



International educational resources at every stage with Pearson

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Your presenters



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Pearson and iProgress

Why choose Pearson Edexcel?

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Partner schools,
universities and
employers

110+



Countries take
Pearson Edexcel
qualifications

3.5M



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Pearson exams
annually

10M



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marked on behalf of
the DFE*

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International qualifications based on British best practice

Curriculum and qualifications that are international in outlook and content, yet grounded in the pedagogy, ethos and aims of the English national curriculum, the most popular curriculum in the world.



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Our complete series of academic qualifications, curricula and resources for international schools.

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What is iProgress?



**Qualifications and exam
support services**

**Curricula and published
resources (digital and print)**

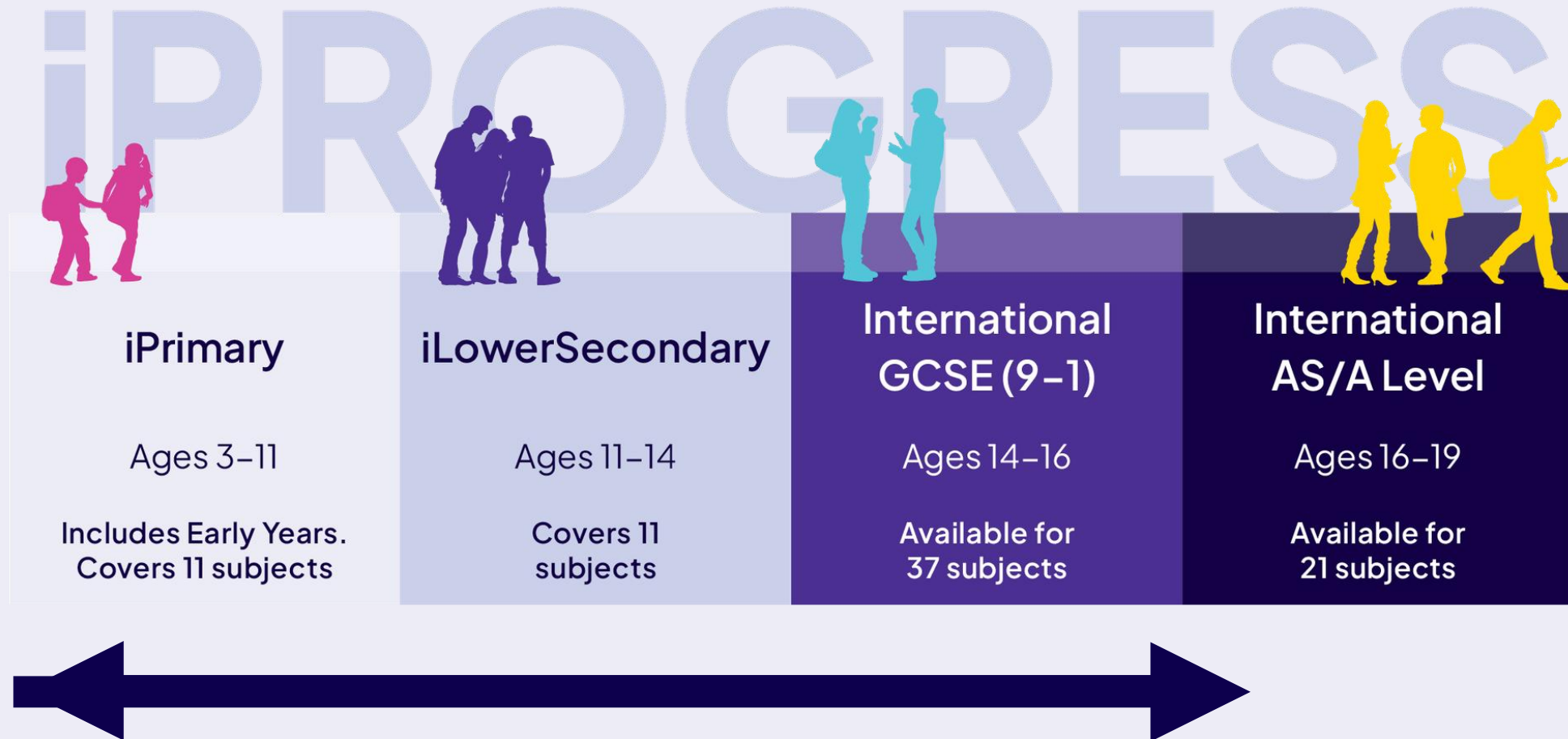
**Training and Professional
Development**

02

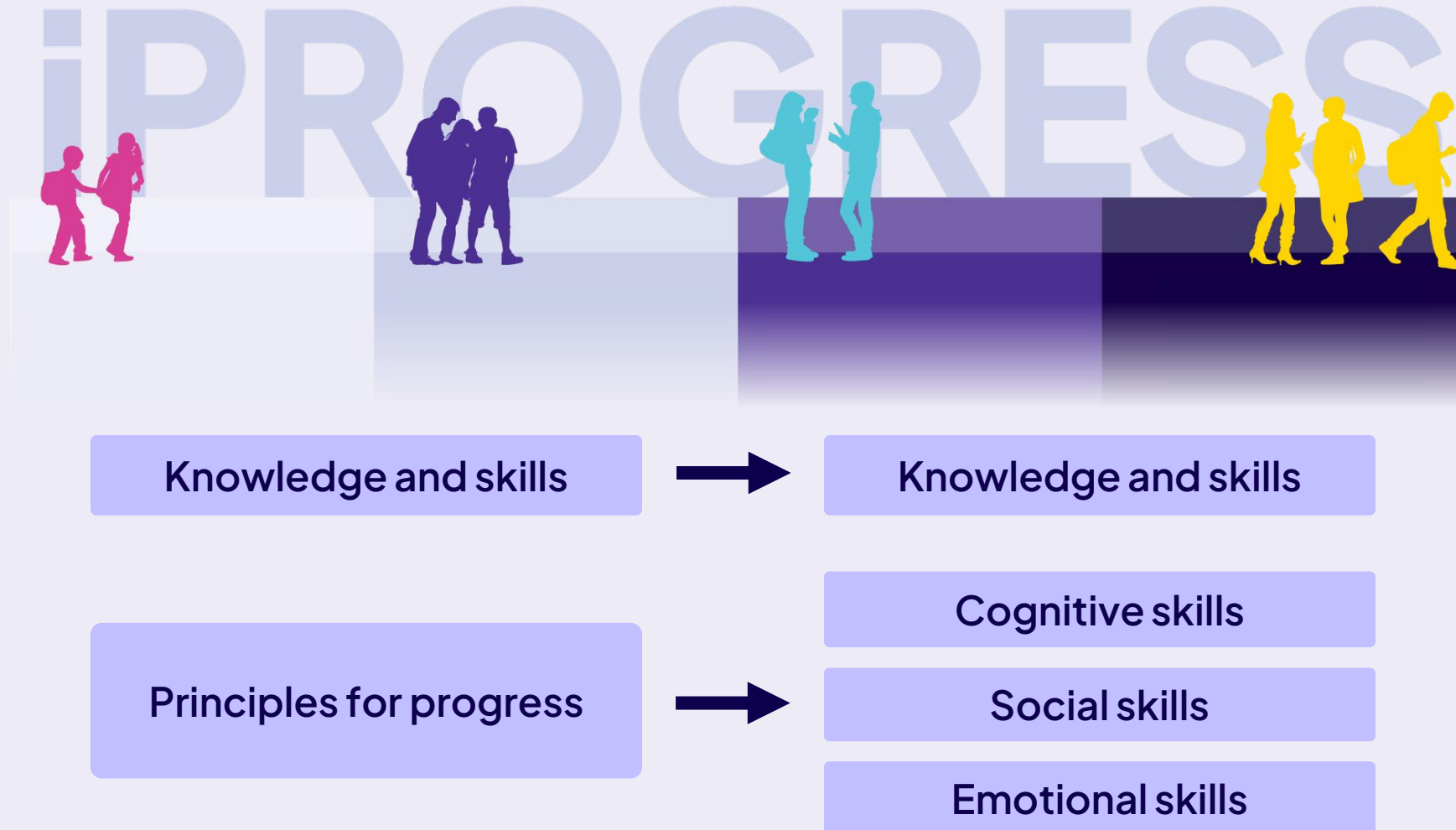
Pearson Edexcel iPrimary and iLowerSecondary

Laying the early foundations for future success

How did we create iPrimary and iLowerSecondary?



How do we prepare students for the future?



Developed using research-based principles to ensure learner progress

01

Engaging all

02

Differentiation

03

Enabling independent learning

04

Effective questioning

05

Teacher talk

06

Collaborative activities

07

Teacher demonstration

08

Developing thinking skills

09

Reflecting on learning

10

Feedback (in both directions)

Support at iPrimary and iLower Secondary

iPLS Curricula



Curriculum documents
Schemes of work
Lesson plans
Worksheets
Progress tests
Markbooks
Teacher guides
EAL support toolkit
Professional development
And lots more support...

Courseware



Qualifications



Specification
Sample assessment materials
Examiner reports
ExamWizard
ResultsPlus
Access to scripts
Mocks service

Curriculum documents

The iPrimary programme is easily accessed on the Primary Active Learn platform.

The screenshot displays the Primary Active Learn platform interface. On the left, there are four filter categories: Year, Subject, Term, and Type. The 'Year' filter is expanded, showing options from R (514) to Yr 6 (526). The 'Subject' filter is also expanded, showing options from Art (2) to The World Around Us (156). The 'Term' filter is expanded, showing 'Show Terms'. The 'Type' filter is expanded, showing options from Answers (860) to Worksheet (149). The main content area shows a list of curriculum documents, each with a checkbox, a thumbnail image, a title, a description, a type, and a link. The documents are: iPrimary Mathematics Curriculum, iPrimary Mathematics Curriculum Year 1, iPrimary Mathematics Curriculum Year 2, iPrimary Mathematics Curriculum Year 3, and iPrimary Mathematics Curriculum Year 4. A purple arrow points from the 'Year' filter to the first document, and another purple arrow points from the 'Subject' filter to the first document.

Year

- ☐ R (514)
- ☐ Yr 1 (694)
- ☐ Yr 2 (668)
- ☐ Yr 3 (690)
- ☐ Yr 4 (573)
- ☐ Yr 5 (536)
- ☐ Yr 6 (526)

Subject

- ☐ Art (2)
- ☐ Computing (599)
- ☐ Design (3)
- ☐ English (1141)
- ☐ Geography (3)
- ☐ Global Citizenship (413)
- ☐ History (3)
- ☐ Maths (774)
- ☐ Music (3)
- ☐ Physical Education (3)
- ☐ Science (786)
- ☐ The World Around Us (156)

Term

[Show Terms](#)

Type

- ☐ Answers (860)
- ☐ Assessment (8)
- ☐ Book (18)
- ☐ Curriculum document (44)
- ☐ Lesson plan (607)
- ☐ Photocopiable (947)
- ☐ Question sheet (1096)
- ☐ Scheme of work (106)
- ☐ Teacher Guide (5)
- ☐ Teacher Handbook (1)
- ☐ Teaching guidance (50)
- ☐ Worksheet (149)

iPrimary Mathematics Curriculum

This document contains the full curriculum for iPrimary Mathematics.

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830178>

iPrimary Mathematics Curriculum Year 1

This document contains the curriculum for Year 1 of iPrimary Mathematics.

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830179>

iPrimary Mathematics Curriculum Year 2

This document contains the curriculum for Year 2 of iPrimary Mathematics.

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830180>

iPrimary Mathematics Curriculum Year 3

This document contains the curriculum for Year 3 of iPrimary Mathematics.

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830181>

iPrimary Mathematics Curriculum Year 4

This document contains the curriculum for Year 4 of iPrimary Mathematics.

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830182>

Filter by year,
subject, term, and
document type

Top tips for using
the platform

The screenshot shows the Primary Active Learn platform home page. The top navigation bar includes 'Active Learn', 'Home', 'Resources', 'Assessment', and 'Planning'. There is a search bar with 'Resource search' and a magnifying glass icon. On the right, there are links for 'Help', 'Admin', and 'My Account'. The main content area features a 'Back' button, a 'Primary' logo, and three large icons: 'Resources', 'Current Allocations', and 'Search'. Below these icons is a cartoon illustration of four children (two girls and two boys) standing together. On the right side, there is a 'Top Tips' section with two paragraphs of text. The footer includes copyright information for Pearson Education and links for 'Terms of use', 'Terms and conditions', 'Privacy notice', 'Cookie policy', 'Cookie settings', 'Contact us', and 'Pearson UK'.

Active Learn Home Resources Assessment Planning

Resource search

[Back](#)

Primary

Resources Current Allocations Search

Top Tips

If you need to reset a student password, you can do this from the Admin area. Only teachers can reset student passwords.

We advise making sure that your students have email addresses listed on their accounts, as this provides them with more options for logging in and resetting their passwords.

