanding and skills are developing. In addition, as part of an active learning environment, learners will also regularly reflect on their learning and progress. Together these will give you lots of information about each learner's strengths and weaknesses.

In order to help learners make progress, they will need to receive feedback on their knowledge, understanding and skills and how they can develop them further. Feedback may be oral or written. All feedback should be constructive and meaningful to learners. In particular, it should help learners to identify what their next steps are.

Most importantly, having been given guidance on how to improve, learners need an opportunity to carry out the steps for improvement and demonstrate evidence of their competence. Without opportunities to reflect and improve, feedback cannot effectively impact learning.

We are constantly giving our learners feedback. Our response to their contributions in questioning sessions or discussions may be oral but it can also be non-verbal – a smile or a gesture. There are countless examples of when we do this – a smile at the beginning of a lesson, a nod of the head. Below are listed some techniques for giving specific feedback.

Oral feedback

Oral feedback is potentially the most effective form of feedback. The language of the classroom has an enormous impact on learners, and should create an ethos where speaking freely about learning is positive. Oral feedback needs to be focused around the learning objective of the lesson, and on progress towards and achieving the success criteria. Feedback can be given to an individual, to a group or to the whole class.

Written feedback

Written feedback should be positive, clear and appropriate in its purpose – it needs to offer positive benefits to teachers and learners, and the outcomes need to be fed back into planning. The most effective feedback occurs when the work is discussed together face-to-face, but if this does not occur and learners' work is marked outside of a lesson, the following should be considered:

- Can learners read your comments?
- Can learners understand your comments?
- Are comments clearly linked to the learning objectives and success criteria?
- Do you allow learners time to read your feedback?
- Will the feedback you provide have a constructive impact on their skill development?

Writing on learners' work should always be neat and clear. It should not compromise their efforts to produce well-presented, high quality work.

For digital texts, you could add comments to documents or blogs and learners could respond by adding or amending their work in a different colour. Some learners may benefit from using 'tracked changes' in a word processor.

Self- and peer-assessment

Learners should be involved as far as possible in the review of their own development. You should encourage learners to use self-evaluation continually, so that reflection and improvement become a natural part of the process of learning.

Peer- and self-assessment are much more than learners commenting on their own or each other's work. Peer-assessment enables learners to give each other valuable feedback so they learn from and support each other. It adds a valuable dimension to learning: the opportunity to talk, discuss, explain and challenge each other enables learners to achieve beyond what they can learn unaided. Peer-assessment helps develop self-assessment, which promotes independent learning, helping learners to take increasing responsibility for their own progress.

Self-assessment and monitoring can involve learners directly if they carry out independent research or write reflections in a journal. You can discuss these with learners at key points in the year.

Digital technologies also provide a range of ways of recording evidence of learners' working, which can be used for self- or peer-assessment or for you to give feedback.

4.4 Whole class, group, pair and individual activities

There are many different ways of organising the classroom when following the Cambridge Primary Science curriculum. As you plan your lessons, aim to have a mixture of teacher-led, individual, pair and group activities.

Teacher-led activities

Teacher-led activities should be used sparingly within lessons, although to ensure learners engage and understand, it is essential that teachers ask a variety of questions and that learners are encouraged to answer them individually and in small groups.

Examples of teacher-led activities include:

- teacher demonstration
- teacher talk/presentation
- teacher-led discussion.

Individual activities

Learners will need to work independently at times. These kinds of activities can be made more interactive through the use of peer- or self-assessment.

Examples of individual activities:

- Learners draw or make notes showing their scientific observations.
- Learners create a leaflet or poster summarising recent learning.
- Learners carry out an independent scientific investigation and present their findings to a group or to the class.

Paired activities

Having someone to share ideas with is invaluable, and a critical friend can offer advice and guidance. Working in pairs helps learners to construct meaning and both partners can be focused and engaged in learning.

