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**Primary Science**

Teacher's Resource 6

Fiona Baxter & Liz Dilley

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## Digital resources



The following items are available on Cambridge GO. For more information on how to access and use your digital resource, please see inside front cover.

Active learning

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Developing learner language skills

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Improving learning through questioning

Language awareness

Metacognition

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Letter for parents – Introducing the Cambridge Primary resources

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Curriculum framework correlation

Scheme of work

Diagnostic check and answers

Mid-year test and answers

End-of-year test and answers

Answers to Learner's Book questions

Answers to Workbook questions

Glossary

You can download the following resources for each unit:

Differentiated worksheets and answers

Language worksheets and answers

Resource sheets

End-of-unit tests and answers

# > Acknowledgements

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# > Introduction

## **Welcome to the new edition of our Cambridge Primary Science series.**

Since its launch, the series has been used by teachers and learners in over 100 countries for teaching the Cambridge Primary Science curriculum framework.

This exciting new edition has been designed by talking to Primary Science teachers all over the world. We have worked hard to understand your needs and challenges, and then carefully designed and tested the best ways of meeting them.

As a result of this research, we've made some important changes to the series. This Teacher's Resource has been carefully redesigned to make it easier for you to plan and teach the course.

The series still has extensive digital and online support, including Digital Classroom, which lets you share books with your class and play videos and audio. This Teacher's Resource also offers extra teaching guidance and downloadable resources.

The series uses the most successful teaching pedagogies like active learning and metacognition, and this Teacher's Resource gives you full guidance on how to integrate them into your classroom.

Formative assessment opportunities help you to get to know your learners better, with clear learning objectives and success criteria as well as an array of assessment techniques, including advice on self and peer assessment.

Clear, consistent differentiation ensures that all learners are able to progress in the course with tiered activities, differentiated worksheets and advice about supporting learners' different needs.

All our resources are written for teachers and learners who use English as a second or additional language. They help learners build core English skills with vocabulary and grammar support, as well as additional language worksheets.

We hope you enjoy using this course.

**Eddie Rippeth**

*Head of Primary and Lower Secondary Publishing, Cambridge University Press*



# > About the authors

## Fiona Baxter



Fiona Baxter has been involved in Science education for over 25 years and has many years of Science teaching experience. In recent years her main focus has been on developing learning materials for both primary and secondary school curricula. One of Fiona's areas of interest in Science education is making science more accessible to both teachers and learners, particularly in developing countries, through the use of low cost, everyday materials for practical work. She also feels strongly about the inclusion of girls in Science activities in the classroom and the workplace.

Fiona believes that using the Cambridge Primary Science series will help learners to build a strong conceptual foundation for further studies in Science, while at the same time making the learning experience engaging and fun.

## Liz Dilley



Liz was born and educated in London and did a BSc and post graduate diploma in Education at the University of Bristol.

Shortly after university she moved to South Africa, where she taught for several years before training as a second-language English writer. This led to a variety of experiences in teacher training, adult education and writing for school-aged learners.

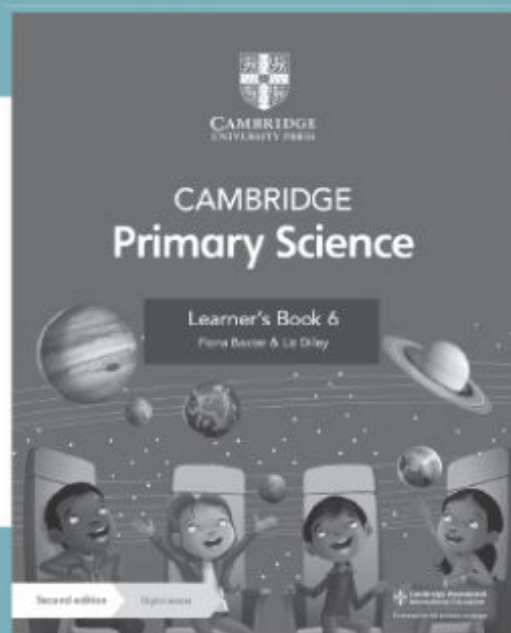
From the mid-1990s Liz began to focus more on writing textbooks for Life Sciences, Physical Science and Social Sciences. She wrote textbooks for the new Namibian curriculum and later the new South African curriculum – about 200 titles in total.