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Curriculum documents

Objectives are clear with an explicit outcome

Clearly labelled topic areas for learning, referenced against the syllabus

iLOWERSECONDARY COMPUTING YEAR 9		
YEAR 9		
PROBLEM SOLVING: ALGORITHMS, DECOMPOSITION AND ABSTRACTION		
ALGORITHMS		
Reference	Objective	Notes and guidance
PS9.1A	Be able to code an algorithm in both a visual and textual language.	This is an overarching statement that runs through many of the other objectives.
PS9.1B	Understand how bubble sort and linear search algorithms work.	Pupils could be shown these algorithms using practical activities, video animations, pseudocode and/or flowcharts. For both, the concept of comparisons is important and pupils may be introduced to the concept of efficiency in terms of how many comparisons are required. It may, therefore, be useful for pupils to compare the utility of these algorithms with small and large data sets. For bubble sort, the concept of passes is important (as is how the algorithm knows to end – by keeping track of whether any comparisons have been made in a pass).
PS9.1C	Understand how abstraction can be used effectively to model aspects of the real world.	London Underground / Rome Metro / Karachi Metrobus / any other transport map. Classification of plants, animals, and animal/plant characteristics. Cooking (ingredients, quantities, methods, time).
ABSTRACTION		
Reference	Objective	Notes and guidance
PS9.2A	Be able to design computational abstractions that model the state and behaviour of real-world problems and physical systems.	Pupils should be shown how the abstraction works and why it is an abstraction of a real-world problem. Pupils could use a device, for example a Raspberry Pi or Microbit, to create a motion sensor/alarm link.
PS9.2B	Be able to program abstractions of real-world examples.	Pupils can practically create their designed abstraction, as PS9.2A
PS9.2C	Be able to describe/demonstrate a search algorithm and program it.	Linear search. Do a web search for 'linear search flamenco dance' to see an example of a demonstration.
PS9.2D	Be able to describe/demonstrate a sort algorithm and program it.	Bubble sort. Do a web search for 'bubble sort Hungarian dance' to see an example of a demonstration.
PS9.2E	Be able to evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems.	

iPRIMARY ENGLISH YEAR 1		
YEAR 1		
SPOKEN LANGUAGE		
RECEPTIVE LANGUAGE		
Reference	Objective	Guidance
SL1.1A	Follow short, basic classroom instructions supported by pictures or gestures.	The student is able to follow an instruction such as 'Stand up', as the teacher demonstrates it.
SL1.1B	Recognise familiar key words and phrases in short basic descriptions, if spoken slowly and clearly.	The student is able to recognise everyday nouns and verbs, such as 'mum', 'dad', 'brother', 'sister', 'boy', 'girl', 'sit', 'walk', 'come here' and 'write down'.
EXPRESSIVE LANGUAGE		
Reference	Objective	Guidance
SL1.2A	Give and request simple personal information using a basic phrase.	The student is able to state audibly, for example, 'My name is Xiao.'
SL1.2B	Use simple everyday words from taught vocabulary sets.	The student is able to recognise and audibly name, for example, a fish.
SL1.2C	Answer short, simple questions using a word or basic phrase.	The student is able to answer a question such as 'What will you do after school?' with an audible phrase such as 'Eat dinner.'
SL1.2D	Recite simple sentences by heart, including rhymes and poems.	The student is able to understand, memorise and repeat up to six sentences introduced by the teacher, and join in with predictable phrases.
READING		
READING: WORD READING and PHONICS		
Reference	Objective	Guidance
R1.1A	Say the letter names and sounds associated with all 26 lower-case letters of the English alphabet.	When shown any letter of the alphabet, the student is able to respond with the name and the sound of the letter.
R1.1B	Blend to read words in which letters of the alphabet are associated with known sounds.	The student is able to read an unfamiliar word by saying and blending the sounds to make the word (for example, /t/ - /e/ - /n/ - /t/: tent).

Each curriculum objective has a unique reference

Provides examples or clarifications of what an objective looks like in practice

Schemes of Work

MATHEMATICS

iPrimary  Pearson

iPrimary Mathematics Scheme of Work

Year 1

Teaching week	iPrimary objectives	Activities
Year 1 Term 1 Week 1	N1.1A Count forwards and backwards to and from 100, starting at any given number. N1.1B Read, write and say aloud numbers written in figures from 1–100. N1.1C Match counting numbers (and also 0) to objects, images or actions. N1.1G Compare and order numbers to 100. N1.2A Say aloud the number that is 1 more than any number from 0–99 and 1 less than any number from 1–100.	Count up to 20 objects (match number to object); Estimate and count up to 30 objects; Count on and back and order numbers to 10; Recognise domino/dice arrays without counting; Identify a number 1 more (next number in count).
Year 1 Term 1 Week 2	N1.1F Identify missing numbers up to and including 100. N1.2B Partition a collection of up to 10 objects, and then up to and including 20 objects, in two. N1.2C Solve addition problems involving number bonds up to and including 20. N1.2G Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) for number bonds up to and including 20. N1.2H Solve missing number problems for addition and subtraction problems up to and including 20.	Find pairs that make 5; Subitise to 5; Find pairs that make 6; Subitise to 6; Find pairs that make 10; Subitise fingers to 10; Match pairs to 5, 6 and 10 to number sentences; Find missing numbers in number sentences.
Year 1 Term 1 Week 3	N1.2A Say aloud the number that is 1 more than any number from 0–99 and 1 less than any number from 1–100.	Double numbers 1–5; Find 1 and 2 more; Count back 1 and begin to find 1 less.
Year 1 Term 1 Week 4	N1.3A Recognise, work out and name a half as one of two equal parts of an object or shape and recognise that two-halves make one-whole.	Recognise, name and describe squares, rectangles, circles and triangles; Recognise basic line symmetry; Sort 2D

Objectives with clear reference to curriculum

Term and unit being covered

Curriculum codes make it easy to cross reference

ENGLISH

iLowerSecondary  Pearson

Year 9

Term/ Unit	iLowerSecondary objectives	Activities
Autumn 1	R9.1C Summarise longer texts or speeches effectively, selecting appropriate and relevant information and detail. R9.1D Compare, contrast and/or combine key points of information within a text or in spoken language. R9.2A Respond to a writer's or speaker's intention and viewpoint. R9.2B Develop a critical response to a text through writing, discussion or presentation, by considering the text's features and their effects. R9.2C Select a range of relevant, focused evidence to support ideas. R9.2D Make detailed comparisons of writers' ideas and perspectives between two texts. R9.3A Respond to a writer's or speaker's key structural or organisational choices for effect and impact. W9.1A Gather and shape a range of relevant ideas before writing. W9.2A Select appropriate forms to achieve intention and purpose, selecting and using their conventions correctly. W9.2B Select and use appropriate linguistic conventions for a range of purposes and audiences, including intonation, tone, volume and expression in spoken language.	Explore how reality is presented in the media, including the genres of reality television, reportage, documentary and sports reporting – it concentrates on the creation and manipulation of audience response through language choice and the decisions of editors and writers, culminating in an exploration of bias and writing to argue; Examine a close reading and comparison task and explore argument writing, considering the impact of government policies and schemes on personal freedom and identity control.

Lesson Plans

Referenced pages
for student book and
workbook

Curriculum objectives

Key vocabulary,
objectives and
prior knowledge
needed

Differentiated
levels including
support and
extend

SCIENCE

iPrimary P Pearson

Year 1 Unit: Sorting Out and Grouping Materials Lesson 2			
Main Focus	Prior Knowledge	Key Vocabulary	Curriculum Objectives
I can describe and compare further physical properties of solids.	Describe and compare physical properties of some everyday materials	materials, properties, float, sink, transparency, light	- Understand that different materials have particular properties - Describe simple properties of materials using senses - Understand that materials can be sorted in a number of ways including colour, texture and hardness
Teaching Summary			
Remind students of their work on describing the properties of materials , and then gather them around a bowl of water. Put a block of wood in the water and ask students to describe how it behaves. Introduce the term ' float ' as necessary. Repeat the activity with a similar-sized block of glass and again ask students to describe how it behaves. Introduce or revisit the term ' sink '. Explain that whether something floats or sinks is another property of a material. Add it to the class list of properties.			
Main Activity			
Core: Give each group a bag of sample materials (see Physical Resources). Explain that they are going to test all the materials to see if they float or sink in a bowl of water, and ask students to note their predictions. Ask students to carry out their tests and record their findings. Then give out bags containing objects made from the materials tested, including some heavy objects that are made from materials that float and some light objects that are made from materials that sink (see Physical Resources). Ask: 'Which objects will float? Which will sink?' Ask students to test each object, again recording their predictions and findings. Support: Test further different objects of different weights but made from the same materials to address the misconception linking weight to floating and sinking. Extend: Give each group a piece of paper tissue and ask them to lay it in a bowl of water. Ask: '<i>What do you notice?</i>' (The paper tissue will float and then slowly sink). Read 'Investigate it!' and discuss the question. Give each group squares of the four types of paper (see 'Investigate it!' and Physical Resources). Ask students to do their own investigations in comparison.			
Plenary			
Share results as a class. Ask: 'Were your predictions correct? Were there any surprises?' (For example, some heavy objects sink/some light objects float.) Ask: 'Can you match each object to the material it is made from?' Students can test them to see if they still float or sink once more if they want to. Ask: 'What do you notice?' (Objects made out of the same materials either float or sink.) Show images of other sample objects (e.g. an eraser, cardboard box, wooden peg, polystyrene packaging, ceramic teacup, origami, metal key, plastic bath toy) and ask students to indicate with thumbs up or down if each object will float or sink.			
Additional Activity			
Explain to students that some materials allow light through while others stop it. Demonstrate this by covering the end of a torch with a piece of cellophane and then a piece of thick fleece blanket. Explain that sometimes it is difficult to judge if any light is getting through, as we can't easily measure this, and, if possible, take students into a dark room for the activity. Give each group a torch and a selection of materials to test transparency . Ask students to sort the materials into three groups: those that let a lot, a little and no of light through. Discuss results and outline any differences. Ask: 'When might it be useful to block out light?' (For example, blackout curtains for bedtime during the summer or blinds for helping us to see the whiteboard in the classroom.)			
Resources			
Physical Resources		Photocopiable Resources	
Bowls of water		N/A	

ENGLISH

iLowerSecondary P Pearson

Year 9 Unit 4: Making history		Student Book pp. 136–137 Workbook pp. 126–127	
Section 1 Comparing histories: Lesson 1		Skills focus: Writing to inform	
Main Curriculum Objectives	R9.1B Identify and retrieve a range of key and supporting information in a text or in spoken language.	R9.1D Compare, contrast and/or combine key points of information within a text or in spoken language.	R9.4B Respond to a writer's or speaker's vocabulary choices for effect and impact, including intonation, tone, volume and expression in spoken language.
Secondary Curriculum Objectives	R9.1E Make inferences from a range of evidence found in texts or instances of spoken language.	R9.2A Respond to a writer's or speaker's intention and viewpoint.	

Introduction		10 minutes	Support
- Ask students to suggest what kinds of information they expect a biographical text to include, and what kinds of questions they expect it to answer. - Ask students to note down anything they know about Christopher Columbus.			Use the question words 'who', 'what', 'when', 'where' and 'why' as prompts.
First phase		15 minutes	Support
- Read Extract A. - Take students' initial responses. Ask: Does any of this information contradict your expectations or previous knowledge of Columbus? - Ask students to complete Activity 1. - Take feedback, focusing on where students found information on each topic. - Discuss students' success in scanning for, and synthesising, a range of information.			Work on Activity 1, question 1b as a whole class or in supported groups, identifying relevant evidence and examining its implications.
Second phase		20 minutes	Support
- Introduce Activity 2. Discuss the ideas that information texts should, or should try to be, impartial – but that a purely factual text may not engage readers' interest. - Ask students to complete Activity 2. - Encourage students to note the connotations of the significant vocabulary choices they have identified.			In Activity 2, check understanding by taking feedback after each of questions 1a, 2a and 3a, before students complete questions 1b, 2b and 3b respectively.
Plenary		10 minutes	Support
- Take feedback on Activity 2, focusing on the variety of impressions created by vocabulary choices. - Ask: How impartial do you find the extract to be in its presentation of information about Christopher Columbus?			Validate all relevant responses.
			Deepen
			Challenge students to summarise their impressions of Columbus in just one or two words.

Set workbook activities	5 minutes
- Point students towards the activities on pp. 126–127 of the Workbook. - Check understanding and answer any questions. - These activities focus on key information and ideas, and exploring vocabulary choices.	

Teacher Guides

Techniques and advice on how to create an iPrimary Classroom environment

Creating an iPrimary classroom environment



Creating an iPrimary classroom environment

The iPrimary curriculum supports a classroom environment that engages all students in learning activities and in which all students can progress.

A classroom environment that is engaging for students usually contains some or all of the following characteristics.

- Learning objectives are shared with students and the teacher checks that all students understand what is being asked of them.
- Class discussions involve all students participating in some way.
- Teacher talk is important but is always accompanied by opportunities for students to consider the new content/problem/ideas being presented by the teacher.
- Students see the connections between what they are learning and their lives.
- Students will have a go even when they are not sure of the answer.
- Students enjoy lessons and take their share of responsibility in making progress.
- Classrooms have attractive resources and student work on display, which are used by both teacher and students.
- Seating arrangements will vary to suit the learning objectives, including desks arranged for small-group work.
- Students will often use resources to work on problems and carry out inquiries together where the teacher guides – rather than directs – this process.
- Noise levels can be quite high but the talk is productive and on-task.

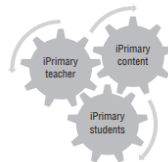
This next section will outline some of the key instructional methods you will have at your disposal in the iPrimary classroom to create an effective learning environment and explain why these are an effective way of engaging learners.

ACTIVE LEARNING

Broadly, a positive classroom environment will involve the teacher leading what can be called 'active learning strategies'. Active learning can sometimes mean that students are literally more physically active, but it *always* means that all students are required to think about what they are doing. As an iPrimary teacher you will ensure students *engage* in learning activity. You will view learning as an interactive process and help students to take some responsibility for their own learning. There are three key areas.

1. Students interact – or engage – with you, the teacher.
2. Students interact – or engage – with resources and new content.
3. Students interact – or engage – with each other.

These three axes of engagement interact and feed into each other as illustrated in the following diagram.



8

Specific formative and summative assessment strategies and support

iPrimary assessment



iPrimary assessment

Through the iPrimary curriculum, and your teaching strategies and learning activities, your students will develop the ability to do well in tests. They will be able to:

- make connections between ideas
- transfer their learning from one context to another
- use the same skill in different contexts.

The iPrimary curriculum is designed to develop learning skills and requires your students to become adaptable learners. It encourages students to acquire a 'growth mindset', which helps students to see ability as something they can develop themselves. Students are also encouraged to grow in resilience and perseverance, which helps them in test and examination conditions as they are much less likely to be daunted or to give up when a question looks difficult on first reading. They will be well prepared to break down questions into logical parts and to 'have a go' at producing an answer.

FORMATIVE ASSESSMENT

As teachers, we make assessments every day about what students know, understand and can do in every class we teach. When we use this information to identify the next steps in learning for students and to modify teaching and learning activities, this is formative assessment or 'assessment for learning'.

This involves a new kind of dialogue between teachers and students. We know from our own experience that learning is driven by what both teachers and *learners* do in the classroom.

Formative assessment (or assessment for learning) asks three key questions.

1. Where is the student going?

Formative assessment involves creating, clarifying and clearly communicating learning targets and the success criteria which indicate these targets have been achieved. Through this process, teachers and students develop a common understanding about the end goal of the learning. Using clear success criteria means that the teacher, the student and even a peer can assess student work.

