

# Oxford Resources for Cambridge

2021



# Shaping the future through education

Welcome to the 2021 Oxford resources for Cambridge catalogue.

*We believe* that education can transform lives and realise human potential.

*We recognise* that we are living in an ever changing world, where the way we work, live, learn and communicate with each other is constantly evolving.

*We strive* to inspire, empower and support our worldwide community of teachers, students and parents so that each learner may **aspire** to new heights, **succeed** in their academic goals and **progress** through all stages of the Cambridge Pathway and beyond.

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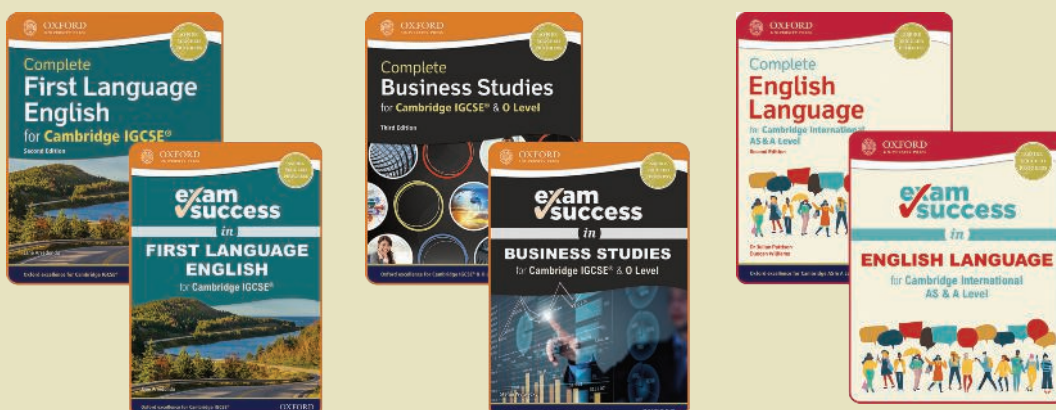
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# Raise your students' grades

Bring clarity and focus to IGCSE® & O Level and AS & A Level exam preparation with detailed guidance and exam practice. Now available in great-value print packs with the Student Books.



Find out more: [www.oxfordsecondary.com/cambridge-exam-success](http://www.oxfordsecondary.com/cambridge-exam-success)

# Oxford resources for Cambridge

## What we offer

Below is a full map of our publishing for Cambridge Assessment International Education syllabuses, so you can see all the subjects and levels we support and find the materials you need.

	Cambridge Primary	Cambridge Lower Secondary	Cambridge IGCSE® & O Level	Cambridge International AS & A Level
Science	Oxford International Primary Science <b>NEW</b>	Complete Science <b>NEW</b> Essential Science	Complete Science <b>NEW</b> Essential Science <b>NEW</b>	Complete Science
Mathematics	Oxford International Primary Maths <b>NEW</b>	Complete Mathematics <b>NEW</b> Essential Mathematics	Complete Mathematics (Core & Extended)* Pemberton Mathematics*	Complete Mathematics
English	Oxford English for Cambridge Primary	Complete English <b>NEW</b> Complete English as a Second Language	Complete First Language English* Complete English as a Second Language* Complete Literature in English	Complete English Language
Global Perspectives		Complete Global Perspectives <b>NEW</b>	Complete Global Perspectives	Global Perspectives & Research
Economics			Complete Economics Essential Economics	Economics
Business Studies			Complete Business Studies Essential Business Studies	Business
Accounting			Complete Accounting Essential Accounting	Accounting
Enterprise			Complete Enterprise*	
Geography			Complete Geography Environmental Management	Geography
History			Complete 20th Century History	
Foreign Languages			Tricolore 4 5e French Gu Wu Mandarin Chinese	
Computing/ICT	Oxford International Primary Computing	Oxford International Lower Secondary Computing	Complete ICT* Complete Computer Science	
Psychology				Psychology

\* These titles are for IGCSE only

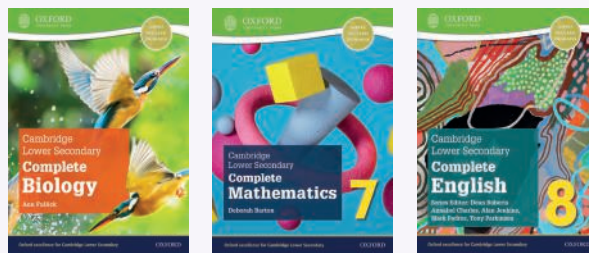


# What's new

## Lower Secondary Science, Mathematics and English

Our revised Complete resources for the latest Lower Secondary curricula retain the strengths of our established Complete series, but with a more explicit focus on building the vital skills that students need to progress to IGCSE. We have also introduced a new digital offer for this range that enhances learning with interactive activities and material.