In 2012–2016 she co-authored the Cambridge Primary Science Series and is now a co-author of the new series.

Liz lives in Cape Town, South Africa, with her husband and family. She enjoys hiking, boating and travelling to interesting places.

# > How to use this series

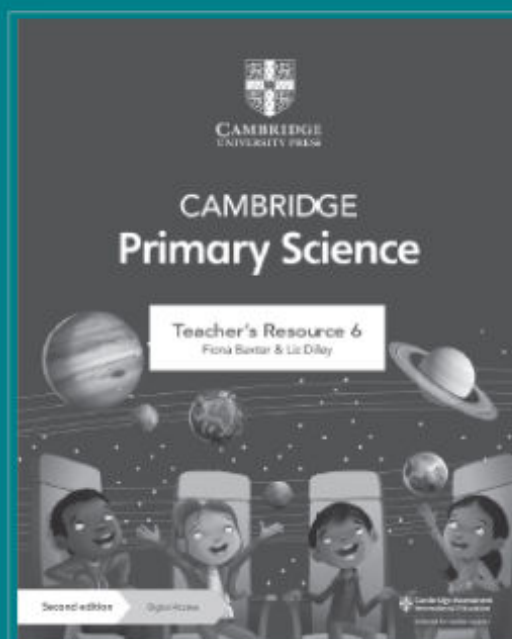
All of the components in the series are designed to work together.

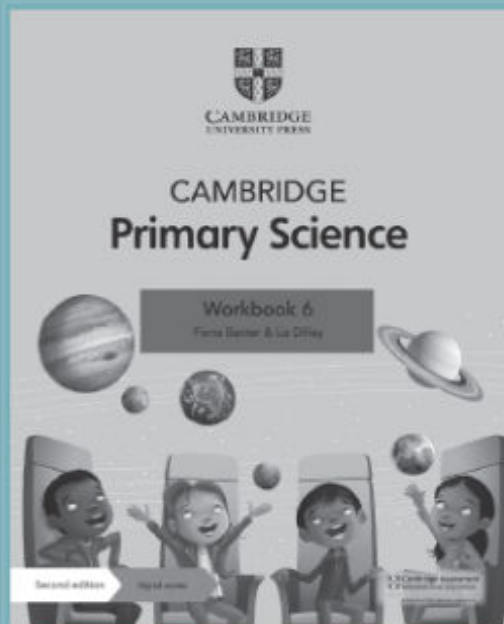


The Learner's Book is designed for learners to use in class with guidance from the teacher. It offers complete coverage of the curriculum framework. A variety of investigations, activities, questions and images motivate students and help them to develop the necessary scientific skills. Each unit contains opportunities for formative assessment, differentiation and reflection so you can support your learners' needs and help them progress.

The Teacher's Resource is the foundation of this series and you'll find everything you need to deliver the course in here, including suggestions for differentiation, formative assessment and language support, teaching ideas, answers, tests and extra worksheets. Each Teacher's Resource includes:

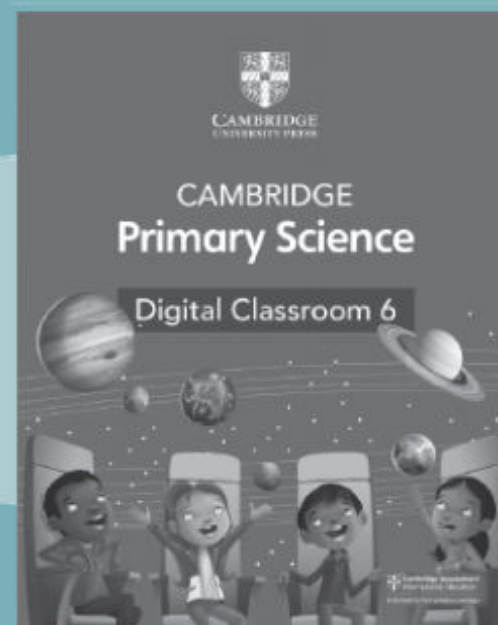
- A print book with detailed teaching notes for each topic
- Digital Access with all the material from the book in digital form plus editable planning documents, extra guidance, worksheets and more.