2. Where is the student now?

The formative assessment process seeks evidence about what students currently know and can do in relation to the learning target. Teachers gather this evidence through a variety of strategies, including questioning, observations of class discussion and review of ongoing work. The teacher reviews how students are engaging with and participating in the lesson and can adjust their teaching to effectively develop student understanding.

3. How will the student get to where they are going?

Using the information gathered about the student's current achievements and the learning target, teachers and students can make adjustments that support student achievement. Teachers adjust their ongoing teaching and learning activities and students adjust their learning behaviours and actions. The formative assessment process closes the gap between students' current learning and desired outcomes.

The benefits of formative assessment

The benefits of implementing formative assessment approaches in the classroom include:

- clear, 'actionable' feedback that helps students to improve future work and achievement
- in 'formative assessment' classrooms, students become better all-round learners and may do better in examinations

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EAL Support Toolkit



iPrimary and iLowerSecondary: Professional Development

Implementation training

Our implementation professional development has been designed to fully equip teachers with an understanding of the components of iPrimary and iLowerSecondary, as well as key teaching and learning strategies to help them implement the curriculum effectively and confidently in their classrooms.

Our professional development programme is divided into sessions that provide three different areas of support:

- ✓ iPrimary and iLowerSecondary orientation
- ✓ Modelled lessons
- ✓ Teaching and learning strategies.

We also have more than 20 continuing professional development modules available.



iPLS internal and external assessments

Internal assessments

Progress tests provided for every single unit to check student progress and inform future teaching – updated every year.

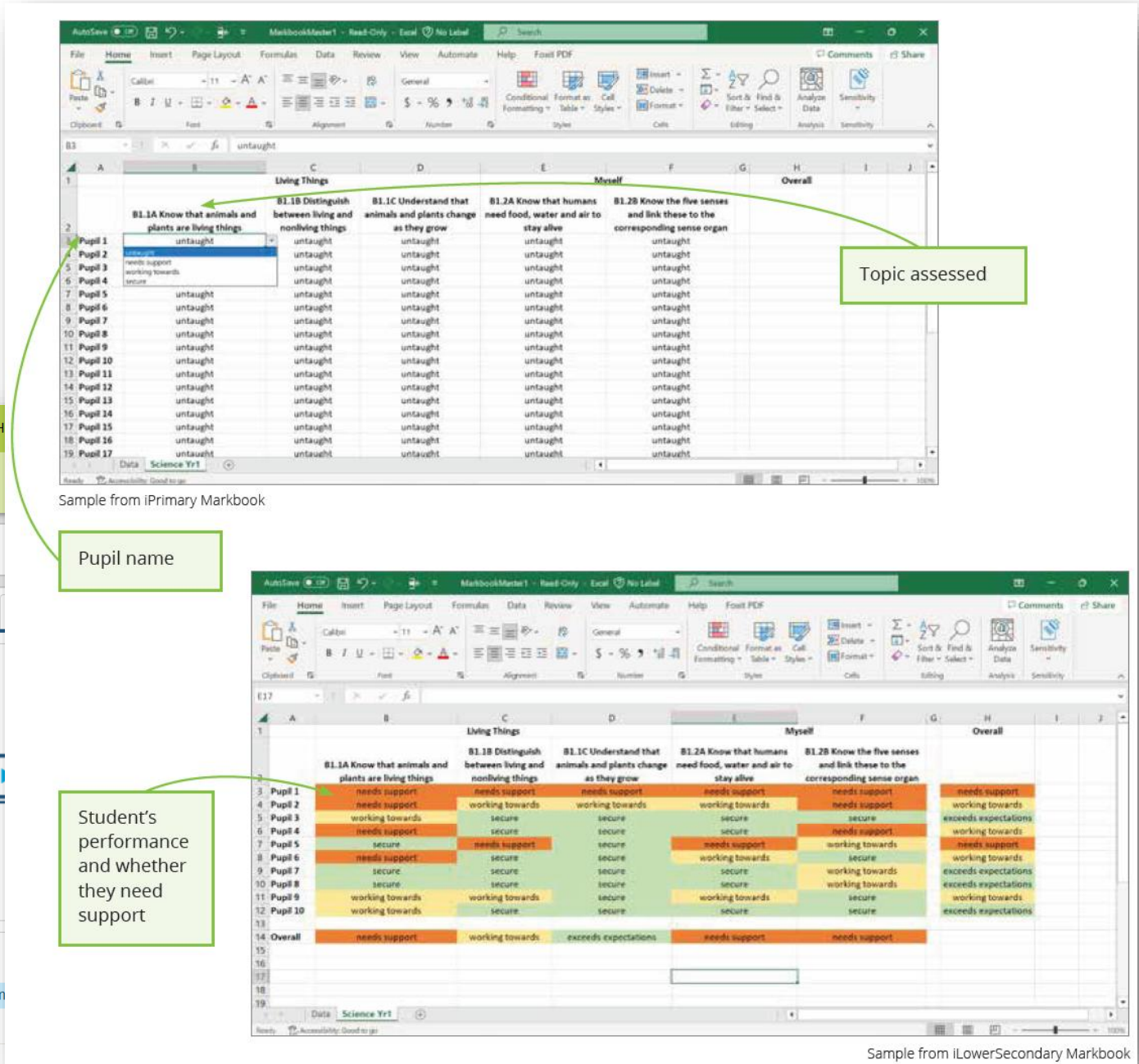
End of year progress tests – updated every year.



External assessments

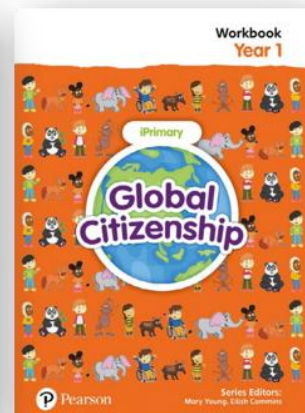
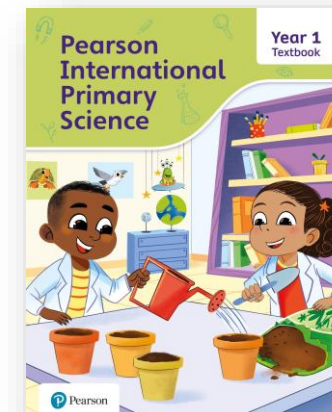
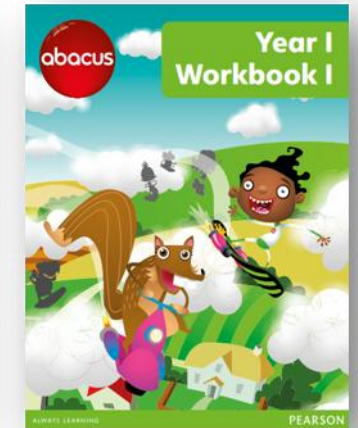
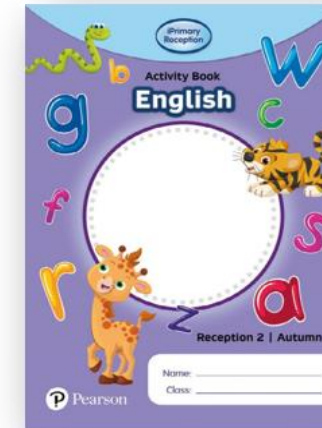
Edexcel Achievement Tests for Year 6 and Year 9 provide international benchmarking in English, Maths, Science, Computing and (from 2024) Global Citizenship.

- Comprehensive analysis freely available through ResultsPlus service.
- No minimum or maximum number of entries for external achievement tests
- Created to the same rigorous standards as for International GCSE and International A-Level
- Provides benchmark for beginning of relevant International GCSE



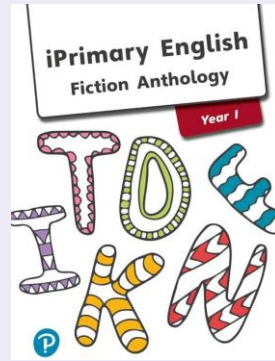
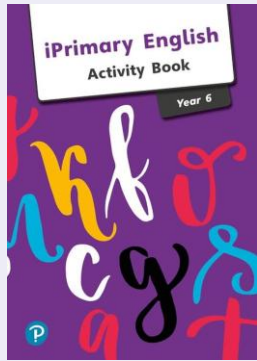
iPrimary Published Resources

iLowerSecondary Qualifications	Published Resources
<u>Overview</u>	<u>Overview</u>
<u>iPrimary English</u>	<u>iPrimary English Bug Club</u>
<u>iPrimary Mathematics</u>	<u>Abacus/Power Maths</u>
<u>iPrimary Science</u>	<u>Pearson International Primary Science (PIPS)</u>
<u>iPrimary Computing</u>	<u>Inspire Computing</u>
<u>iPrimary Global Citizenship</u>	<u>iPrimary Global Citizenship</u>

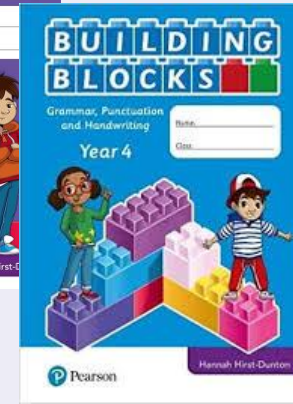
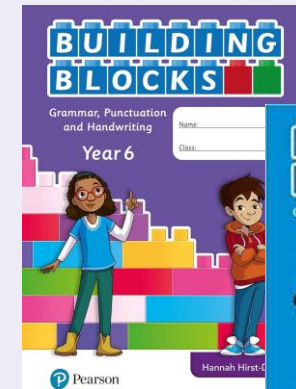
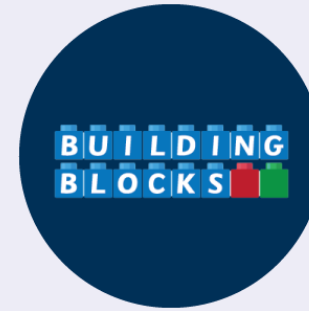


Closer look at Primary English courseware

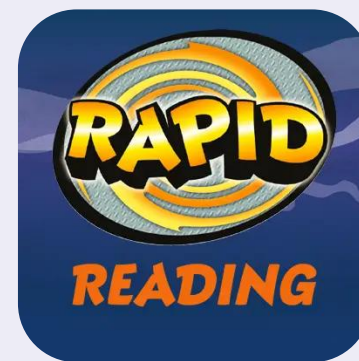
iPrimary English:
Whole school literacy course



Targeted support:



ENGLISH		iPrimary English	
iP5 Modelled English Lesson Handout 1: Lesson Plan		Term: 3	Week: 4
Year 5		Duration: 2 weeks	
iPRIMARY ENGLISH Unit 10: Fiction: Big Giant, Little Bear (Story 1) The Giant			
About this unit: The students start by reading and listening to Big Giant, Little Bear (Story 1) The Giant, responding to questions that stretch their comprehension and questioning skills. They examine the author's use of language to create atmosphere and tension, namely her choice of descriptive words and phrases. In the main writing task, they bring together their work, to develop and write their own stories, using the sample story as a model for structure and themes. Time is given at the end of the unit for the students to produce reading their stories about and incorporate sound effects. Stimulus synopsis: Big Giant, Little Bear (Story 1) The Giant This book contains two stories set in the forests. In the first one, a man catches a giant to escape being eaten. In the second story, a woman and a polar bear learn to respect one another and work together. This set of teachers' resources focuses on the first story. The eBook version of the recommended text is available via a BugClub subscription on ActiveLearn Primary. Talk to your local Pearson representative for details.			
Day 1 Comprehension 1	Day 2 Comprehension 2	Day 3 Comprehension 3	Day 4 Comprehension 4
Read, listen to and respond to a traditional story.	Read, listen to and respond to a traditional story.	Read, listen to and respond to a traditional story.	Read, listen to and respond to a traditional story.
Summarise the main points	Explore characters in detail (Chapter 2)	Recall and summarise events (Chapters 3-4)	Read a story aloud (Chapter 4)
Practice inference and prediction (Chapter 1)	Day 5 Sentence Grammar 1	Day 6 Short composition 1: Day 1	Day 7 Short composition 1: Day 2
Understand how to use the persuasive speech with regular and short sentences	Plan and write using the persuasive speech with regular and short sentences	Write first draft of a short story	Revise and edit writing to produce a final draft of a short story
Understand how to use metaphors in combinations of text			



iLowerSecondary Published Resources

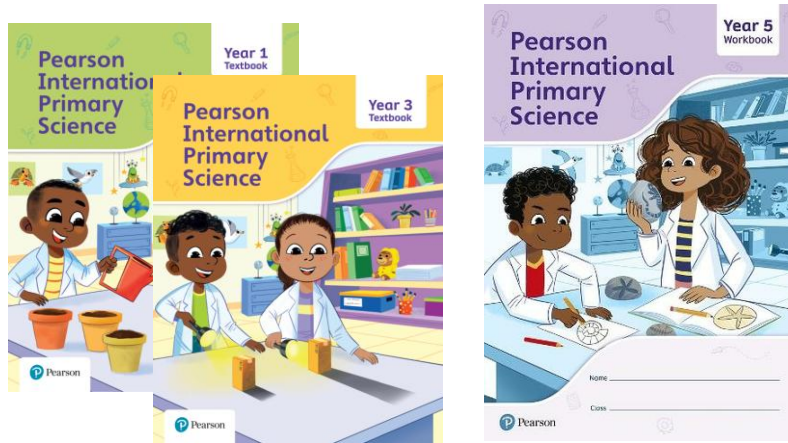
iLowerSecondary Qualifications	Matched Resources
Overview	Overview
iLowerSecondary English	Inspire English
iLowerSecondary Mathematics	Maths Progress International
iLowerSecondary Science	Exploring Science International
iLowerSecondary Computing	Inspire Computing
iLowerSecondary Global Citizenship	iLowerSecondary Global Citizenship