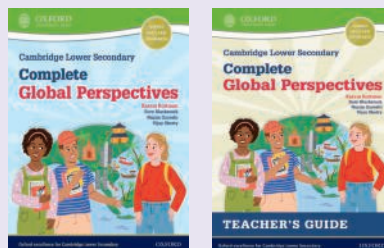
**Pages 5–7**



## Lower Secondary Global Perspectives

Our resources provide structure to Lower Secondary Global Perspectives. They support teachers in developing their approach to this innovative subject and in ensuring students develop the transferable skills required to succeed.

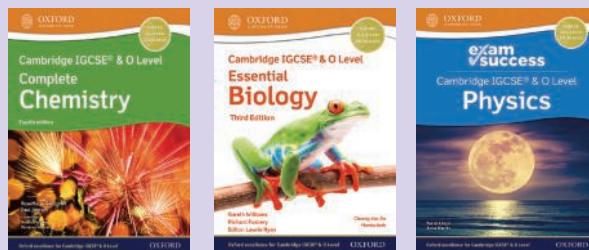
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## IGCSE® & O Level Science

We offer two routes that are completely matched to the latest Cambridge syllabuses and fully equip students for their exams, so you can choose based on your class need and teaching preference. The Complete series is a tried and trusted rigorous route through the syllabus. The Essential series provides a clear, step-by-step approach to the syllabus, ideal for EAL learners.

**Pages 10–12**



# Meet some of Oxford's expert Cambridge author team



At Oxford we work closely with an expert team of examiners, teachers and trainers who have extensive experience of working all around the world.

With in-depth insight into the Cambridge syllabuses and examinations, plus a practical understanding of the challenges learners face, Oxford's authors have excellent knowledge about what students need to confidently aspire, succeed and progress.

## Terry Cook

Terry is a Cambridge Principal Examiner, teacher trainer and author of several Cambridge IGCSE & O Level and AS & A Level Commerce textbooks. Most recently he has written Oxford Exam Success Guides, covering IGCSE Enterprise, IGCSE & O Level Economics and AS & A Level Economics.



## Richard Fosbery

Richard is the Chief Examiner of multiple AS & A Level syllabuses, an experienced international teacher and teacher trainer, and author of several Cambridge Lower Secondary, IGCSE and AS & A Level Science textbooks, including Exam Success in AS & A Level Biology. Throughout his career he has committed to giving his students as much experience of practical Biology as possible.



## Jane Arredondo

Jane is an examiner, teacher trainer and author of Complete First Language English for Cambridge IGCSE and Cambridge Lower Secondary Complete English 9. She feels that being able to communicate clearly and concisely in writing is fundamental to success at all levels of students' education.



## Stefan Wytwyckj

Stefan is a Cambridge Principal Examiner, teacher trainer, teacher and author of Exam Success in Business at both IGCSE and A Level. As a teacher he believes it is his responsibility to support students up to and through their exams, as summative examinations are often crucial in determining a young person's future.



## Philippa Gardom Hulme

Philippa has extensive experience in teaching Chemistry around the world and has authored multiple Oxford titles including for Cambridge Lower Secondary and Cambridge AS & A Level. She knows that students often find Chemistry challenging, and wants to help them reach their potential in their exams.



## James Nicholson

James has taught secondary Mathematics for over 25 years and was a Principal Research Fellow at Durham University. Part of the author team for Complete Mathematics for Cambridge AS & A Level, he believes a practice-focused approach, grounded in real-life application, is vital to supporting students' success.



Prices and publication dates are correct at time of publication and are subject to change.

For the most up-to-date information, visit [www.oxfordsecondary.com/cambridge](http://www.oxfordsecondary.com/cambridge)

Tax may be added to your purchase. The amount will depend on where you are in the world.