The skills-focused write-in Workbook provides further practice of all the topics in the Learner's Book and is ideal for use in class or as homework. A three-tier, scaffolded approach to skills development promotes visible progress and enables independent learning, ensuring that every learner is supported. Teachers can assign learners questions from one or more tiers for each exercise, or learners can progress through each of the tiers in the exercise.

Digital Classroom includes digital versions of the Learner's Book and Workbook, complete with pop-up answers, designed for teachers to use at the front of class. Easily share the books with the whole class on your whiteboard, zoom in, highlight and annotate text, and get your learners talking with videos, images and interactive activities.



↓ A letter to parents, explaining the course, is available to download from Cambridge GO (as part of this Teacher's Resource).




# > How to use this Teacher's Resource

This Teacher's Resource contains both general guidance and teaching notes that help you to deliver the content in our Cambridge Primary Science resources. Some of the material is provided as downloadable files, available on **Cambridge GO**. (For more information about how to access and use your digital resource, please see inside front cover.) See the Contents page for details of all the material available to you, both in this book and through Cambridge GO.

## Teaching notes

This book provides **teaching notes** for each unit of the Learner's Book and Workbook. Each set of teaching notes contains the following features to help you deliver the unit.

The **Unit plan** summarises the topics covered in the unit, including the number of learning hours recommended for the topic, an outline of the learning content and the Cambridge resources that can be used to deliver the topic.

Topic	Approx. number of learning hours	Outline of learning content	Resources
1.4 Diseases	3-4	Organisms that cause diseases; body defences against disease; ways to control the spread of diseases	<b>Learner's Book:</b> Activity 1: Find information about diseases Activity 2: Group methods to prevent diseases Think like a scientist 1: Analyse hygiene methods that people use <b>Workbook:</b> Topic 1.4  Worksheets 1.4 <b>Digital Classroom:</b> Video – Living things that cause disease

The **Background knowledge** feature explains prior knowledge required to access the unit and gives suggestions for addressing any gaps in your learners' prior knowledge.

Learners' prior knowledge can be informally assessed through the **Getting started** feature in the Learner's Book.

### BACKGROUND KNOWLEDGE

The human body consists of a number of different systems that work together so that we can survive. At all times different body systems work together on specific jobs. These different body systems depend on one another.

The **Teaching skills focus** feature covers a teaching skill and suggests how to implement it in the unit.

### TEACHING SKILLS FOCUS

#### Graphic organisers

Many learners find that using visual material, such as charts and diagrams, helps them to learn more effectively. Graphic organisers are visual illustrations of concepts and information.

Reflecting the Learner's Book, each unit consists of multiple sections. A section covers a learning topic.

At the start of each section, the **Learning plan** table includes the learning objectives, learning intentions and success criteria that are covered in the section.

It can be helpful to share learning intentions and success criteria with your learners at the start of a lesson so that they can begin to take responsibility for their own learning



LEARNING PLAN		
Learning objectives	Learning intentions	Success criteria
<b>6Bs.01</b> Describe the human circulatory system in terms of the heart pumping blood through arteries, capillaries and veins, describe its function (limited to transporting oxygen, nutrients and waste) and know that many vertebrates have a similar circulatory system.	<ul style="list-style-type: none"> <li>Describe the parts of the circulatory system and their functions.</li> </ul>	<ul style="list-style-type: none"> <li>Learners can describe the parts of the circulatory system and their functions.</li> </ul>

There are often **common misconceptions** associated with particular learning topics. These are listed, along with suggestions for identifying evidence of the misconceptions in your class and suggestions for how to overcome them.

Misconception	How to identify	How to overcome
Blood in the veins is blue, due to diagrams of the circulatory system showing the veins in blue.	Ask learners how the blood in the arteries and veins is different and why they think so.	Explain that the blood in both the arteries and veins is red but the blood in the veins is darker red as it carries very little oxygen. (The exception is the pulmonary veins from the lungs.)