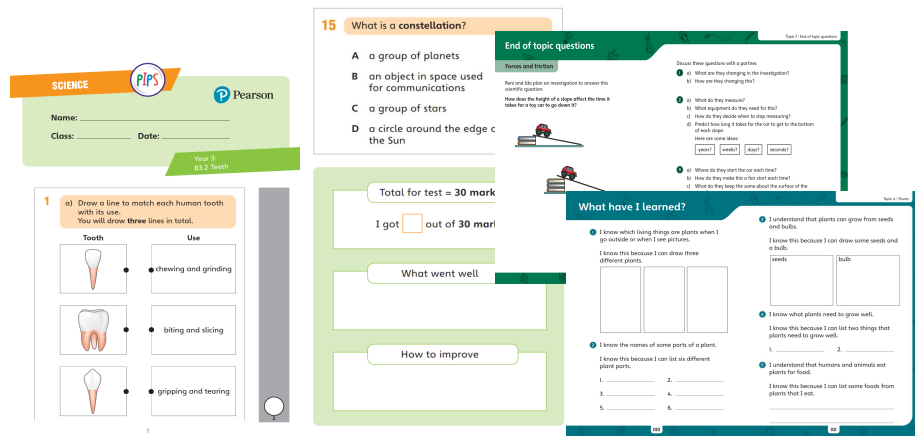
Product spotlight: PIPS and Exploring Science International



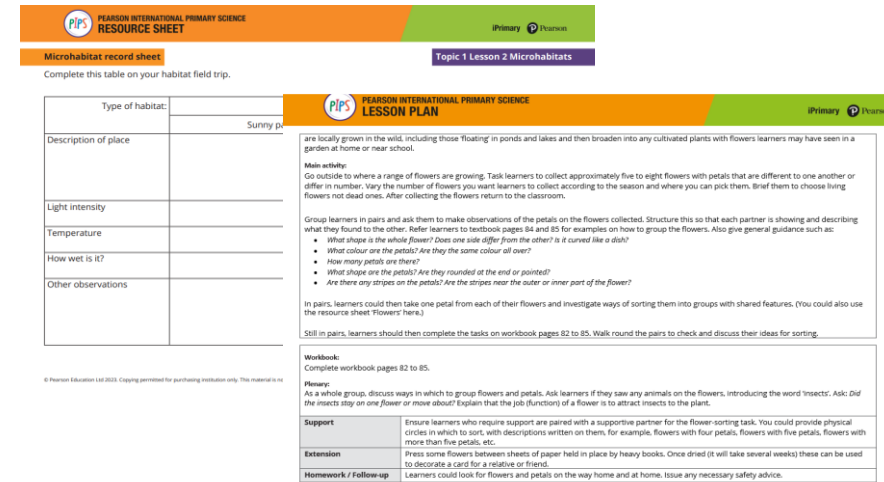
What is PIPS?



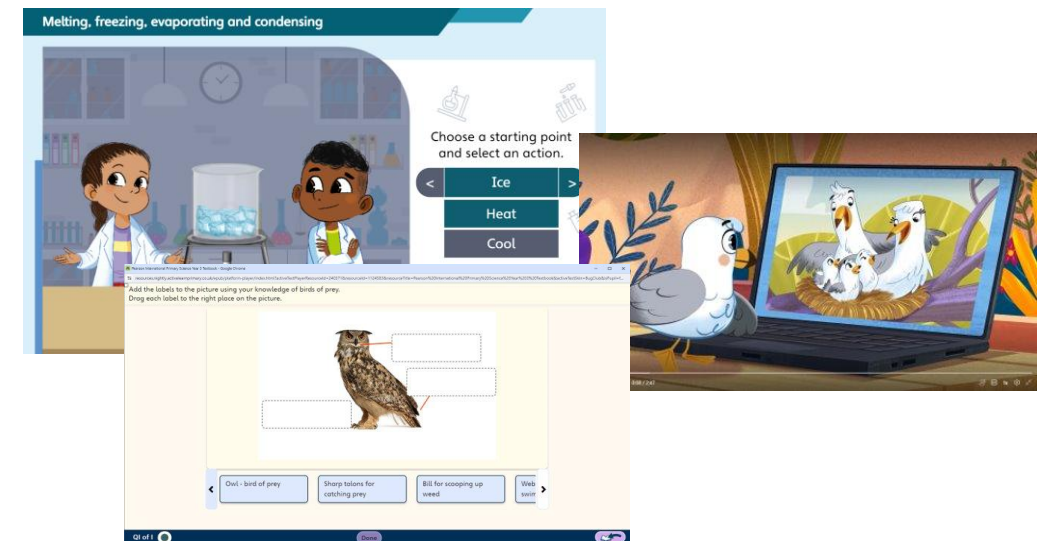
Textbooks and workbooks



Assessments



Lesson planning, resource sheets and answers



Digital interactives



Structure

iPrimary Year 1
Early scientific enquiry
BIOLOGY
Living things
Myself
Animals
Plants
CHEMISTRY
Sorting and grouping materials
PHYSICS
Light and dark
Pushes and pulls

Contents

1	Living things	2
2	Myself	18
3	Animals	44
4	Plants	76
5	Sorting and grouping materials	102
6	Light and dark	120
7	Pushes and pulls	136





EARLY SCIENTIFIC ENQUIRY

Reference	Enquiry area	Objective	Guidance	Links to subject content
ESE1.1	Scientific ideas	Understand what is meant by a scientific question.		
		Use different types of simple enquiry to answer scientific questions.		
ESE1.2	Investigating	Recognise and use simple equipment.	For example: thermometer with simple scale, beaker and weighing scales.	
		Set up simple practical tests.		
		Observe changes, such as new materials being formed or growth and development of living things.		
		Understand what is meant by a fair test.		Year 2: Compare properties of a variety of materials using comparative and fair tests.
		Make simple observations to compare objects and/or living things.		Year 1: Compare observable similarities and differences between humans.
		Identify and classify objects and/or living things.		
		Use a simple dichotomous key to identify plants and animals.		Year 3: Use keys to identify animals and plants in local habitat(s).
ESE1.3	Obtaining and presenting evidence	Use observations to suggest answers to simple questions.		
		Collect and record data as tally charts and in simple tables.		
		Present data on simple bar charts.		
		Use drawings and labelled diagrams to present observations.		
ESE1.4	Conclusions	Draw simple conclusions using simple scientific language.		
		Identify simple patterns and trends in data.		Year 2: Investigate how sounds can be made louder or quieter by changing the distance from the source.
ESE1.5	Evaluating	Suggest ways in which tests could be improved.		

Where possible, each year group's objectives should be taught through practical investigation in order to embed learning and provide definite links with enquiry objectives.

An example of where practical investigations may be carried out is:

Year 3 Physics: P3.1F Understand patterns in the way that the sizes of shadows changes.

Other examples are highlighted in the 'Possible links to enquiry' column on each year group's objective page.

Components – lesson planning

Clear curriculum objectives

Page to page mapping

Resources supplied
worksheets/videos

Before you teach,
contextualise for teachers
Pulls out common
misconceptions and
prerequisites

Extension and support



PEARSON INTERNATIONAL PRIMARY SCIENCE
LESSON PLAN

iPrimary Pearson

Year	Topic No.	Topic Name	Lesson No.	Lesson Name
1	4	Plants	24	Flowers
Curriculum objectives	B1.4C – Understand that some plants have flowers and these can be a variety of shapes and colours ESE1.2 – Investigating: Make simple observations to compare objects and/or living things ESE1.2 – Investigating: Identify and classify objects and/or living things Workbook also gives opportunities for: ESE1.3 – Obtaining and presenting evidence: Collect and record data as tally charts and in simple tables ESE1.3 – Obtaining and presenting evidence: Present data on simple bar charts			
Learning focus	What shapes are flowers?			
Key vocabulary	petal; floating; shape; family; more; fewer			
Book references	Textbook pages 82–85		Workbook pages 82–85	
Resources supplied	Flowers worksheet			
Other resources needed	A variety of flowers from local and regional plants, ideally still on the plants where they are growing One or two large fresh flowers for demonstration – choose as simple a structure bearing in mind it is the petals that are the focus Optional pre-picked typical examples of mustard (Brassicaceae), daisy (Asteraceae) and rose (Rosaceae) families of flowers Optional sorting circles and labels for support Optional heavy books and paper for flower pressing (see ‘extension’ section)			
Lesson Outline				
Before you teach: This lesson is best done practically, by going outdoors and then bringing living specimens into the classroom. Observing the plants <i>in situ</i> before removing flowers allows learners to observe how and where they are growing. Ensure that you check in advance for hazardous local plants that you wish to avoid and for insect sting or pollen allergies (also applies to inside the classroom). The names of flower families are not an important part of the learning. They are used so that learners can understand that flowers can be grouped into smaller groups rather than just as ‘flowering plants’ in a similar way to grouping vertebrates as mammals, birds, etc. Introduction: As a whole group, review textbook page 82 and introduce the word ‘petal’, using one or two of the flowers brought in for demonstration. Discuss where flowers				

Components – textbook

Growing plants

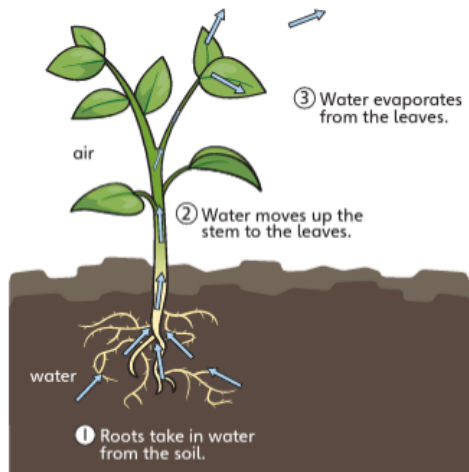
Revision topic 3

Here are some key points for this topic.

- Plants need the correct amount of water and light to grow well.
- Soil provides minerals to help plants grow.
- Fertilisers and organic matter can give plants extra minerals.

Here are some key things to understand and to be able to do.

■ Understand how water is transported inside plants

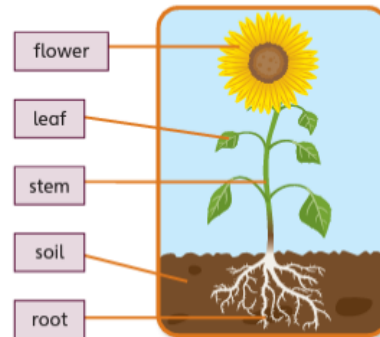


When water evaporates from the leaves into the air, more water moves up the stem.

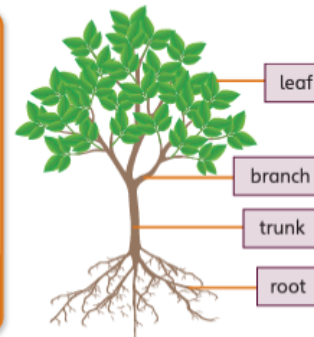
Topic 7 | Revision

■ Recognise parts of a plant on a diagram and know their functions

This is a sunflower plant.



This is a tree.



A tree has a trunk. Other flowering plants have a stem.

Part of plant	Function
roots	anchor the plant take in water and minerals
stem or trunk	supports the plant transports water and nutrients (such as minerals and food the plant makes)
leaves	make food using sunlight for nutrition
flowers	attract insects for pollination make seeds for reproduction

How would you describe the difference between a stem and a trunk?

What is the word that describes living things that make their own food?

Topic opener page, entry to topic sparking curiosity and observing skills

Main spreads:

- Key info and questions
- Mascots
- Key words
- Embed inquiry and investigative approach

End of topic questions and discussion activities

Revision – year 6



Components – workbook

Topic opener page includes lesson objectives

Main spreads:

- Builds to high-order thinking questions
- Mimics exam style

End of topic questions structured to demonstrate how learners know things

Revision – year 6

What have I learned?

- 1 I can tell the difference between living and non-living things.

I know this because non-living things **cannot**

- 2 I know that plants are living things.

I know this because plants can

I can draw a picture of some plants.

Topic 1 | Living things

- 3 I know that animals are living things.

I know this because animals can

I can draw a picture of some animals.

- 4 I understand that animals change as they grow.

I know this because baby animals like kittens change into

- 5 I understand that plants change as they grow.

I know this because seeds change into

Assessment

Formative assessment opportunities highlighted throughout

Regular informative summative assessment opportunities

End of term and end of year achievement tests

Structured, explicit progression onto iLS and International GCSE

SCIENCE   Pearson

Name: _____

Class: _____ Date: _____

Year 3:
B3.2 Teeth

1 a) Draw a line to match each human tooth with its use.
You will draw **three** lines in total.

Tooth	Use
	☐ chewing and grinding
	☐ biting and slicing
	☐ gripping and tearing

15 What is a **constellation**?

- A** a group of planets ☐
- B** an object in space used for communications ☐
- C** a group of stars ☐
- D** a circle around the edge of the Sun ☐

Total for test = **30 marks**

I got out of **30 marks**

What went well

How to improve

Digital – hotspots in ebook

Every lesson has an accompanying interactive hotspot quiz question launched from ebook

Owls

Owls are birds of prey.

curved beak to tear food to eat

Large wings help owls to fly slowly to find food.

Look at the colour of this owl's feathers. We say it is **camouflaged**.

Camouflage means being a similar colour to what is around it.

Birds of prey are birds that use sharp talons and curved beaks to hunt and kill other animals to eat.

Look at the owl's eyes. They face forwards like human eyes. This gives the owl a very good sense of sight.

sharp talon on strong foot to catch other animals

Owls spend most of their time **hunting** for food.

softer wing feathers

The soft wing feathers help to silence any noise they do make. Feathers also protect the owl from sharp branches.

Owls' large wings are almost **silent** when they fly.

Owls can **surprise** animals they are hunting.

Key words

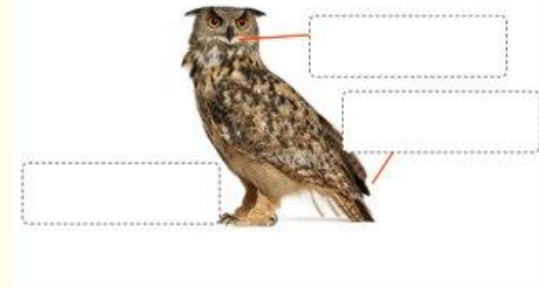
beak tear talons hunting
camouflaged silent surprise

Topic 1: Animal adaptations

Pearson International Primary Science Year 3 Textbook - Google Chrome

resources/reg@ty.activelinkprimary.co.uk/outputs/platform-play/index.html?activeTextPlayerResourceId=240271&resourceId=1124383&resourceTitle=Pearson%20International%20Primary%20Science%20Year%203%20Textbook&activeTextDate=BugClub&suppl=L...