To find out more, visit: [www.oxfordsecondary.com/tax](http://www.oxfordsecondary.com/tax)

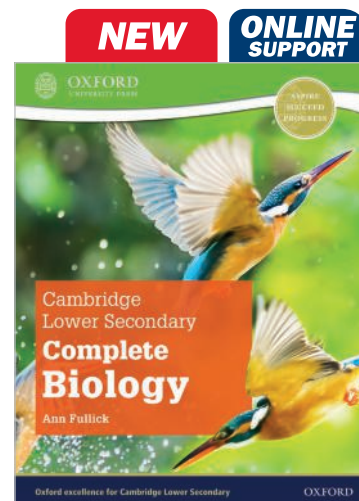



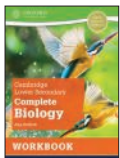


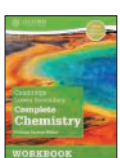
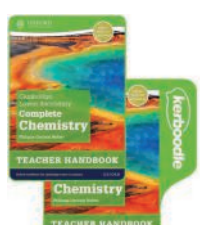

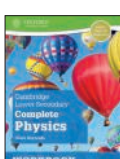

## Complete Science

### Stretch your students and prepare them for the step up to Science IGCSE®

Build a solid foundation in Lower Secondary Science with this **rigorous separate science approach** from experienced authors.

- Materials and activities **signpost the path to Science IGCSE** and help to ensure students make good progress
- Enhance learning with the Kerboodle Book, an electronic version of the Student Book with **extra interactive content**
- Help students **reach their full potential** with Workbooks for independent practice and the Teacher Handbooks, which offer a **fully-integrated formative and summative assessment model**



	Student and Kerboodle Books (Second Edition)	Workbooks	Print & Kerboodle Teacher Handbooks
Biology	 <p>Print 978 138 201834 0 £22.99</p> <p>Kerboodle 978 138 201837 1 £22.99</p> <p>Print &amp; Kerboodle Pack 978 138 201833 3 £30.99</p>	 <p>978 138 201846 3 £9.99</p>	 <p>978 138 201841 8 £82.99</p>
Chemistry	 <p>Print 978 138 201848 7 £22.99</p> <p>Kerboodle 978 138 201851 7 £22.99</p> <p>Print &amp; Kerboodle Pack 978 138 201847 0 £30.99</p>	 <p>978 138 201860 9 £9.99</p>	 <p>978 138 201855 5 £82.99</p>
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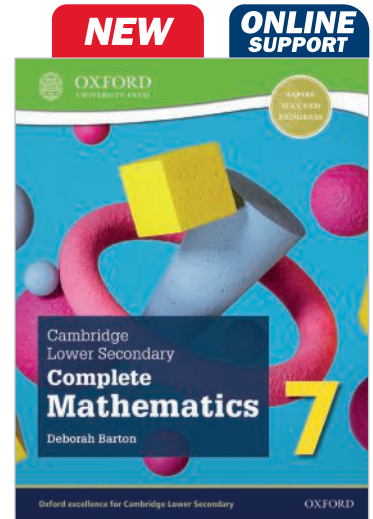
Kerboodle Books are **electronic versions** of the Student Books, for use in the classroom and at home. They feature **extra content and activities** to enhance students' learning.

# Complete Mathematics

## Develop the vital skills your students need to progress smoothly to Mathematics IGCSE®

Ensure students **fully cover and excel** in the Cambridge Lower Secondary Mathematics curriculum, with this **stretching approach** from the expert author of our previous, best-selling edition.

- Make sure your students **progress smoothly towards Mathematics IGCSE** with materials and activities designed to prepare them for the step up
- Improve learning with the Kerboodle Book, an electronic version of the Student Book with **extra interactive content**
- Help students **reach their full potential** with Homework Books for independent practice, and get **full support for teaching the curriculum** from the Teacher Handbooks, including digital content