Examples of paired activities:

- Learners consider their ideas individually, then share with a partner and then adapt and share their ideas with the class.
- Learners peer assess each other's work against a checklist as they need to know how and what to look for:
  - Do you understand what the other person has written?
  - Has the other person worked systematically on the problem?
  - Is the work accurate?
  - Can you say what is 'good' about the work?
  - Can you suggest how the work might be improved?
- Learners work together on answering a question, possibly through a scientific investigation.

Group activities

Working in small groups, learners can take on varying roles and learn how to collaborate and cooperate with others.

Examples of group activities:

- Learners plan and carry out a scientific investigation as a group.
- Small groups of learners rotate around a variety of activities, trying out each one.
- Learners work together in a small group for a few minutes to answer a question or complete a task and then present their solution.

Organising and managing group work

Groups can be arranged in many ways. Although learners often choose groups by friendships, it is useful to organise groups in other ways. Importantly, learners need to experience working with a variety of their peers, rather than sitting in the same group all the time.

One quick method of grouping learners is to number them as they come into the classroom and allocate a number to each group of tables. If choosing their own groups, learners need to be given a strict time limit to arrange themselves, say 30 seconds, and guidance on how to include everyone and choose sensible 'working' groups.

Setting ground rules for group work

Clear ground rules are needed on how to conduct group work. You should develop these with your class and could include some of the following:

- Respect and value everyone's opinions.
- Do not interrupt when others are speaking.
- Use and accept constructive criticism.
- Take your fair share of the tasks.
- Support and explain to each other – you have a collective responsibility.
- Meet deadlines.
- Listen to each other and the teacher when instructions are given.

As the teacher, you need a clear signal that indicates when you want the class to listen. Simple ways of doing this are by positioning yourself at the front of the room holding your hand up. Counting down from five to zero is also an effective method as by the time zero has been reached the class is silent, equipment is down and all eyes are on you.

Assigning roles

One way to support group work is to assign roles to members of the group. This allows learners to focus on one particular area. It is important though that each member of the group reports back about their progress so that all members are aware of what is going on.

Not all of these roles may always be needed but here is an example of the different roles that could be assigned:

Scribe	Resource manager	Adjudicator	Analyst
Keeps records	Lists resources needed	Manages discussions/ debates	Identifies key information
Collects information	Locates and fetches resources	Organises and counts votes	Identifies what further information is needed
Seeks clarification	Makes sure everyone has the resources needed	Ensures all members of the group are heard	Identifies where further information can be found
Writes up findings	Timekeeper	States final agreed group decision	Researches unknown words/phrases

Monitoring pair and group work

While learners are working in pairs/groups, you need to monitor progress. How much you intervene will depend on the age of the learners. It is important that you do not intervene too much so that learners become too reliant on you. Instead, you should allow learners to make mistakes, find their errors and correct them and encourage learners to help and support each other. This will encourage learners to become more responsible: a key Cambridge learner attribute. One way of doing this is to use the 'three before me' rule. This means that learners are expected to look to three different sources of information (peers, resources, etc.) before they ask you. You can also have a 'three questions' rule that states that each group can only ask you three things during any one lesson or learning activity.

Part of your role is to ensure that every member of a pair or group is involved, that quiet learners are not excluded. Standing back and observing learners is a good start. You can then follow this up with questions directed at individuals. For learners who are not engaged in an activity, small targets can be set and a time limit given before you return to the individual.

Examples:

- 'When I come back in 5 minutes I want you to explain how you have ...'
- '... is responsible for telling me why you ... I will be back in 3 minutes.'
- 'I will pick one of you randomly to present your ideas, so make sure you are all confident in your method and explanation.'

However you monitor pair or group work, it is important that you give learners time in which to discuss their ideas/ practise their scientific enquiry skills and that you move around the classroom and listen to the language that learners are using. The vast scientific vocabulary, which learners need to engage with and use, is a critical aspect of their development (see Section 4.5).

4.5 Language and dialogue in Cambridge Primary Science classrooms

Language is an essential communication tool in all classrooms, and you should celebrate the diversity of languages your learners may have. Even though the Cambridge Primary Science resources are written in English, this does not mean that all the dialogue in your classroom must be in English.