Add the labels to the picture using your knowledge of birds of prey.
Drag each label to the right place on the picture.



Owl - bird of prey

Sharp talons for catching prey

Bill for scooping up weed

Web swirl

Q1 of 1

Done

Which is the odd one out?

Click on one picture and explain why you chose it.



it does not have the same shape

Which sound is made by the source in this picture?
Click on each answer to hear it, then choose which is the right one.



What happens in order for us to hear a sound?
Drag the tiles to put them in the right order.



An object vibrates.



The air around the object vibrates.



The air inside our ear canal vibrates.



Our ear detects the sound.



Sort these sounds into high pitched and low pitched.
Drag each label into the correct box.

High pitched

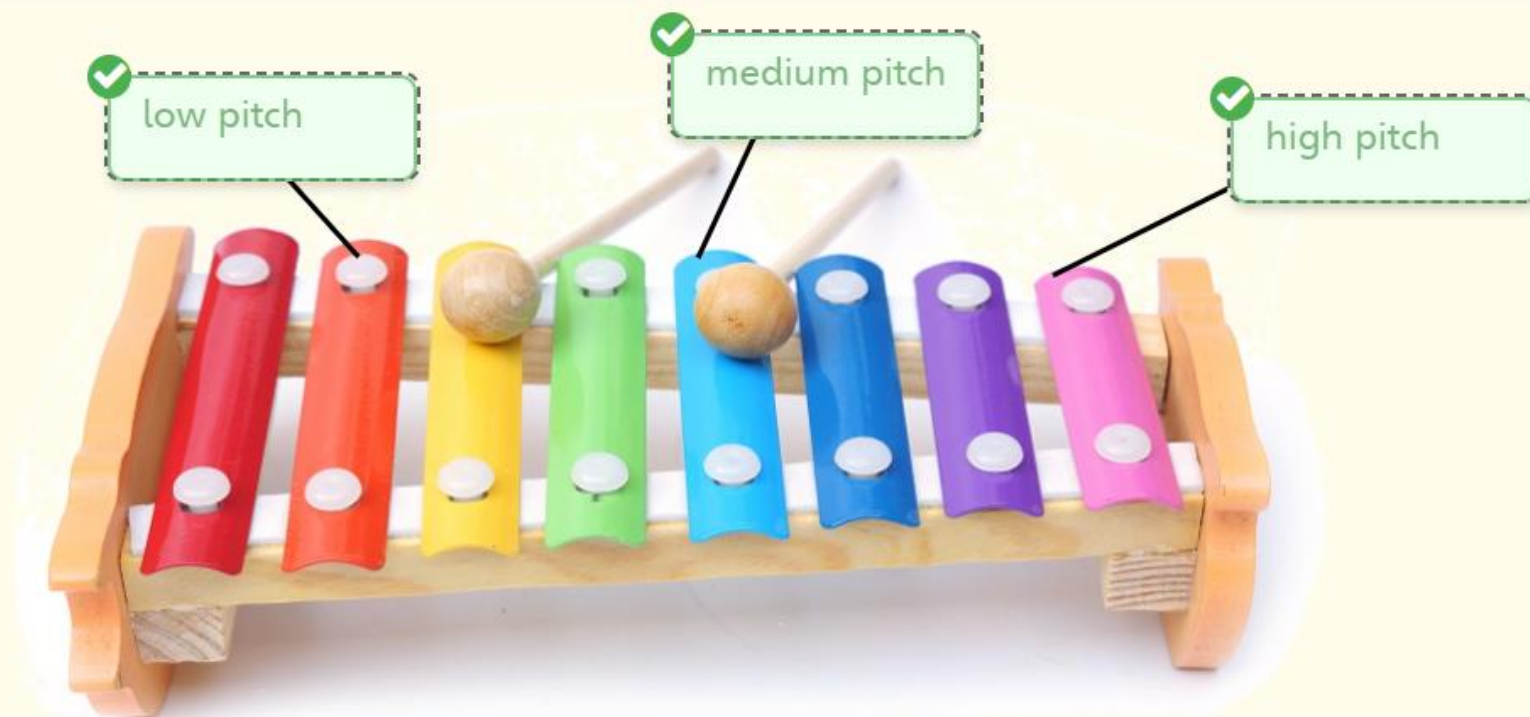
- ✓ mouse squeaking
- ✓ whistle
- ✓ chick cheeping

Low pitched

- ✓ train rumbling
- ✓ lion roaring
- ✓ bass drum

That's correct. Well done!

Imagine playing this xylophone. Which bars would make the highest pitched sounds?
Drag each label to the right place on the picture.





Resources | iPrimary

▼ Year

- ☐ R (526)
- ☐ Yr 1 (705)
- ☐ Yr 2 (678)
- ☐ Yr 3 (698)
- ☐ Yr 4 (587)
- ☐ Yr 5 (547)
- ☐ Yr 6 (531)

▼ Subject

- ☐ Art (2)
- ☐ Computing (621)
- ☐ Design (3)
- ☐ English (1164)
- ☐ Geography (3)
- ☐ Global Citizenship (431)
- ☐ History (3)
- ☐ Maths (795)
- ☐ Music (3)
- ☐ Physical Education (3)
- ☐ Science (814)
- ☐ The World Around Us (160)

▼ Term

- ☐ Year R 1 (38)
- ☐ Year R 1 Term 1 (91)
- ☐ Year R 1 Term 2 (71)
- ☐ Year R 1 Term 3 (72)
- ☐ Year R 2 (44)

Markbooks

Abacus

Power Maths

Power Maths WRM Edition **NEW**

Progress & Assess: Reading

Progress & Assess: Science

White Rose

Observations

Pupil Profiles

Activity Reporting

Abacus

Bug Club

Grammar and Spelling Bug

Heinemann Active Maths

The Maths Factor

Maths Flex

Pearson International Primary Science **NEW**

Primary Interactive Library

Power Maths

Rapid

iPrimary

Show: 50 4007 resources found | 2 3 ... 81



n for iPrimary Mathematics.

[primary.co.uk/resource/830178](https://www.activelearnprimary.co.uk/resource/830178)[Year 1](#)

r Year 1 of iPrimary Mathematics.

[iPrimary Mathematics Curriculum](#)

This document contains the curriculum

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830178>[iPrimary Mathematics Curriculum Year 3](#)

This document contains the curriculum for Year 3 of iPrimary Mathematics.

Type: Curriculum document

Link: <https://www.activelearnprimary.co.uk/resource/830181>

How do I see activity reporting as a teacher?



Activity Reporting | Pearson International Primary Science



Oliver George pupil overview |

Pearson International Primary Science Year I Textbook

Last opened 25/06/2024 18:22pm

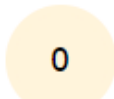
[← Back](#)

Leah's test class

Oliver George 

Last 1 year



Topic	Topic  performance	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7	Lesson 8
Sorting and grouping materials	0%								
Plants	66%								
Animals	0%								
Myself	42%								
Living things	75%								

Digital – topic videos



Every topic has an animated topic video where the mascots provide entry to key learning objectives



What other things do you think **all** living things can do?

Can you see something else that is **not** a living thing?



Topic animated videos – Benefits to teachers and learners?

Engaging entry to topic

Complex topics broken down – support for less experienced/non specialist teachers

Encourages relating to own experiences

Uses key vocab in context (EAL support)

Learning in real-world/relatable context

Asks questions to spark discussion in class



Digital – virtual labs

Virtual labs for all 21 core investigations

Melting, freezing, evaporating and condensing X Close

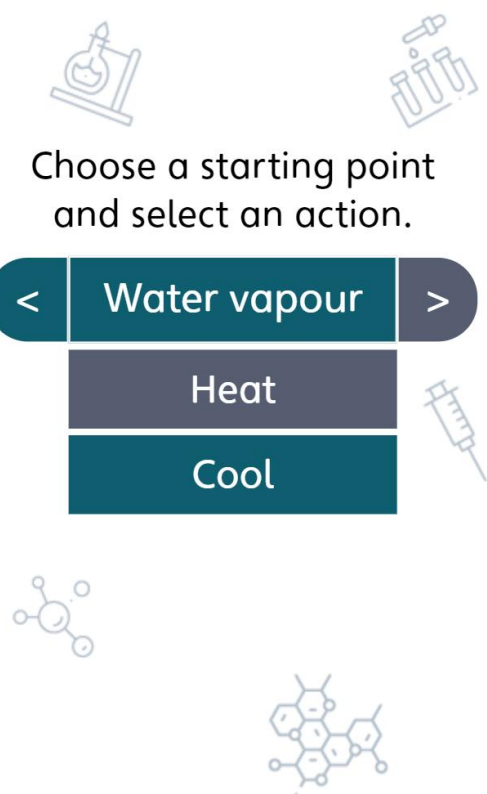


Choose a starting point and select an action.

< **Water vapour** >

Heat

Cool



Digital – virtual labs

Virtual labs for all 21 core investigations

Evaporation, condensation, melting, and freezing with thermometers

X Close

Heat it with a bunsen burner

What is the temperature ?

Let's record that temperature on a bar chart.

The temperature is 100 degrees Celsius.

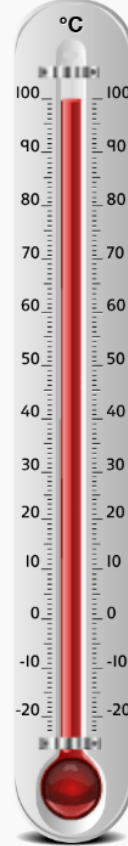


Click on the thermometer to measure the temperature.

Temperature in °C

Temperature (°C)
100
80
60
40
20
0

Heat it with a bunsen burner



Next

Support at iPrimary and iLower Secondary



Closer look at Year 6 and Year 9 qualifications

Externally marked

Internationally benchmarked

Provide certification

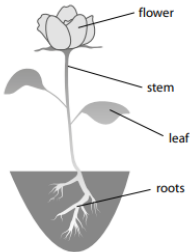
High-rigour assessments

Optional

SECTION A
Answer ALL questions.

For questions 1 – 10 put a cross in one box ☒ to indicate your answer.
If you change your mind, put a line through the box ☒ and then put a cross in another box ☒.
Each question is worth one mark.

1 The diagram shows parts of a flowering plant.



Which part of the plant takes in water and nutrients?

☐ A flower
☐ B leaf
☐ C roots
☐ D stem

(Total for Question 1 = 1 mark)

2 What pumps blood around the body?

☐ A heart
☐ B lungs
☐ C oxygen
☐ D thorax

(Total for Question 2 = 1 mark)

DO NOT WRITE IN THIS AREA

Pearson Edexcel International Award in Primary Science - Sample Assessment Materials

OUTSTANDING
PEARSON
LEARNER
AWARDS

Curriculum

R6.4A	Use titles, contents pages, search engines, headings, sub-headings and other features to retrieve information quickly and make notes of key points.
R6.3A	Infer the meaning of idiomatic language using context.
R6.3B	Infer a character's intentions from their actions and dialogue.
R6.3C	With some guidance, make predictions by interpreting a sequence of clues in a text.
R5.4B	Understand and explain how different text features can convey information.
R6.2A	Identify words and phrases from more than one place in texts, to support answers.
R5.4C	Read arguments and persuasion texts, identifying key text features and distinguishing between fact and opinion.
R6.5A	Recognise a range of conjunctions, adverbs and prepositions used to link ideas and to aid cohesion within a text.
W6.3C	Write around 400 words in a range of non-fiction genres, using appropriate structural and language features and considering their audience.
W4.3A	Organise writing so that ideas are sequenced or grouped.
W6.6D	Use commas to clarify meaning and avoid ambiguity.
W6.6E	Use hyphens to clarify meaning and avoid ambiguity.

Specification

Students must:	
RA01	retrieve information, events or ideas from texts.
RA02	deduce, infer or interpret information, events or ideas from texts
RA03	identify and comment on the structure and organisation of texts
RA04	explore the writers' use of language, at word and sentence level
RA05	consider the writers' purposes and viewpoints, and the overall effect of the text on the reader
GA01	demonstrate how accurate use of grammar, punctuation and spelling contribute to meaning
WA01	write a response appropriate to task, audience and purpose
WA02	organise writing by sequencing and structuring information appropriately and coherently
WA03	communicate meaning in writing through the use of accurate grammar, punctuation and spelling.

03

Pearson Edexcel International GCSEs

Modern, progressive international qualifications available in 37 subjects, in a choice of assessment routes (modular or linear) and formats (onscreen or paper-based)

Why Pearson Edexcel International GCSEs?



They are designed for international learners

They are modern, progressive qualifications for globally minded students, with academic content and assessment designed specifically for international learners.



They are benchmarked to UK GCSEs

This grade for grade benchmarking means you can be confident that your child's international qualifications are recognised and respected by schools and universities across the world.



They are accessible for second language learners

Their content and assessment methods are designed to enable successful progression for all learners, including those for whom English is their second language.



They offer flexibility and choice

Your school can choose when and how your students are assessed. With flexible assessment options, you can choose modular or linear routes and paper-based or onscreen exams.

Why Pearson Edexcel International GCSEs?



They embed transferrable skills

These qualifications develop problem solving, critical thinking, leadership and collaboration skills alongside subject knowledge to ensure our learners have all the tools for success.



They offer increased differentiation

They follow the modern 9-1 grading structure which offers increased differentiation for our top learners (a grade 9 represents a higher level of attainment than a Cambridge A*).



They are supported by specification-aligned textbooks ...