Cambridge  
Lower Secondary

Mathematics

	Student and Kerboodle Books (Second Edition)	Homework Books (Pack of 15)	Print & Kerboodle Teacher Handbooks
Stage 7 (age 11–12)	 <p>Print 978 138 201862 3 £23.99 Kerboodle 978 138 201865 4 £23.99 Print &amp; Kerboodle Pack 978 138 201861 6 £31.99</p>	 <p>978 138 201872 2 £112.99</p>	 <p>978 138 201869 2 £82.99</p>
Stage 8 (age 12–13)	 <p>Print 978 138 201875 3 £23.99 Kerboodle 978 138 201878 4 £23.99 Print &amp; Kerboodle Pack 978 138 201874 6 £31.99</p>	 <p>978 138 201885 2 £112.99</p>	 <p>978 138 201882 1 £82.99</p>
Stage 9 (age 13–14)	 <p>Print 978 138 201888 3 £23.99 Kerboodle 978 138 201891 3 £23.99 Print &amp; Kerboodle Pack 978 138 201887 6 £31.99</p>	 <p>978 138 201898 2 £112.99</p>	 <p>978 138 201895 1 £82.99</p>



Kerboodle Books are **electronic versions** of the Student Books, for use in the classroom and at home. They feature **extra content and activities** to enhance students' learning.



**Interactive practice and dedicated Cambridge Lower Secondary support** on MyiMaths.

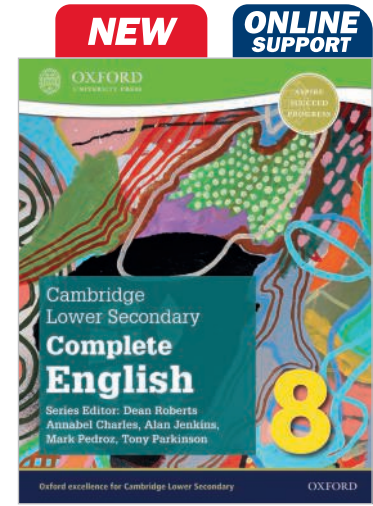
From £625 per annum+VAT  
Find out more:  
[www.myimaths.com](http://www.myimaths.com)

# Complete English

## Fully prepare your students for the transition to English IGCSE®


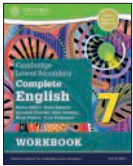







Embed an excellent understanding of the Cambridge Lower Secondary English curriculum and help students reach their full potential with this new edition from internationally experienced authors, all experts in teaching, learning and assessment.

- Help **prepare your students for IGCSE** with materials and activities designed to support the development of required skills
- Strengthen learning with the Kerboodle Book, an electronic version of the Student Book with **extra interactive content**
- Ensure students **achieve their best** with Workbooks for independent practice and full teaching support from the Teacher Handbooks, which include digital content



Cambridge  
Lower Secondary

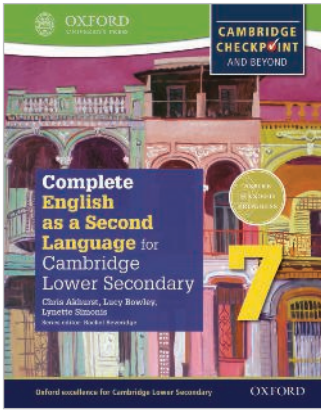
English

	Student and Kerboodle Books (Second Edition)	Workbooks	Print & Kerboodle Teacher Handbooks
Stage 7 (age 11–12)	 <p>Print 978 138 201915 6 £19.99 Kerboodle 978 138 201918 7 £19.99 Print &amp; Kerboodle Pack 978 138 201914 9 £25.99</p>	 <p>978 138 201925 5 £9.99</p>	 <p>978 138 201922 4 £82.99</p>
Stage 8 (age 12–13)	 <p>Print 978 138 201927 9 £19.99 Kerboodle 978 138 201930 9 £19.99 Print &amp; Kerboodle Pack 978 138 201926 2 £25.99</p>	 <p>978 138 201937 8 £9.99</p>	 <p>978 138 201934 7 £82.99</p>
Stage 9 (age 13–14)	 <p>Print 978 138 201939 2 £19.99 Kerboodle 978 138 201942 2 £19.99 Print &amp; Kerboodle Pack 978 138 201938 5 £25.99</p>	 <p>978 138 201949 1 £9.99</p>	 <p>978 138 201946 0 £82.99</p>



Kerboodle Books are **electronic versions** of the Student Books, for use in the classroom and at home. They feature **extra content and activities** to enhance students' learning.