Learners will learn a lot by being able to use their first language to aid their understanding of topics and their development of Cambridge Primary Science. They will be able to transfer skills, concepts and learning strategies across languages if you encourage 'trans-languaging' in the classroom, allowing learners to communicate in different languages. To do this, it is important that all Cambridge Primary Science teachers are 'language aware'.

Being language aware means you understand the possible difficulties that language presents to learning. These difficulties might arise because a learner is learning your subject through an additional language or it might be the first time a learner has come across certain vocabulary or structures in their first language.

One of the leading authorities on bilingual education, Professor Jim Cummins, suggests that learners need a minimum level of linguistic and conceptual knowledge in their first language to successfully develop a second language. Once this knowledge is firmly established in a first language, learners can draw on this learning when working in an additional language.

A teacher who is language aware understands why learners face the difficulties they do and what they can do to support them. You can encourage them to make use of their first language to understand ideas and concepts.

To support learners, you can pre-teach key vocabulary and use visuals with words to encourage understanding. Pre-teaching key vocabulary can help towards a more inclusive classroom. This does not mean giving learners a list of random words to go away and look up in a dictionary. This will only demotivate them. Instead, you can introduce vocabulary to learners by using photos, by getting them to do mind maps and brainstorm words and phrases they already know to help them access an informative text, a story, a poem, an audio or video clip. You should use contexts that learners are familiar with and have an interest in to pre-teach vocabulary.

Promoting talk

Using talk partners can create a very positive classroom atmosphere because learners work with different people. Many learners feel more confident discussing with a partner before giving an answer to the whole class. An example is 'think, pair, and share' where learners are given the opportunity to think about a question before they discuss it with a partner and then they share their ideas in a small group or with the whole class.

You can organise talk partners in either a structured or a random way. Partners can be changed at certain intervals to vary the experience.

There are many benefits of using talk partners. For example, they provide opportunities:

- for all learners to speak and listen to each other
- for learners to generate ideas, views and opinions or practise scientific language skills in a safe environment
- for all learners to voice their understanding of ideas and concepts or use their language skills
- to enable participation by learners who might not be as confident in the whole-class situation
- to develop thinking, speaking, listening, collaborative and cooperative skills
- to ensure all learners are involved in the lesson
- to enable learners to learn from each other
- for thinking time
- to encourage extended responses
- to develop coherent thinking
- to develop 'process talk' (thinking through talk).

Example talk partners activity

Odd one out:

1) Give learners a series of images related to a science-learning objective, where each could be the odd one out for different reasons (e.g. a lion, whale, fish, insect and lizard for a biological classification activity).

2) Learners discuss the images and decide which image is the odd one out and why.

3) Learners then share their decision and rationale.

Every class will have loud and quiet learners. One problem facing teachers every day is how to get some learners to participate and how to stop others taking over a discussion.

Speaking tokens: A simple and effective method is the use of 'speaking tokens'. A learner is given four tokens. These could be buttons, glass pebbles or slips of paper. Each time a learner contributes to a class discussion they give back one token. The aim is to have given them all back by the end of the lesson. Quiet learners are encouraged to offer their ideas. Louder learners have to prioritise their input to the more important influential comments they wish to make, thus also giving others a chance to participate.

Discussion starters: In order to encourage learners to talk about different ideas, you can use a range of discussion starters. Examples include:

- Why do you think ... said that?
- Can you think of an opposite idea?
- What would happen if this was not true?
- Can you add an idea?

Promoting writing

To develop learners' research and written communication skills, you will need to teach learners how to make notes, organise these notes, and put together sentences and paragraphs which link clearly. Working together with the learners' English teacher will help you to understand which skills they have already been taught.

Graphic organisers are useful in that they help learners visually represent their ideas, organise information and grasp concepts such as sequencing and cause and effect. They can be used as an end product but also as part of the process to help learners guide and organise their thinking as they find solutions.

Examples of graphic organisers include:

- KWL chart, where learners categorise what they Know, Want to learn and have Learnt
- mind maps and spider diagrams, showing the connections between a range of ideas
- Venn and Carroll diagrams to organise results.