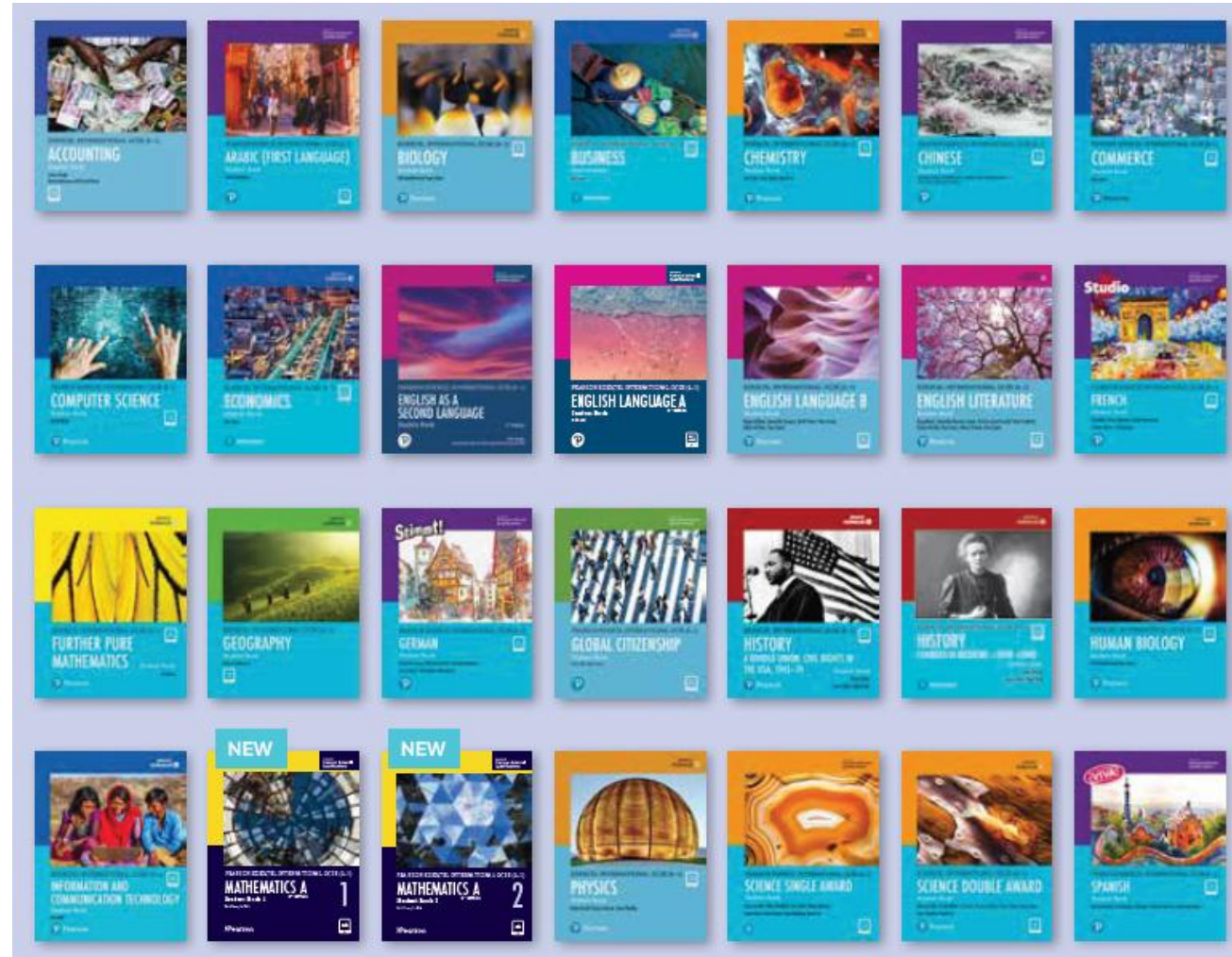
Qualifications are supported by engaging, clearly structured textbooks - available in print and digitally.



...and digital teaching resources

We offer lesson planning, resources, exam practice material etc, all available online.

International GCSE Published Resources: Textbooks



Inside the textbooks...

Learning objectives always clearly signposted

Key learning points are highlighted to ensure learning is explicit and to avoid misconceptions

Key vocabulary is explained throughout with clear definitions to ensure student understand subject-specific terms

Activities provide opportunities for students to actively engage with their learning.

22 READING SKILLS FICTION TEXTS

LEARNING OBJECTIVES

This lesson will help you to:

- understand how to identify figurative language
- consider how figurative language is used for effect in creating character, atmosphere and emotion.

KEY POINT

Similes and metaphors are sometimes confused. Remember that similes compare using 'like' or 'as', while metaphors make a more direct comparison of one thing to another. For example, 'She's as fierce as a tiger' is a simile, but 'She's a tiger when she's angry' is a metaphor.

SUBJECT VOCABULARY

metaphor describing something by comparing it to an image which it resembles, in a way that suggests the object is the image

simile similar to a metaphor, a description that says that an object is *like* an image rather than that *it is* the image

personification when something which is not human is made to sound human by attributing human qualities to it

FIGURATIVE LANGUAGE

Figurative language is used to create powerful imagery in texts. It can be used by writers or poets to create atmosphere, mood, tone, emotion, or to add to your understanding of descriptions of character or setting.

Figurative language works by making comparisons between two things. It therefore provides the reader with a strong visual image to identify with. The most common figurative techniques are **metaphor, simile and personification**.

ACTIVITY 1

SKILLS ANALYSIS

▼ USING FIGURATIVE DESCRIPTIONS

Look at the photos and write your own figurative descriptions of each. For example: *The amber flames leapt and danced.* 'Leapt' and 'danced' are personification, emphasising the active nature of the fire and likening it to a person dancing. *The beach was like a white ribbon of paper.* This simile conveys the colour and shape of the beach.






Transferable skills show how learning extends beyond the subject matter itself.

Inside the textbooks...

102 Book 1 Number 3

Exercise 35* Use the rules of indices to simplify these. Then use your calculator to check the answer.

1 ► $6^5 \times 6^6$ 2 ► $7^{12} \div 7^6$

3 ► $(8^3)^4$ H 4 ► $4(4^4)^4$

H 5 ► $2^3 \times 2^4 \times 2^5$ H 6 ► $2^{10} \times 2^2 \div 2^4$

H 7 ► $(2^3)^5 \times (2^3)^4 \div (2^4)^3$ H 8 ► $2^3 \times 2^{27} + (2^{30})^2$

H 9 ► Solve for p if $3^p = 27^4$ H 10 ► Solve for q if $5^{(q-1)} = 625$

H

Fractional indices

The laws of indices can be extended to fractional indices.

Activity 1

Skills Reasoning

a Use your calculator to work out: i $4^{\frac{1}{2}}$ ii $9^{\frac{1}{2}}$ iii $16^{\frac{1}{2}}$ iv $25^{\frac{1}{2}}$ v $36^{\frac{1}{2}}$
What do you think the index $\frac{1}{2}$ means? Check your theory with some other numbers.

b Use your calculator to work out: i $8^{\frac{1}{3}}$ ii $27^{\frac{1}{3}}$ iii $64^{\frac{1}{3}}$
What do you think the index $\frac{1}{3}$ means? Check your theory with some other numbers.

Using the laws of indices, $4^{\frac{1}{2}} \times 4^{\frac{1}{2}} = 4^{(\frac{1}{2} + \frac{1}{2})} = 4^1 = 4$
But $\sqrt{4} \times \sqrt{4} = 4$
This means that $4^{\frac{1}{2}} = \sqrt{4} = 2$ so $4^{\frac{1}{2}}$ means the square root of 4
Similarly, $8^{\frac{1}{3}} \times 8^{\frac{1}{3}} \times 8^{\frac{1}{3}} = 8^{(\frac{1}{3} + \frac{1}{3} + \frac{1}{3})} = 8^1 = 8$
But $\sqrt[3]{8} \times \sqrt[3]{8} \times \sqrt[3]{8} = 8$
This means that $8^{\frac{1}{3}} = \sqrt[3]{8} = 2$ so $8^{\frac{1}{3}}$ means the cube root of 8
In a similar way it can be shown that $16^{\frac{1}{4}} = \sqrt[4]{16} = 2$, $32^{\frac{1}{5}} = \sqrt[5]{32} = 2$, and so on.
Writing numbers as powers can simplify the **working**.

Example 4 Work out $27^{\frac{1}{3}}$

Method 1: Write as a root.
 $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

Method 2: Write 27 as a power of 3, then use the index laws to simplify.
 $27^{\frac{1}{3}} = (3^3)^{\frac{1}{3}} = 3^{3 \times \frac{1}{3}} = 3^1 = 3$

Exercises and activities provide opportunities for students to practise and embed newly taught skills or learning

4 ECOLOGY AND THE ENVIRONMENT 11 THE ORGANISM IN THE ENVIRONMENT 103

KEY POINT

Some books (and even some teachers!) talk about 'throwing' quadrats. The idea is that you stand in the middle of a field and throw the quadrat over your shoulder. This is supposed to be random, but it certainly is not! The place where the quadrat falls will depend on where you choose to stand, how hard you throw it, etc. It is wrong to use this method.



Figure 11.4 A student sampling with a quadrat

It is important that sampling in an area is carried out *at random*, to avoid bias. For example, if you were sampling from a school field, but for convenience only placed your quadrats next to a path, this probably would not give you a sample that was representative of the whole field. It would be a *biased* sample.

ACTIVITY 1

PRACTICAL: USING QUADRATS TO COMPARE THE SIZE OF A PLANT POPULATION IN TWO AREAS OF A FIELD

One way that you can sample randomly is to place quadrats at co-ordinates on a numbered grid.

Imagine that there are two areas of a school field (A and B) that seem to contain different numbers of dandelion plants. Area A is more trampled than area B and looks like it contains fewer dandelions. This might lead you to propose the hypothesis: 'The dandelion population in area A is smaller than the dandelion population in area B'.

In area A, two 10-metre tape measures are arranged to form the sides of a square (Figure 11.5).

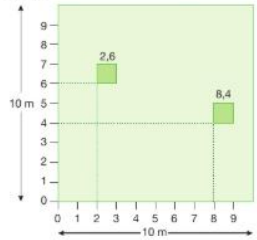


Figure 11.5 A 10 m × 10 m grid with 1 m² quadrats positioned at co-ordinates 2,6 and 8,4.

Inside the textbooks...

Case studies are selected for their international relevance and bring topics to life for students

24

PHYSICAL ENVIRONMENTS

1 RIVER ENVIRONMENTS

CASE STUDY: RIVER MANAGEMENT LESSONS FROM SPAIN

A Mediterranean climate means that Spain's annual rainfall is small. Most of it falls in the winter half of the year, so that summer droughts are common. Also, the availability of water in Spain and the demand for water do not coincide. The basic idea behind the two projects described below was to transfer water from the sparsely populated centre of Spain to provide much-needed water in the south-east, particularly for irrigation.

THE TAGUS-SEGURA PROJECT
A 286 km-long series of aqueducts and canals was completed in 1978 to carry water from two reservoirs in the upper Tagus valley to a large reservoir in the Segura valley (Figure 1.28). Water is distributed from this reservoir to consumers in the provinces of Alicante, Murcia and Almería.

There are a number of problems as a result of this project:

- most of the irrigation water has gone to agribusinesses rather than local farmers
- much of the water has been consumed, not by agriculture, but by the urban developments and tourist resorts along the coast (Figure 1.29)
- the availability of this transferred water has encouraged a wasteful or extravagant use of it.

THE EBRO PROJECT
In 2001, an even more ambitious river management plan was proposed. This was to dam and divert the longest river in Spain, the Ebro, which flows into the Mediterranean some way south of Barcelona. The scheme meant building more than a hundred dams in the upper reaches of the Ebro as well as hundreds of kilometres of canals. These would transfer 100 billion litres of water per year to the same arid south-eastern parts of Spain as the water from the Tagus.

In 2004, the project was abandoned largely because of:

- the bad experiences of the Tagus-Segura project
- the huge threat it posed to the Ebro delta, an important agricultural area and wildlife wetland (Figure 1.30).

The Spanish government decided to meet the growing water shortages by constructing coastal desalination plants. This water policy continues to today.

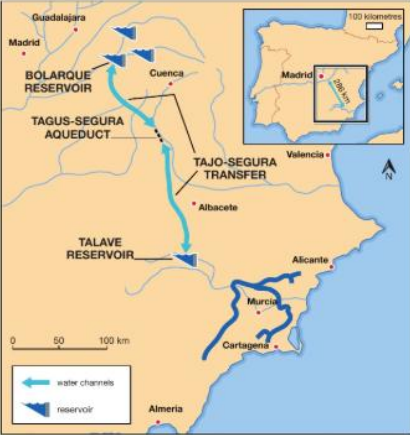


Figure 1.28: Map of the Tagus-Segura project



Figure 1.29: Cartagena is one of the consumers of Tagus water.



Figure 1.30: An aerial view of the Ebro delta

SKILLS

SELF DIRECTION

ACTIVITY

Find out why it was so important to increase the supply of irrigation water to south-east Spain.

Activities engage students further with case studies

22

BUSINESS ACTIVITY

SOLE TRADERS, PARTNERSHIPS, SOCIAL ENTERPRISES AND FRANCHISES

The advantages and disadvantages of partnerships are summarised in Table 3.2.

GENERAL VOCABULARY

legally binding agreement has been made, and certain actions are now either required or prohibited by law

ADVANTAGES OF PARTNERSHIPS

Easy to set up and run – no legal formalities.
Partners can specialise in their area of expertise.
The job of running a business is shared.
More capital can be raised with more owners.
Financial information is not published.

DISADVANTAGES OF PARTNERSHIPS

Partners have unlimited liability.
Profit has to be shared.
Partners may disagree and fall out.
Any partners' decision is **legally binding** on all.
Partnerships still tend to be small.

Table 3.2 Advantages and disadvantages of partnerships

LIMITED PARTNERSHIPS

SUBJECT VOCABULARY

limited partnership partnership where some partners contribute capital and enjoy a share of the profit but do not take part in the running of the business
limited liability business owner is only liable for the original amount of money invested in the business
audits official examination of a company's financial records in order to check that they are correct

KEY POINT

In 2000, the law changed in the UK so that limited liability partnerships could be formed. This is where all partners have limited liability. However, to set up a limited liability partnership, the business has to **comply** with a number of legal requirements such as sending annual accounts to the Registrar of Companies (more commonly known as Companies House).

GENERAL VOCABULARY

comply to do what you have to do or are asked to do

One of the partners at work

ACTIVITY 1

CASE STUDY: KISULI, OKUMA AND OWINO

Kisuli, Okumu and Owino is a firm of chartered accountants based in Mombasa, Kenya. It employs, in addition to the three partners, 16 other staff and provides a range of financial services for local clients. A deed of partnership was drawn up when the business was established in 2010. To raise finance for the business, each partner contributed KES 2 000 000. One of the strengths of the business was that each of the partners was a specialist in a particular field. Michael Kisuli was a corporate tax specialist, Edwin Okumu was an investment analyst and Joseph Owino was in charge of audits.