# Complete English as a Second Language

## Develop English language skills for all ability levels

- Equip and **engage learners with integrated activities** and relevant, up-to-date texts
- Benefit from **unit-by-unit teacher notes, answer keys and audio transcripts** in the Teacher Pack

### Complete English as a Second Language (First Edition)

#### Stage 7 (age 11–12)

Student Book	978 019 837812 9.....£20.99
Workbook	978 019 837815 0.....£8.99
Teacher Pack	978 019 837818 1.....£64.99

#### Stage 8 (age 12–13)

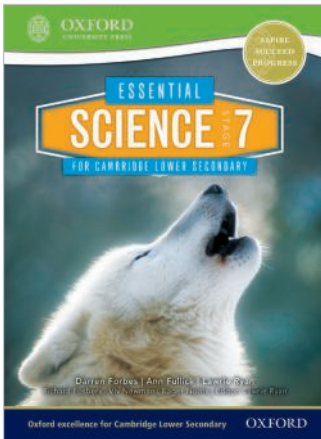
Student Book	978 019 837813 6.....£20.99
Workbook	978 019 837816 7.....£8.99
Teacher Pack	978 019 837819 8.....£64.99

#### Stage 9 (age 13–14)

Student Book	978 019 837814 3.....£20.99
Workbook	978 019 837817 4.....£8.99
Teacher Pack	978 019 837820 4.....£64.99

#### Stages 7–9

Writing and Grammar Practice Book	978 019 837821 1.....£13.99
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# Essential Science

## Enhance EAL students' scientific knowledge

- **Tailor your teaching to ability level** with an integrated approach for ages 11–13 and a separate science approach for ages 13–14
- Help EAL students succeed with **clear, straightforward language**

### Essential Science (First Edition)

#### Stage 7 (age 11–12)

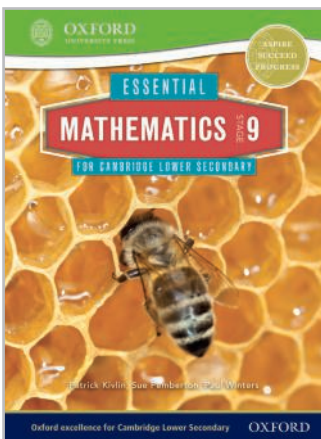
Student Book	978 019 839980 3.....£23.99
Workbook	978 1 4085 2065 9.....£11.99

#### Stage 8 (age 12–13)

Student Book	978 019 839983 4.....£23.99
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#### Stage 9 (age 13–14)

Biology Student Book	978 019 839986 5.....£12.99
Biology Workbook	978 1 4085 2071 0.....£5.99
Chemistry Student Book	978 019 839989 6.....£12.99
Chemistry Workbook	978 1 4085 2074 1.....£5.99
Physics Student Book	978 019 839992 6.....£12.99
Physics Workbook	978 1 4085 2077 2.....£5.99



# Essential Mathematics

## Develop EAL students' mathematical skills

- Support every student with a **clear, international approach**
- **Reinforce knowledge** with engaging exercises and **cement understanding** with theory notes and worked examples

### Essential Mathematics (First Edition)

#### Stage 7 (age 11–12)

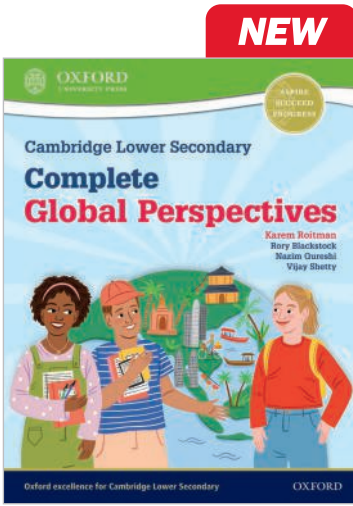
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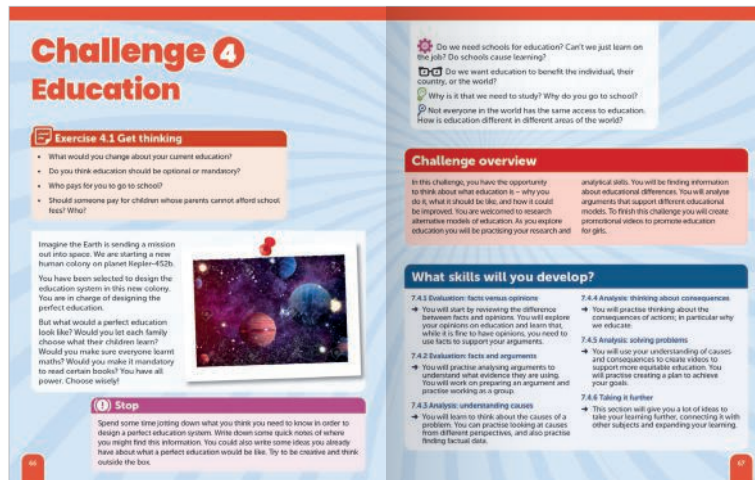