For each topic, there is a selection of **starter ideas**, **main teaching ideas** and **plenary ideas**. You can pick out individual ideas and mix and match them depending on the needs of your class. The activities include suggestions for how they can be differentiated or used for assessment. **Homework ideas** are also provided.

## Starter idea

### 1 Getting started (15–20 minutes)

**Resources:** Learner's Book. Each learner will need paper and coloured pencils

**Description:** The activity will help identify the misconception that the lungs are hollow and inflate and deflate like a balloon when we inhale and exhale.

## Main teaching ideas

### 2 How much air do we breathe in and out? (30–40 minutes)

**Learning intention:** To find out how much air our lungs can hold.

**Resources:** One balloon per learner

**Per group:** a tape measure or length of string, a marking pen and a ruler

**Description:** Learners will exhale into a balloon and measure the size of the blown-up balloon. This will give them an idea of how much air their lungs can hold.

The **Language support** feature contains suggestions for how to support learners with English as an additional language. The vocabulary terms and definitions from the Learner's Book are also collected here.

## LANGUAGE SUPPORT

Write the new words for the topic on the board. Say the words out aloud so learners know how the words sound.

**Learners will use the following words:**

**breathing:** the way we take air into our lungs and let it out again

The **Cross-curricular links** feature provides suggestions for linking to other subject areas.

## CROSS-CURRICULAR LINKS


You can link making a model to explain breathing in Main teaching idea 2 with Arts and crafts and Design.

Recording data in tables and drawing graphs in Main teaching ideas 3 links with data handling and graphing in Maths.



› **Digital Classroom:** If you have access to Digital Classroom, these links will suggest when to use the various multimedia enhancements and interactive activities.

## Digital resources to download

This Teacher's Resource includes a range of digital materials that you can download from Cambridge GO. (For more information about how to access and use your digital resource, please see inside front cover.) This icon  indicates material that is available from Cambridge GO.

Helpful documents for planning include:

- **Letter for parents – Introducing the Cambridge Primary resources:** a template letter for parents, introducing the Cambridge Primary Science resources.
- **Lesson plan template:** a Word document that you can use for planning your lessons. Examples of completed lesson plans are also provided.
- **Curriculum framework correlation:** a table showing how the Cambridge Primary Science resources map to the Cambridge Primary Science curriculum framework.
- **Scheme of work:** a suggested scheme of work that you can use to plan teaching throughout the year.

Each unit includes:

- **Differentiated worksheets:** these worksheets are provided in variations that cater for different abilities. Worksheets labelled 'A' are intended to support less confident learners, worksheets labelled 'B' should cater for the majority of learners, while worksheets labelled 'C' are designed to challenge more confident learners. For some worksheets, 'Help' and 'Stretch' sheets are provided in addition to the worksheet activity, which can be given to less confident or more confident learners as appropriate. Answer sheets are provided.
- **Language worksheets:** these worksheets provide language support and can be particularly helpful for learners with English as an additional language. Answers sheets are provided.
- **Resource sheets:** these include templates and any other materials that support activities described in the teaching notes.
- **End-of-unit tests:** these provide quick checks of the learner's understanding of the concepts covered in the unit. Answers are provided. Advice on using these tests formatively is given in the Assessment for Learning section of this Teacher's Resource.