Writing frames allow learners to decide how to structure their work before they start. They can be useful for introducing specific aspects of Scientific enquiry for the first time.

Example writing frame

I predict ……..... because …….....

The …….....er the light the …….....er the shadow

In conclusion …….....My evidence is …….....

Teacher modelling is when you demonstrate to learners what they are expected to produce. A high-quality piece of work is studied and the important features identified. Learners can then try to replicate these features in their own work.

Using questions effectively

If a learner asks a question in class they should look to fellow learners to answer the question first rather than the teacher. If learners are not initially confident enough to put their hand up and ask a question in class, alternative approaches can be used. These include:

Question wall: Choose an area of the classroom where questions and answers can be posted. This could be on a poster or slips of paper stuck to the wall. Learners are free to add their own questions and answer any that they can. At various times in a series of lessons the class can review the questions together and move any questions they can to the answer area.

Question box/problem book: A similar idea is to have a box in which learners can post their questions. Alternatively, you can pass around a problems book where learners write down any questions they have and review other learners' questions. You can review questions in the box or book and use them to direct future learning.

Question starters: One way to help learners to ask open questions is to regularly use question starters. These encourage fuller, more justified answers from learners.

Examples include:

- Why ...?
- How do we know that ...?
- What if ...?
- How does this compare to ...?
- How would you ...?
- How did ...?
- Explain why ...?
- What might it mean if ...?
- What might happen if ...?
- How could you tell ... was true?

For questions that require more thought, it is important to give learners time to think before they are expected to answer. Aim to wait for about five seconds between asking a question and expecting a response.

4.6 The inclusive Cambridge Primary Science classroom

Learners bring different competencies to their lessons. For example, some might excel in mathematics and science, but find subjects where they need to write at any length a challenge. There will inevitably be different levels of literacy amongst your learners, and for some learners English might be a second, third or even fourth language. This diverse range of competencies and backgrounds should be celebrated in your classroom.

It is part of your role to discover what the competencies and backgrounds of your learners are and to get the best out of every learner. Achieving this will involve creating a positive learning environment in which all learners feel confident to make suggestions, take risks, ask for help and admit when they are finding something difficult.

You can do this by:

- ensuring that all learners take an active role in the learning process
- showing appreciation of everyone's ideas and contributions
- encouraging learners to give good reasons for their ideas
- involving everyone in whole class activities and discussions
- inspiring confidence in learners to develop their own ideas
- making sure learners have enough time to explore ideas properly/formulate responses
- helping learners to work together and share their ideas with others and to appreciate the ideas of others
- encouraging learners to make their own decisions
- using varied questioning techniques and encouraging learners to think of their own questions.

By using a variety of teaching strategies, you can address the needs of learners with a variety of backgrounds, competencies and interests. These strategies will contribute to an overall inclusive learning environment, in which all learners feel equally valued and supported and are able to develop and succeed in your lessons and beyond.

Benefits of an inclusive learning environment include:

- being able to connect with and engage all your learners
- being able to provide support or challenge as appropriate
- being more prepared for any issues that arise
- having the freedom to prepare interesting, exciting lessons that learners can relate to and connect with
- ensuring learners feel comfortable in the classroom environment so that they are prepared to voice their opinions and ideas or ask any questions
- creating a positive learning environment where learners enjoy your lessons and are successful, as the teaching and learning activities you design will support their competencies, backgrounds and interests.

Teaching strategies and approaches for inclusive learning

To make learning inclusive in Cambridge Primary Science, you should use a variety of ways of presenting information for learners to work with to develop their knowledge, understanding and skills. For example, you can use a combination of written, oral and visual resources and materials.

Try to provide flexibility and choice in how learners demonstrate their development of knowledge, understanding or skills. Your focus will be on the development of learning rather than presentation of the learning. For example, when producing written work, learners could choose to create a leaflet, a webpage or other media presentation. After learners have demonstrated their current level of learning, aim to give targeted feedback on how they can improve further. It is valuable to let them know what they have done well and what the next steps are to progress their learning.