# Complete Global Perspectives

## Support students in developing the outlook of global citizens

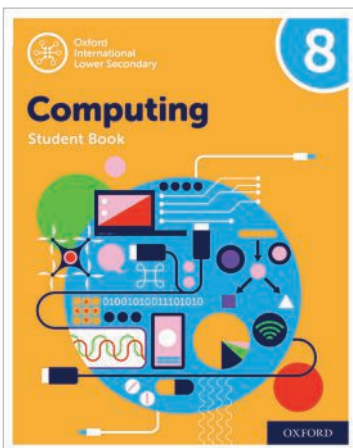
Complete coverage of the three-year syllabus that provides a **clearly-defined route through the course**, from experienced teacher Karem Roitman.

- **Develop key transferable skills** with engaging exercises, and stretch students with extension activities
- Benefit from an **international focus and approach** informed by Global Perspectives experts
- **Save time lesson planning** and get ideas for enabling students to share knowledge collaboratively with the Teacher's Guide



### Complete Global Perspectives Stage 7–9 (age 11–14)

Student Book	978 138 200874 7	£20.99
Teacher's Guide	978 138 200876 1	£81.99



# Computing for Lower Secondary

## Expand students' curiosity with computing skills for the digital world

Equip students for the step up to IGCSE ICT or Computer Science with a practical, project-based approach suitable for the Cambridge ICT Starters syllabus.

- **Build students' knowledge** and competency as the course advances with structured progression and key concepts revisited at each level
- Prepare students for the **demands of the rapidly evolving digital landscape** with a focus on computational thinking, programming skills and digital literacy

### Oxford International Lower Secondary Computing

Student Book 7	978 019 849785 1	£20.99
Student Book 8	978 019 849786 8	£20.99
Student Book 9	978 019 849787 5	£20.99
Teacher's Guide 7–9	978 138 200747 4	£39.99



Cambridge  
Lower Secondary

Global  
Perspectives

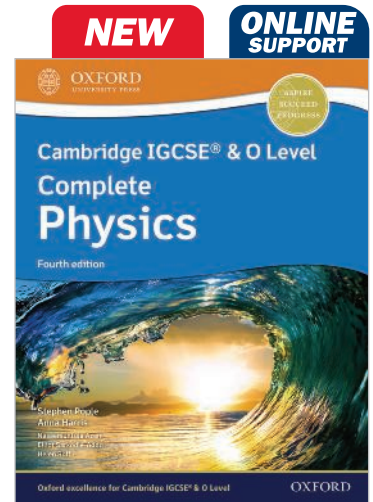
Computing

## Complete Science

A rigorous and engaging approach for the best exam results

Blended support, fully matched to the latest Cambridge IGCSE® & O Level Science syllabuses.

- Help students to progress with **varied and flexible assessment-focused support**
- **Equip learners for further study** with enriching content
- Improve performance with **interactive tests, practice papers and worksheets** in the Enhanced Online Student Books