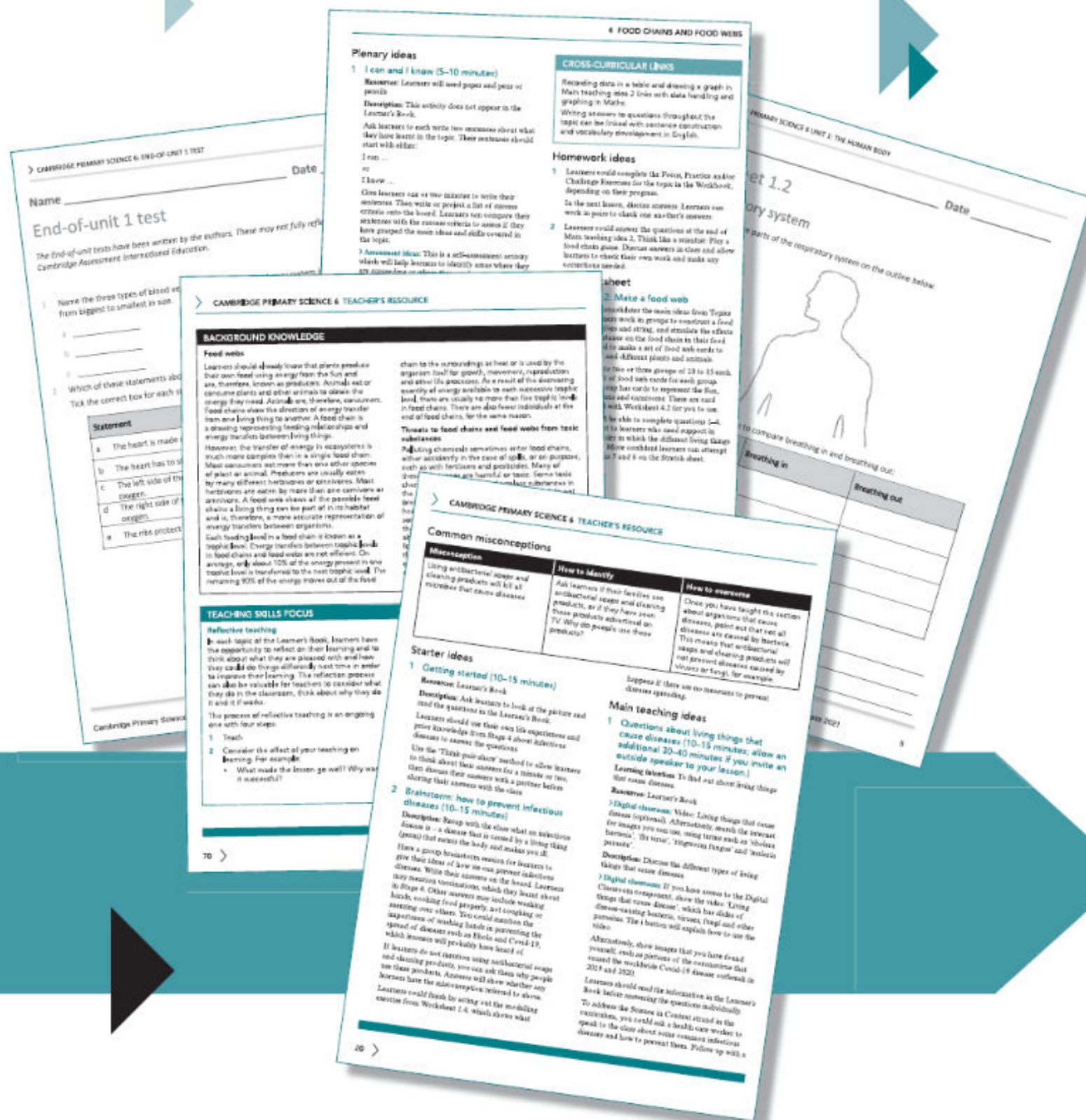
Additionally, the Teacher's Resource includes:

- **Diagnostic check and answers:** a test to use at the beginning of the year to discover the level that learners are working at. The results of this test can inform your planning.
- **Mid-year test and answers:** a test to use after learners have studied half the units in the Learner's Book. You can use this test to check whether there are areas that you need to go over again.
- **End-of-year test and answers:** a test to use after learners have studied all units in the Learner's Book. You can use this test to check whether there are areas that you need to go over again, and to help inform your planning for the next year.
- **Answers to Learner's Book questions**
- **Answers to Workbook questions**
- **Glossary**



In addition, you can find more detailed information about teaching approaches.

**Video** is available through the Digital Classroom.





# > About the curriculum framework

*The information in this section is based on the Cambridge Primary Science curriculum framework (0097) from 2020. You should always refer to the appropriate curriculum framework document for the year of your learners' assessment to confirm the details and for more information.*

Visit [www.cambridgeinternational.org/primary](https://www.cambridgeinternational.org/primary) to find out more.