Feedback from learners can help in your aim to have an inclusive Cambridge Primary Science classroom. You might try giving out small pieces of paper, commonly known as exit slips, as learners leave the lesson and asking them to anonymously write how confident they felt about the content learned or skills practised during the lesson from 1 to 4, with 4 being the most confident. You could also ask for two suggestions for how they might feel more confident. You can discuss your findings with learners in the next lesson and talk about the changes you are making so that everyone feels included and able to learn and achieve in the lesson.

4.7 Differentiation

Differentiation is a strategy you can use to help you make your lessons more inclusive. Differentiation aims to promote learning so that all reach their potential: the best that they as individuals are able to achieve. Your skills as a teacher will be to encourage learners on their journey to reach their own personal goals through carefully planned provision of exciting and stimulating learning experiences. Differentiation means thinking about your learners' needs and trying to match the teaching methods, learning activities, resources and learning environment to individual learners or groups of learners. The purpose of differentiating learning is to enable all learners to have a positive learning experience and become successful learners.

Reasons for differentiation

Differentiation allows you to appropriately challenge each learner. This can be by providing support for those learners who are struggling and more challenge for those that need it.

How to differentiate

You can create and adapt teaching methods and resources or materials in a variety of different ways to give each learner the opportunity to be successful in your classroom.

Use different groupings: You can vary the groupings of learners depending on the learning activity or learning objective. Sometimes you might decide that friendship groups are appropriate for a particular activity. At other times, you might plan groups made up of learners with different competencies. By organising groups in this way learners will be able to gain ideas and skills from each other and all learners will be able to progress.

Vary the activity: This is when learners meet the learning objectives in different ways. Learners might engage with a topic through doing research with secondary sources, short defined practical activities or an extended scientific investigation.

Vary the outcome: This is when learners have the same task, but are expected to achieve different outcomes. For example, when learning about predictions at Stage 3 you will expect all learners to make a prediction but some will be able to give more detailed explanations for their predictions.

Vary the amount and type of learner support: This is when learners receive additional help and support either from the teacher, a classroom assistant or other learners. For example, you might work with a small group of learners who need more support, and allow other learners to work in unsupported groups with a summary sheet of questions to focus their learning.

Appropriate resources can be provided and adapted to support different groups of learners. Learners who need extra support can also be given the opportunity to choose their own support materials. This encourages them to be more independent in their own learning and how they learn.

Some learners may need extension activities. These should be based on the same learning objective as the rest of the class. Many of the Cambridge Primary Science learning objectives can be achieved at different levels. For example, when learners have met *3Bp3 Know that water is taken through the roots and transported through the stem* they could be extended by comparing the structure of the water transport system in several different plants. This could be linked to *3Eo1 Observe and compare objects, living things and events*.