Inside the textbooks...

Exam-style questions, based on real exam material, support students preparing for their exams.

16Book 1Exam practice

Exam practice: Number 1

Give all answers, where appropriate, as fractions or mixed numbers in their simplest form.

Question 1

Write each fraction in its simplest form.

a

$\frac{14}{42}$

[1]

b

$\frac{140}{42}$

[1]

c

$\frac{14}{42}$

[1]

Question 2

Calculate

a

$\frac{5}{12} \times 1\frac{1}{15}$

[2]

b

$5\frac{1}{4} \div \frac{7}{8}$

[2]

Question 3

Calculate $\frac{4}{5} + 1\frac{3}{4} - 1\frac{1}{12}$

[3]

Question 4

Calculate

a

$3 \div 2 \times (1 + 4)^2$

[2]

b

$\frac{1}{2} + \frac{1}{2} \div \frac{5}{6}$

[2]

Question 5

A recent survey has found that the Great Wall of China is more than twice as long as was previously thought. Its length is now given as 21 196.18 km.

Write this length

a

correct to 1 d.p.

[1]

b

correct to 1 s.f.

[1]

Question 6

The planning rules for a housing development state that $\frac{1}{3}$ of the houses should have three bedrooms, $\frac{3}{8}$ should have four bedrooms, $\frac{1}{24}$ should be executive homes and the rest should have two bedrooms.

a

What fraction of the houses have two bedrooms?

[2]

b

If 24 houses have two bedrooms, how many houses are on the development?

[3]

Question 7



Olivia's fish tank contains $42\frac{2}{5}$ litres of water. She is emptying it out using a scoop which holds $1\frac{1}{3}$ litres of water. How many full scoops will it take to empty the tank?

[4]

[Total 25 marks]

Book 1Chapter summary17

Chapter summary: Number 1

Working with fractions

Always simplify fractions to their simplest form:
 $\frac{4}{6} = \frac{2 \times 2}{2 \times 3} = \frac{2}{3}$

The word 'of' means the same as 'multiplied by':
 $\frac{1}{2}$ of $\frac{1}{3} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

Convert mixed numbers into improper fractions: $2\frac{1}{4} = \frac{9}{4}$

Treat whole numbers as fractions, e.g. $5 = \frac{5}{1}$

To multiply fractions, multiply top and bottom then cancel down, or cancel first and then multiply.
For example, $\frac{3}{5} \times \frac{10}{12} = \frac{30}{60} = \frac{1}{2}$

or
 $\frac{3}{5} \times \frac{10}{12} = \frac{1}{1} \times \frac{2}{4} = \frac{1}{2}$

To divide by a fraction, turn the fraction upside down and multiply: $\frac{1}{3} \div \frac{1}{2} = \frac{1}{3} \times \frac{2}{1} = \frac{2}{3}$

To add or subtract fractions, put them over the lowest common denominator: $\frac{1}{4} - \frac{1}{6} = \frac{3}{12} - \frac{2}{12} = \frac{1}{12}$

Significant figures and decimal places

The first significant figure is the first non-zero digit in the number, reading from the left.
The first s.f. is highlighted in yellow.

a

3400

b

0.367

c

0.00845

For decimal places, count the digits after the decimal point (going from left to right).
The third d.p. is highlighted in yellow.

a

12.3456

b

0.0073

For example, when rounding to 2 s.f., look at the third s.f. If this is greater than or equal to 5 then round the second figure up. If rounding to 3 s.f., look at the fourth s.f. and so on.

2499 = 2000 (1 s.f.)
2499 = 2500 (2 s.f.)
0.2499 = 0.2 (1 d.p.)
0.2499 = 0.25 (2 d.p.)

Order of operations (BIDMAS)

• First	B	Brackets
• Second	I	Indices
• Third	DM	Division and/or Multiplication, working from left to right
• Fourth	AS	Addition and/or Subtraction, working from left to right

The part of the expression being worked out at each step is highlighted in yellow.

$5 + (2 + 1)^2 \times 4 = 5 + 32 \times 4$ Brackets
 $5 + 3^2 \times 4 = 5 + 9 \times 4$ Indices
 $5 + 9 \times 4 = 5 + 36$ Division and/or Multiplication
 $5 + 36 = 41$ Addition and/or Subtraction

Note that calculators use the correct order of operations.

End of chapter summaries consolidate learning for students

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Product spotlight: Teaching Hubs

International GCSE Published Resources: Teaching Hubs

Complete course coverage for each guided learning hour

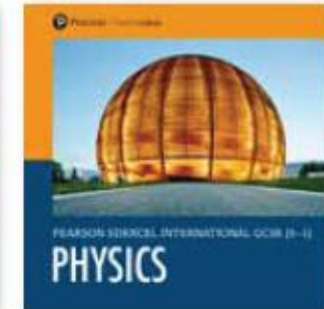
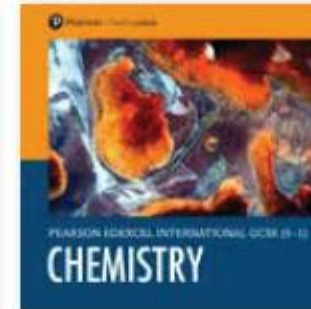
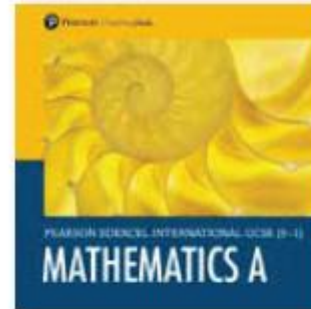
Fully digital product

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Professional development modules are included within each course



A closer look at a Teaching Hubs course



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Pearson Edexcel International GCSE (9-1) Chemistry Teaching Hub

Scheme of Work	Professional Development: Welcome	Professional Development: Common Misconceptions and Mistakes	Term 1	Term 2
Term 3	Professional Development: Preparing for Mock Examinations	Year 10 End-of-Year test	Term 4	Term 5
Professional Development: Preparing for the International GCSE Examinations	Term 6	Exam Practice – Edexcel Past Papers	Professional Development: Self-reflection and Next Steps	

Scheme of work

					
Year and term	Week	Lesson number	Lesson name	Specification point(s)	Student Book pages
Year 10, Term 1a		Lesson 6	Separating Techniques – Distillation	• crystallisation 1.10 describe these experimental techniques for the separation of mixtures: • simple distillation • fractional distillation	Pages 18–19
Year 10, Term 1a	Week 4	Lesson 7	Chromatography	1.10 describe this experimental technique for the separation of mixtures: paper chromatography 1.11 understand how a chromatogram provides information about the composition of a mixture 1.12 understand how to use the calculation of R _f values to identify the components of a mixture 1.13 practical: investigate paper chromatography using inks/food colourings	Pages 19–21 Lab Book: Pages 5–7
Year 10, Term 1a		Lesson 8	Atomic Structure	1.14 know what is meant by the terms: atom and molecule 1.15 know the structure of an atom in terms of the positions, relative masses, and relative charges of sub-atomic particles 1.16 know what is meant by the terms atomic number, mass number, and relative atomic mass (A _r)	Pages 24–26
Year 10, Term 1a	Week 5	Lesson 9	Isotopes and Relative Atomic Mass	1.16 know what is meant by the terms atomic number, mass number, and relative atomic mass (A _r) 1.17 be able to calculate the relative atomic mass of an element (A _r) from isotopic abundances	Pages 26–27
Year 10, Term 1a		Lesson 10	The Periodic Table	1.18 understand how elements are arranged in the Periodic Table: • in order of atomic number • in groups and periods. 1.19 understand how to deduce the electronic configurations of the first 20 elements from their positions in the Periodic Table	Pages 30–34
Year 10, Term 1a	Week 6	Lesson 11	Using Electronic Configurations	1.22 understand how the electronic configuration of a main group element is related to its position in the Periodic Table 1.23 understand why elements in the same group of the Periodic Table have similar chemical properties 1.24 understand why the noble gases (Group 0) do not readily react	Pages 33–35
Year 10, Term 1a		Lesson 12	Metals and Non-metals	1.20 understand how to use electrical conductivity and the acid-base character of oxides to classify elements as metals or non-metals 1.21 identify an element as a metal or a non-metal according to its position in the Periodic Table	Pages 35–36

Lessons

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Term 3

Lesson 47: Consolidation

Lesson 48: End-of-term Test 2

Lesson 49: Acids, Alkalis and Indicators

Lesson 50: The pH Scale

Lesson 51: Neutralisation

Lesson 52: Concentration and Water of Crystallisation

Lesson plan content



Lesson 52: Concentration and Water of Crystallisation

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1 Lesson 52 - Overview



Website



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2 Lesson 52 - Teacher guidance



Website



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3 Lesson 52 - Resources



Website



Open

Lesson 52 | Overview

Concentration and Water of Crystallisation

[Expand all sections](#)[Collapse all sections](#)

Specification references

- 1.34C understand how to carry out calculations involving amount of substance, volume and concentration (in mol/dm^3) of solution
- 1.31 understand how the formulae of simple compounds can be obtained experimentally, including salts containing water of crystallisation

Learning objectives

In this lesson, students will learn to:

- recall the meaning of the term 'mole'
- convert between volume measurements in cm^3 and dm^3
- calculate the concentration of an acid neutralising an alkali of known concentration and vice-versa
- explain how the formulae of simple compounds can be obtained experimentally, including salts containing water of crystallisation.

[Slideshow: Learning objectives](#)

Prior knowledge

Students should already be familiar with the concepts of the mole from **Lesson 42** and concentration from **Lesson 45**.

Key definitions

Lesson 52 | Teacher guidance

Concentration and Water of Crystallisation

- Worksheets will need to be printed for students in advance of the lesson.
- While all care is taken to ensure resource content is in line with cultural sensitivities, please be aware that it should be reviewed before sharing with students.

[Expand all sections](#)[Collapse all sections](#)[Student Book pages](#)

Starter

5 minutes ⌚ ▾

Teaching session 1

15 minutes ⌚ ▾

Student work 1

20 minutes ⌚ ▾

Teaching session 2

10 minutes ⌚ ▾

Student work 2

10 minutes ⌚ ▾

Challenge (optional)

10–15 minutes ⌚ ▾

Teaching session 1

15 minutes  ^**Concentration**

- Students should be familiar with concentration calculations from **Lesson 45**. This Teaching session recaps and extends this work. Ask students: *Can you remember the equation used for calculating concentration in g/dm^3 ? (Answer: concentration = mass (in grams) $\div$ volume (in cubic decimetres).)*
- Ask students: *What is 1 dm^3 ? (Answer: 1000 cm^3)*
- Tell students: *Remember, to convert from dm^3 to cm^3 multiply by 1000 and to go from cm^3 to dm^3 , divide by 1000.*
- Tell students that they can use a formula triangle to help them, but they need to be careful in exams. If a question requires an equation, noting down the formula triangle will not gain any marks as there is no equals sign present.
- Display Slide 1 of the slideshow.

Slideshow: Concentration

- Provide mini whiteboards and ask students to complete the calculations on Slide 2 of the slideshow.
- Students should self-assess their answers using Slide 3 of the slideshow.
- Tell students: *It is also possible to refer to concentrations in mol/dm^3 . This is the number of moles of solute dissolved in 1 dm^3 of a solution.*
- Students may see the symbol 'M' used on bottles of acids or alkalis. For example, a bottle of hydrochloric acid might be labelled '2M HCl'. 'M' means ' mol/dm^3 ' and is known as the molarity of the solution.
- Display Slide 4 of the slideshow.
- Using mini whiteboards, ask students to complete the calculations on Slide 5 of the slideshow.
- Students should self-assess their answers using Slide 6 of the slideshow.
- Tell students: *In a neutralisation reaction, the concentration of one solution can be calculated if the concentration of the other solution is known. You just need a balanced chemical equation so that you can determine the ratio of moles between the reactants. This is sometimes called the mole ratio.*
- Display Slide 7 of the slideshow and then talk students through the steps to answer the question on Slides 8 to 10 of the slideshow before displaying Slides 8 to 10.

Student Book

Student Book pages

Starter

Slideshow: Learning objectives

Slideshow: Key definitions

Slideshow: Recall the mole

Worksheet 1

Teaching session 1

Slideshow: Concentration

Worksheet 2

Worksheet 2 Help sheet

Teaching session 2

Slideshow: Water of crystallisation

Slideshow: Formula of a hydrated salt

End-of-lesson activities

Slideshow: Question 1

Homework

Homework sheet

Answers

Student Book answers

Answer sheet

Alternative starter

Slideshow: Quick quiz

Half-term tests, end-of-term tests, consolidation lessons and revision lessons

Practice exam papers, including one specially created for the Teaching Hub course

Pearson Edexcel International GCSE (9–1) 

Chemistry Digital Teaching Hub
Lesson 14 Half-term Test

Half-term Test

Section A – multiple-choice

Complete Section A of the assessment within the guide time of 5 minutes.

These are multiple-choice questions. Choose one correct answer for each question.

1 Which of the following best describes crude oil?

☐ A A compound
☐ B An element
☐ C An ion
☐ D A mixture

[Total for Question 1 = 1 mark]

2 Which of the following best describes the arrangement of particles in a gas?

☐ A The particles are arranged randomly and none are touching.
☐ B The particles are arranged randomly and are all touching.
☐ C The particles are arranged regularly and none are touching.
☐ D The particles are arranged regularly and are all touching.

[Total for Question 2 = 1 mark]

3 When a substance changes from a solid to a gas, what is the name of the process?

☐ A boiling
☐ B evaporation
☐ C melting
☐ D sublimation

[Total for Question 3 = 1 mark]

4 A number of solids were added to water until they formed a saturated solution.
Which of the following solids is the least soluble in water?