The Cambridge Primary Science curriculum framework has been updated for teaching from September 2021. The Cambridge Primary Science curriculum framework has been developed to support learners in building their understanding about the natural world, particularly how to explain and investigate phenomena.

The curriculum framework incorporates three components:

- four content strands (Biology, Chemistry, Physics, and Earth and Space)
- a skills strand called Thinking and Working Scientifically
- a context strand called Science in Context

Biology, Chemistry, Physics and Earth and Space provide the scientific knowledge content, which gradually develops from Stage 1 to Stage 6 and provides a smooth progression towards Cambridge Lower Secondary study.

The Thinking and Working Scientifically learning objectives focus on the key scientific skills that are developed throughout the course. This strand is split into five types of scientific enquiry:

- observing over time
- identifying and classifying
- pattern seeking
- fair testing, and
- research

Science in Context allows for personal, local and global contexts to be incorporated into scientific study, making science relevant to the contexts that learners are familiar with. This element of the curriculum framework offers great flexibility to teachers and learners around the world.

The Cambridge Primary Science curriculum framework promotes a learner-led, enquiry-based approach. Practical work is a valuable part of science learning and develops learners' investigation skills, such as observation, measurement and equipment handling.

# > About the assessment

Information about the assessment of the Cambridge Primary Science curriculum framework is available on the Cambridge Assessment International Education website.

[www.cambridgeinternational.org/primary](http://www.cambridgeinternational.org/primary)



# > Approaches to learning and teaching

The following are the key pedagogies underpinning our course content and how we understand and define them.

## Active learning

Active learning is a pedagogical practice that places student learning at its centre. It focuses on how students learn, not just on what they learn. We, as teachers, need to encourage learners to 'think hard', rather than passively receive information. Active learning encourages learners to take responsibility for their learning and supports them in becoming independent and confident learners in school and beyond.

## Assessment for Learning

Assessment for Learning (AfL) is a teaching approach that generates feedback which can be used to improve learners' performance. Learners become more involved in the learning process and, from this, gain confidence in what they are expected to learn and to what standard. We, as teachers, gain insights into a learner's level of understanding of a particular concept or topic, which helps to inform how we support their progression.

## Differentiation

Differentiation is usually presented as a teaching practice where teachers think of learners as individuals and learning as a personalised process. Whilst precise definitions can vary, typically the core aim of differentiation is viewed as ensuring that all learners, no matter their ability, interest or context, make progress towards their learning outcomes.

It is about using different approaches and appreciating the differences in learners to help them make progress. Teachers, therefore, need to be responsive, and willing and able to adapt their teaching to meet the needs of their learners.

## Language awareness

For many learners, English is an additional language. It might be their second or perhaps their third language. Depending on the school context, students might be learning all or just some of their subjects through English. For all learners, regardless of whether they are learning through their first language or an additional language, language is a vehicle for learning. It is through language that students access the learning intentions of the lesson and communicate their ideas. It is our responsibility, as teachers, to ensure that language doesn't present a barrier to learning.

## Metacognition

Metacognition describes the processes involved when learners plan, monitor, evaluate and make changes to their own learning behaviours. These processes help learners to think about their own learning more explicitly and ensure that they are able to meet a learning goal that they have identified themselves or that we, as teachers, have set.

## Skills for Life

How do we prepare learners to succeed in a fast-changing world? To collaborate with people from around the globe? To create innovation as technology increasingly takes over routine work? To use advanced thinking skills in the face of more complex challenges? To show resilience in the face of constant change? At Cambridge, we are responding to educators who have asked for a way to understand how all these different approaches to life skills and competencies relate to their teaching. We have grouped these skills into six main Areas of Competency that can be incorporated into teaching, and have examined the different stages of the learning journey and how these competencies vary across each stage.

These six key areas are:

- Creativity – finding new ways of doing things, and solutions to problems
- Collaboration – the ability to work well with others
- Communication – speaking and presenting confidently and participating effectively in meetings
- Critical thinking – evaluating what is heard or read, and linking ideas constructively
- Learning to learn – developing the skills to learn more effectively
- Social responsibilities – contributing to social groups, and being able to talk to and work with people from other cultures.