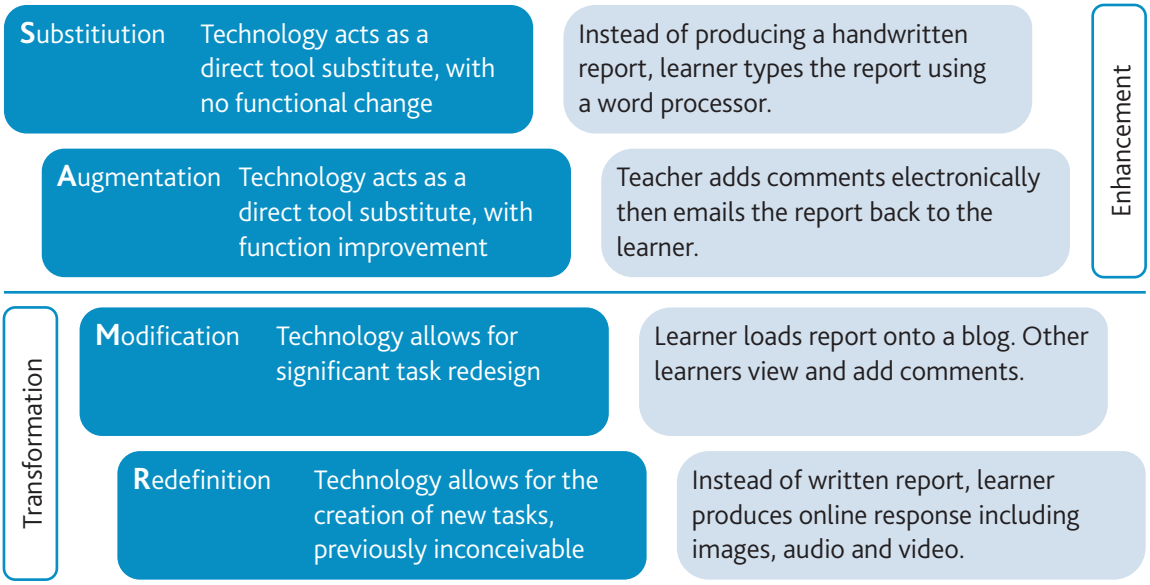
5 Digital technologies

Cambridge Primary Science provides many opportunities for incorporating digital technologies into teaching and learning.

You can make the best use of technology in the classroom by developing your awareness of a range of digital technologies and considering carefully how and why they can be used to support students' learning. The consideration of what learning will be achieved and how the technology may help is fundamental to its effective deployment.

The aim of using digital tools is no longer because they 'engage' and 'enthuse'. Instead, the use of digital technology focuses on impact and progress.

The SAMR (Substitution, Augmentation, Modification, Redefinition) model developed by Dr Ruben Puentedura is a useful reference when considering the implementation of technology in the classroom. The model (see below) shows the stages that adopters of educational technology often follow as they integrate their teaching and learning with technology.



See more in the Cambridge Educational Brief: Digital technologies in the classroom
http://www.cambridgeinternational.org/images/271191-digital-technologies-in-the-classroom.pdf

This section gives you some ideas for how you might use digital technologies for teaching and learning.

5.1 eSafety

There are many positives to using digital technologies, but learners also need to be made aware of the potential dangers and about how to keep safe when using computers, especially online. Learners also need to be given opportunities to consider their own behaviour and the impact that their actions can have on others.

The guidance given to learners will depend on their age, maturity, background and the content that is being delivered. Many online tools are designed for learners aged over 13 to use, but younger learners can access technology safely through supervised use or using school approved accounts. Learners should be given clear instruction about what they should do if they feel unsafe when using digital technologies; this should include how to report their concerns.

We recommend that all schools have an acceptable use policy that describes in detail what learners and school employees should and should not do once they are given access to the school's computer network. Care should be taken to ensure the acceptable use policy is followed during all lessons, including Cambridge Primary Science lessons. If concerns arise, teachers should follow the policy, including making contact with local child protection and law enforcement agencies if appropriate.

Internet filtering and monitoring tools should always be in place and anti-virus software should be up-to-date.

5.2 Using digital technologies to support teaching and learning of Cambridge Primary Science

Digital technologies are particularly useful for Cambridge Primary Science lessons when used as part of a range of effective teaching and learning methods. Learners can be empowered to be more autonomous in their learning yet also be critical and select the most appropriate technology to support their requirements.

Digital technology is a valuable resource, which learners can use to help develop their knowledge, understanding and skills. It is important that both you and your learners feel confident to evaluate where digital technologies may add value to the learning over other non-digital resources.

You can use digital technologies for a variety of reasons. For example to enable learners to:

- gather a lot of information speedily
- graphically represent scientific data
- visualise and explore a wide range of scientific phenomena e.g. through simulations and watching videos of phenomena that cannot be observed in school.

Practical considerations are also necessary. The technology you have available will influence how you choose to use it. For example, if there is one computer per class then the classroom could be set up with an area that allows the computer to be used for research. Will learners have to work individually or is pair-work or small group work possible? How involved will you need to be? Alternatively, if you have access to an interactive whiteboard or projector, you could consider whole class activities where learners present their work, evaluate and discuss approaches to carrying out scientific investigations live on the board. You can also consider video conferencing tools to provide opportunities for wider participation. If you have access to a computer room this might be used for research purposes.