☐ A 200 g of solid A dissolves in 50 cm³ of water
☐ B 25 g of solid B dissolves in 10 cm³ of water
☐ C 1 g of solid C dissolves in 25 cm³ of water
☐ D 25 g of solid D dissolves in 35 cm³ of water

[Total for Question 4 = 1 mark]

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Pearson Edexcel International GCSE (9–1) 

Biology Digital Teaching Hub

Name _____

Paper 1B

Year 10 End-of-Year Test

Time allowed: 2 hours
Total marks available: 110
Total marks achieved:
You must have: ruler, calculator

Instructions

- Use black ink or ball-point pen.
- If pencil is used for diagrams/sketches
- Fill in the boxes at the top of this page with your centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided – there may be more space than you need.
- Show all the steps in any calculations and state the units.
- Calculators may be used.

Information

- The total mark for this paper is 70.
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

Please check the examination details

Candidate surname _____

Centre Number _____ Candidate _____

Pearson Edexcel International GCSE
Tuesday 13 June 2025
Morning (Time: 1 hour 15 minutes)

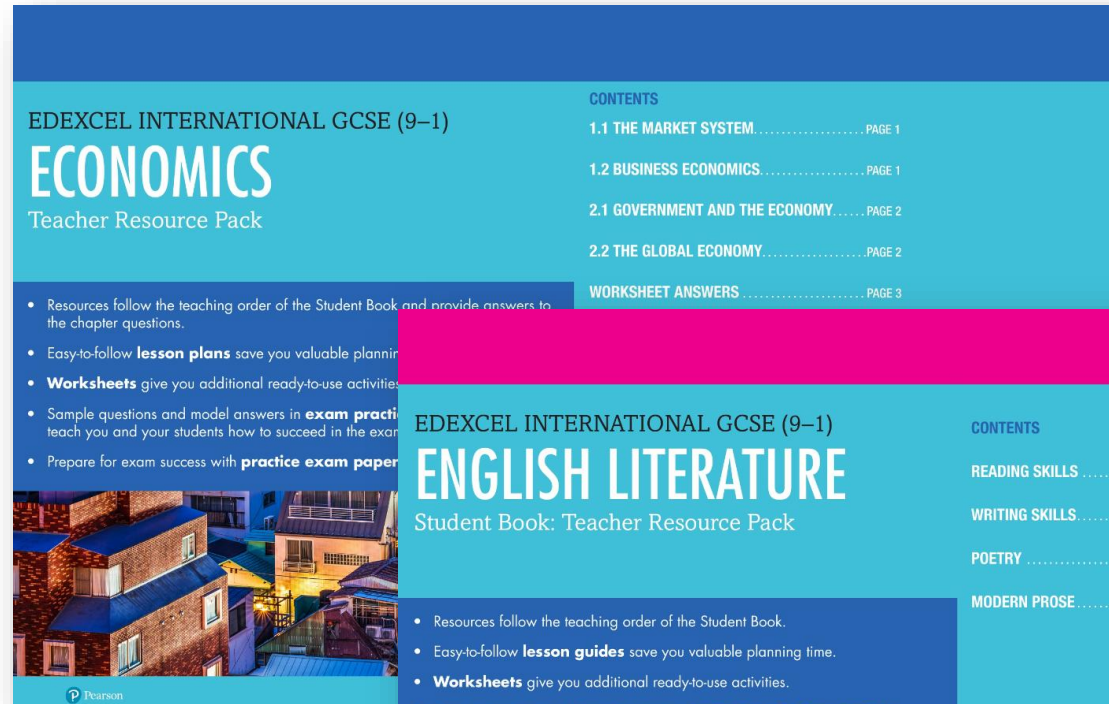
Chemistry
UNIT: 4CH1
PAPER: 2C

You must have:
Calculator

P71952A 

International GCSE Published Resources: Teacher Resource Packs

- Schemes of work
- Lesson planning
- Classroom resources
- Topic tests
- Exam practice questions
- Model answers
- Mock papers with mark schemes



04

Pearson Edexcel International A levels

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...and digital teaching resources

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French	Pure Mathematics
Further Mathematics	Spanish
Geography	Computer Science (coming soon)

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This allows learners to access the content in the way that suits them best.



Inside the textbooks...

Checkpoint questions check understanding of the key learning points of the chapter before moving on.

30 TOPIC A SOCIAL PSYCHOLOGY CHAPTER 2 CONFORMITY

During your study of this topic you will have opportunities to apply your knowledge to different contexts. In Paper 4 you will also be asked to use your knowledge of the topics and approaches to discuss a key question of relevance to society. You will be given a key question and some background information to help apply your knowledge of concepts, theories and research to explain the key question. You should also consider other plausible explanations and develop a for and against argument for the key question you have been given.

SKILLS
CRITICAL THINKING, ANALYSIS, INTERPRETATION, COMMUNICATION

ACTIVITY 3

One key question for society is whether knowledge from social psychology can explain and reduce prejudice.

Prejudice is when an individual makes a judgement about another individual or group of people based on false ideas or stereotypical traits. This can result in the unfair treatment of groups or individuals in society.

Jane Elliott is a former schoolteacher and equal rights activist. While a teacher she conducted a class exercise on her third-grade pupils which became known as the 'blue eyes, brown eyes' study. On the first day she divided her class based on eye colour and told the children that the blue-eyed children were superior to the brown-eyed children. She gave extra privileges to the blue-eyed children and denied privileges to the brown-eyed children. The next day she reversed the roles. Throughout the days she observed the behaviour of the children towards one another. She observed the children in each group becoming prejudiced towards one another because of their eye colour.

Discuss the key question of whether knowledge from social psychology can help explain prejudice. You should use concepts, theories and/or research studied in your psychology course.

CHECKPOINT

- Identify which type of conformity is being described in these examples:
 - An individual moves to a different country and adopts the customs and traditions of the new culture in order to become a citizen of that country.
 - A child chooses a cricket club and shows their support by wearing the team sports kit and praising their cricketing skills while at their matches.
 - An employee says that they agree with their supervisor's decision to reduce breaktimes even though the employee does not privately agree.
 - A student starts university and goes to parties with other students who they live with so they are part of the friendship group.
 - A guest at a restaurant doesn't receive his meal with others in his party and is rudely treated by the waiter. At the end of the meal the other members of the party leave a tip so the guest also leaves a tip even though he doesn't want to.
- Select the correct result of Asch's (1951) study:
 - 32 per cent of participants made errors
 - 32 per cent of responses given were errors
 - 32 per cent of trials were errors.

TOPIC A SOCIAL PSYCHOLOGY CHAPTER 2 CONFORMITY 31

SKILLS
ANALYSIS, COMMUNICATION, CRITICAL THINKING, PERSPECTIVE TAKING, REASONING

EXAM PRACTICE

- Fezile is taking an enrichment course at school which involves volunteering for local charities. She is asked by her teacher to volunteer at a local primary school to help younger children learn to read. Fezile agrees to help the children, but has no interest in teaching young children, and would rather spend her time with her friends canoeing on the river. Fezile is also asked to volunteer to train young children to canoe, and chooses not to go canoeing with her friends so that she can teach the young children instead.
 - Describe, using compliance, why Fezile helped the young children to read. (2 marks)
 - Describe, using internalisation, why Fezile helped to train the young children to canoe. (2 marks)
- Kasim is with a large group of friends at a youth club. His friends start ripping the material on the seat covers and drawing on tables. Kasim asks them to stop, but his friends laugh at him and give him a pen to join in. Kasim does not want to join in but he writes on the table. Describe, using conformity, why Kasim joins his friends in writing on the tables. (2 marks)

EXAM TIP

For any named study on the specification, you may be asked how the study could be improved. Review the weaknesses of the study as these are areas for improvement. Once you have identified an improvement, make sure you justify why it is an improvement to the original study.

For example:

Identify an improvement:

Asch (1951) could use a more representative sample that also included female participants instead of just the 50 male students.

Justify the improvement:

This would make his findings about conformity to a majority group more generalisable to a wider target population.

Identify an improvement:

A more realistic task, such as providing photographs of real objects, could be used to test whether individuals would conform to a majority group.

Justify the improvement:

This would increase the validity of Asch's findings about conformity in real-life situations.

Exam tips provide guidance towards exam success and help students avoid misconceptions

Inside the textbooks...

Link boxes direct students to other pages or chapters where they can refresh their memory or find out more.

48UNIT 1

TOPIC 2 DATA REPRESENTATION

WORKED EXAMPLE 5

In this example, an 8-bit fixed-point number has 4-bits allocated to store the integer part and 4-bits allocated to store the fractional part. Figure 2.7 shows how this works for the number 1011.1010.

-8	4	2	1	$\frac{1}{2}$ (0.5)	$\frac{1}{4}$ (0.25)	$\frac{1}{8}$ (0.125)	$\frac{1}{16}$ (0.0625)
1	0	1	1	1	0	1	0

Integer part
1011 (~5 in denary)

Fractional part
1010 (0.625 in denary)

▲ Figure 2.7 Fixed-point representation of -4.375

To check the denary value of a fixed-point binary number, sum all the numbers with a 1 underneath:
 $-8 + 2 + 1 + 0.5 + 0.125 = -4.375$

LINK
To learn another method of representing binary numbers with a decimal point see Student Book 2, Floating-Point Representation (IEEE-754), on page 29.

AI IN ACTION
AI is moving from 32-bit floats to 16-bit, 8-bit and even 4-bit numbers. This creates smaller and more efficient deep learning models which are more energy efficient and cheaper. Efficient models can run on affordable devices including smartphones and IoT devices, widening access worldwide and cutting carbon footprints. But fewer bits mean new potential failure modes so testing, transparency and careful design matter more than ever.

KEY TERM
binary arithmetic: performing mathematical operations such as addition, subtraction, multiplication and division using binary numbers

Fixed-point binary has many benefits as it is simple and easy to implement in hardware and software. It simplifies computer circuits, which means that less hardware, such as power and memory is required. However, a fixed-point binary system has some significant drawbacks, including:

- The position of the binary point is predetermined and fixed depending on the CPU that is being used. This means that if you need to represent values with a larger integer part or more fractional precision, the system must be redesigned. This makes fixed-point systems less flexible than floating-point systems, where the binary point can move.
- If you need to store very small values, but the system is designed to handle larger integers, it may waste bits that could otherwise be used to increase precision in the fractional part.
- It has limited precision. The fixed position of the binary point limits the number of bits available for either the integer or fractional part of the number. This means that only a limited range of values can be represented accurately, which can lead to errors. For example, imagine you wanted to store 0.3 using the allocation of bits shown in Figure 2.8 for the integer and fractional parts. The closest value you can achieve is 0.25.

-16	8	4	2	1	$\frac{1}{2}$ (0.5)	$\frac{1}{4}$ (0.25)	$\frac{1}{8}$ (0.125)
0	0	0	0	0	0	1	0

▲ Figure 2.8 Limited precision of fixed-point representation representing 0.3

2.2 BINARY ARITHMETIC

Computers are made up of circuits. These circuits carry out operations to be able to process and manipulate data using **binary arithmetic**. This allows computers to perform mathematical operations, such as addition, subtraction, multiplication and division using binary numbers.

ADDITION AND SUBTRACTION

Just like denary arithmetic, binary arithmetic also follows specific rules for carrying out operations.

UNIT 1

TOPIC 2 DATA REPRESENTATION

49

Binary addition

Binary addition is the process of adding two numbers in binary. The rules for binary addition are:

- $0 + 0 = 0$
- $0 + 1 = 1$
- $1 + 0 = 1$
- $1 + 1 = 10$ (This is 2 in denary, so write down 0 as the sum and carry 1 over to the next column)
- $1 + 1 + 1 = 11$ (This is 3 in denary, so write down 1 as the sum and carry 1 over to the next column).

When carrying out binary addition on two binary numbers, both numbers must be in the same format. This means you must either add two unsigned numbers or two signed numbers. Mixing the two formats will result in an incorrect outcome.

WORKED EXAMPLE 6

Let's add these two unsigned binary numbers together using binary addition, as shown in Figure 2.9.

0 0 0 1 1 0 1

+ 1 0 0 1 1 0 1

=

▲ Figure 2.9 Binary addition 00011101 + 10011011

First, you start at the right-hand column, which contains $1 + 1$. In binary, $1 + 1 = 10$. This means you write down a sum value of 0 in the current column and carry over a carry value of 1 to the next column on the left (shown by the red circle) in Figure 2.10.

0 0 0 1 1 0 1

+ 1 0 0 1 1 0 1

= 0

▲ Figure 2.10 Binary addition 00011101 + 10011011 – first step

Next, you need to calculate $1 + 0 + 1$. First, add the original sum of $0 + 1 = 1$ and then add the carried over 1, which gives $1 + 1 = 10$. This means you write down a sum value of 0 in the current column and carry over a carry value of 1 to the next column on the left in Figure 2.11.

0 0 0 1 1 0 1

+ 1 0 0 1 1 0 1

= 0 0

▲ Figure 2.11 Binary addition 00011101 + 10011011 – second step

Continue this for the rest of the values.

- $1 + 1 + 0 = 0$ as the sum and carry over the 1 to the next column
- $1 + 1 + 1 = 1$ as the sum and carry over the 1 to the next column
- $1 + 1 + 1 = 1$ as the sum and carry over the 1 to the next column
- $1 + 0 + 0 = 1$
- $0 + 0 = 0$
- $0 + 1 = 1$

Figure 2.12 shows what the final binary addition result would be.

0 0 0 1 1 0 1

+ 1 0 0 1 1 0 1

= 1 0 1 1 1 0 0 0

▲ Figure 2.12 Binary addition 00011101 + 10011011 – final result

Worked examples walk student through new or challenging concepts step-by-step

International A Level Published Resources: Teacher Resource Packs

- Schemes of work
- Lesson planning
- Classroom resources
- Topic tests
- Exam practice questions
- Model answers
- Mock papers with mark schemes



06

More support tools and services

Our support tools, services and resources explained

What support is there for teachers for exams and products?



ExamWizard



Mocks service



**Ongoing webinars and
professional
development**



Access to scripts



ResultsPlus



Subject advisors

07

Progression to university and beyond

Progression to university

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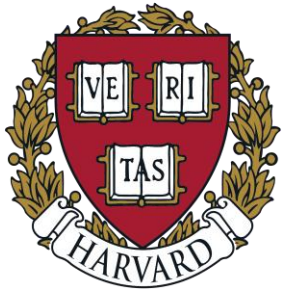
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Any questions?