Mobile devices such as tablets and similar tools can be used within your classroom. Here the digital technology can be presented as a tool to support learning, similar to a box of books. This allows learners to make a positive choice in their use of technology for a particular task when they feel it is appropriate.

It is clear that there are numerous opportunities to integrate digital technology in the classroom, but care is needed not to force its use – it should only be used when it gives added value.

6 Assessment provided by Cambridge International

6.1 Progression tests

As part of Cambridge Primary, end of stage tests (progression tests) are provided for Stages 3 to 6. These are available from the Cambridge Primary support site.

Why use Cambridge Primary Progression Tests?

These tests are for use within the classroom to measure the progress of learners and identify strengths and weaknesses. The tests are designed to be flexible and can be used to:

Assess the performance of learners against the learning objectives in the curriculum framework. The progression tests are produced to precise specifications to ensure a representative coverage of skills and knowledge. The progression tests assess learning objectives from the entire stage and so should be used when they have all been covered. However, it is preferable that they are used when there is still time left in the term to provide learners with feedback and help them reflect on their achievements and consolidate the year's work.

Diagnose strengths and weaknesses. The results of the progression tests should be fed back to your learners. It is important that they know their strengths as well as being aware of the areas that require improvement. Feedback should always be constructive and should include practical advice on how to improve.

Analyse progress from one year to the next. The progression tests can help you see whether your learners are progressing at a steady rate or faster, or slower, than expected. The comparison against an external standard means that learners can show progress which may have been overlooked if these learners were always compared with their peers. Similarly, lower than expected performance can be identified and investigated.

Inform planning. You can use the results of the progression tests to reflect on your teaching over the year and prompt changes for subsequent years. If there are areas where the entire class appears to be strong or weak, you should consider the strategies used for those areas and adapt them as necessary. The data from the progression tests will also be of value to the following year's teachers to provide them with information about prior knowledge of the learners entering their classes. Alternatively, it is possible to give the test for the previous stage at the beginning of the next stage to determine the 'starting point' of learners and identify any areas of weakness that need to be addressed.

Aid reporting to parents. The results of the progression tests can be combined with your own observations to produce informative reports to parents. Parents want to know how their child is doing and the results of the progression tests provide quantitative evidence of this. Reports should include areas of strength as well as areas where improvement is needed.

Results analysis

You can analyse your learners' test results using the reporting tool available on the Cambridge Primary support site **http://primary.cambridgeinternational.org**. The site allows you to:

- access the progression tests and store learners' marks
- organise your learners into groups, making it easier to administer the tests and run reports for each group
- use the reports to track learners' progress by comparing individual results against the rest of the class, the school or other schools around the world
- compare results on a year-by-year basis
- analyse the reports to reflect on your teaching and then focus your efforts where they are needed most
- download, print or email your reports to share with other staff and parents.

Using the reports to inform future lessons

The progression test reports are useful analyses to gain an overview of the strengths and weaknesses in the whole group. They enable you to consider factors that might affect this. It is always a good idea to begin by reviewing the planning for the objectives where the weakness was shown, for example:

- Was a reasonable amount of time allowed for the objectives?
- Was a balance achieved between whole class and differentiated tasks?
- Were there any activities that could be described as favouring either boys or girls (gender bias)?
- Have you made any notes on your lesson plan about how the lesson was?

The planning check alone may not directly reveal the possible reasons for any weaknesses shown in the reports. If this is the case, consider the response of the learners and their performance in class. This could still lead back to planning.

It is possible that the content of a lesson was too difficult for some learners. If so, you may need to adjust the original plans. Doing this does increase pressure on 'finishing' the set of lessons for the objectives in question. However, time spent revising materials can save time when new objectives are introduced because they will be delivered on a firmer base of understanding.

It is also important to check the areas that were strengths because you could gain some 'extra' time by reducing the input for these areas. This has to be carefully judged as you do not want to reduce the standard in those areas.

Review the teaching activities for objectives that were areas of weakness to find out whether the chosen activities were as stimulating as others. If they were not, this will affect learners' responses quite significantly.

This analysis will provide information that can help you improve your planning and teaching for the following year. Although groups of learners will vary from year to year, the review process needs to be ongoing, not just a procedure that simply follows the tests.

Lessons following the test period will need careful planning and incorporate differentiation so that learners can target the particular areas of improvement identified in the reports. The reports may show similar problems for groups of learners which will help with organisation – groupings created for this may change from lesson to lesson. For learners who require more challenge, you could prepare a set of lessons that extend their skills and understanding while ensuring that any areas of weakness are addressed.

Learners can have their own set of targets. These should be set up as part of regular practice in class. Setting up success criteria will support this as well as other self-assessment tools so that learners are involved at all times.

6.2 Cambridge Primary Checkpoint

Cambridge Primary Checkpoint are additional (end of Primary) tests available to Cambridge Primary schools. These are intended for learners at the end of their final year of primary education, when they are around 11 years old. They provide an assessment for learning objectives from Stages 3–6 of the curriculum framework.

Schools make entries for their learners using **CIE Direct**. Cambridge International will then send the examination papers to the school. After learners have taken the Checkpoint tests, the tests are returned to Cambridge International for marking.

Following the Checkpoint, Cambridge International provides detailed feedback including:

- centre report
- report on teaching group
- individual reports to learners.

Learners also receive an individual statement of achievement.

Details about Cambridge Primary Checkpoint (including past papers) are available from **http://primary.cambridgeinternational.org**

7 Support and resources

7.1 Resources available from Cambridge International

Cambridge Primary centres receive access to a range of resources when they register. The Cambridge Primary support site **http://primary.cambridgeinternational.org** is a password-protected website that is the source of the majority of Cambridge-produced resources for the programme.

Included on this website are:

- Curriculum Framework
- progression tests and analysis tools
- past papers and information on Cambridge Primary Checkpoint
- schemes of work – these give a suggested course outline where learning objectives are organised into a teaching order. A brief outline of activities to achieve these objectives is provided together with suggested resources.

7.2 Training

Face-to-face training opportunities

Face-to-face training is available in the form of workshops on planning and teaching strategies. To see what training courses are currently available in your region go to our Events and Training Calendar on the Cambridge International website.

Online training

An online, self-study introductory course is available free to Cambridge Primary centres. It provides an introduction to Cambridge Primary, its educational philosophy and the services and resources available to Cambridge Primary centres.

Additional online tutor-led courses are also available. To see what training courses are currently available go to our Events and Training Calendar on the Cambridge International website.

8 Glossary of key terms

This glossary is provided to assist teachers in understanding the content of this Teacher Guide. The definitions are intended to be sufficient to guide an informed reader.

For more information on important ideas and themes in education, and how to use them in your classroom, please see the *Getting started with …* interactive resources provided at **http://www.cambridgeinternational.org/support-and-training-for-schools/teaching-cambridge-at-your-school/getting-started-with/**

Education terms

Active learning – a classroom approach in which learners are encouraged to 'think hard', rather than passively receive information from their teacher.

Lesson plan – the short-term plan.

Long-term plan – an overview of the whole stage indicating the teaching time available, its division into terms (or semesters) and the knowledge, understanding and skills covered in each term.

Medium-term plan – a plan providing a logical, progressive teaching order of learning objectives, grouped into themes or topics, and an outline of a sequence of teaching activities to deliver the learning objectives.

Metacognition – the process of getting learners to plan, monitor, evaluate and make changes to their own learning behaviour.

Monitor – when a teacher observes learners' performance and progress through a task without getting actively involved.

Scheme of work – the medium-term plan.

Short-term plan – the lesson plan or teaching and learning plan for a lesson/series of lessons.

Success criteria – descriptions of how learners can achieve the learning objectives through a particular activity. This helps learners to know if they have been successful in achieving the learning objectives.

Peer-assessment – classmates assess and give feedback on each other's tasks.

Talk partners – learners discuss the answer to a question with a partner before responding.

Think aloud – a technique related to metacognition, which encourages learners to verbalise their thought processes while completing a task.

Unit of work – a group of learning objectives and activities based around a topic or theme, covering a series of lessons.

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