	Student Books (Fourth Edition)	Workbooks	exam success	
Biology	 <p>Print 978 138 200576 0 £24.99</p> <p>Enhanced Online 978 138 200580 7 £24.99</p> <p>Print &amp; Online Pack 978 138 200575 3 £30.99</p>	 <p>978 138 200583 8 £9.99</p>	 <p>Exam Success Guide 978 138 200629 3 £16.99</p>	 <p>Practical Workbook 978 138 200633 0 £7.99</p>
Chemistry	 <p>Print 978 138 200585 2 £24.99</p> <p>Enhanced Online 978 138 200589 0 £24.99</p> <p>Print &amp; Online Pack 978 138 200584 5 £30.99</p>	 <p>978 138 200592 0 £9.99</p>	 <p>Exam Success Guide 978 138 200634 7 £16.99</p>	 <p>Practical Workbook 978 138 200638 5 £7.99</p>
Physics	 <p>Print 978 138 200594 4 £24.99</p> <p>Enhanced Online 978 138 200598 2 £24.99</p> <p>Print &amp; Online Pack 978 138 200593 7 £30.99</p>	 <p>978 138 200601 9 £9.99</p>	 <p>Exam Success Guide 978 138 200640 8 £16.99</p>	 <p>Practical Workbook 978 138 200643 9 £7.99</p>



Raise your students' grades with Exam Success Guides, providing targeted revision activities and worked examples. Help **grow your students' confidence** with Practical Workbooks, which include complete method, equipment, and safety for all required practicals or alternative to practicals.



# Enriching content equips learners for further study

ORGANISATION AND MAINTENANCE OF ORGANISMS

## 9.4 The heart is the pump for the circulatory system

**OBJECTIVES**

- To know that the blood is pumped around the circulatory system by the action of the heart
- To know that the heart is a muscular organ with four chambers
- To understand how the flow of blood through the circulation is maintained

The heart of a mammal pumps blood through the circulatory system. It provides the pressure that forces the blood through arteries, capillaries and veins. The pressure is generated by the squeezing of the walls of the heart against the incompressible fluid blood. The heart walls can squeeze the blood because they are made of **muscle**, and the muscle contracts rhythmically.

**A double pump**  
The heart is divided into two sides, each of which acts as a pump. The right side of the heart pumps deoxygenated blood coming from the tissues out to the lungs. The left side pumps oxygenated blood coming from the lungs out to the tissues. A much greater pressure (about five times as much) is needed to force blood out to the extremities of the body than is needed to drive blood to the lungs. Because of this, the left side of the heart is much more muscular than the right side (page 101). Even though the two sides of the heart generate different pressures, they work in the same way and have the same parts, as shown in the diagram below.

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ORGANISATION AND MAINTENANCE OF ORGANISMS

**Remember that:**

- The **atrium** receives blood at low pressure from the veins (coming from the lungs or tissues).
- The **ventricle** pumps blood at high pressure out to the arteries (to the lungs or tissues).
- Valves** make sure that the blood flows in the right direction.

**The beating of the heart is controlled by a pacemaker**  
In a healthy person, the heart beats about 70 times a minute during normal levels of activity. This rate is enough to supply blood containing oxygen and nutrients to tissues.

The muscular walls of the heart differ from other muscles in that they never become tired or **fatigued**, because each contraction of the heart is immediately followed by a relaxation. Even when the heart is beating at its fastest during severe exercise (see page 132), the period of relaxation allows the muscle to recover so it does not fatigue.

The pattern of contraction and relaxation is kept going by electrical signals sent from a region of the heart called the **pacemaker**. This is a specialised piece of tissue in the wall of the right atrium. It is sensitive to the swelling of the heart wall as blood enters the heart from the main veins. The signals from the pacemaker make sure that:

- the atria contract just before the ventricles, so that blood flows from atria to ventricles
- the heartbeat is fast enough to meet the demands of the tissues for oxygen and nutrients, and for the removal of wastes.

If the pacemaker does not work as well as it should, an artificial electronic pacemaker can be fitted inside the chest (see box on the right).

**Artificial pacemakers – help for the heart!**  
The beating of the heart is controlled by the natural pacemaker in the wall of the right atrium. If this pacemaker is damaged, pumping goes on automatically at about 30 beats per minute. This is less than half the normal rate, and is only enough to keep a very inactive person alive.

An artificial pacemaker can help people whose natural pacemaker does not work well. This artificial pacemaker is made up of a box containing batteries and an electronic timing device. It is placed in a cavity under the muscle of the upper chest as shown below, and a wire is fed down a vein into the right ventricle. The timing device sends a small electrical charge which triggers the beating of the heart. This is set to give a basic rate of 72 beats per minute. The latest pacemakers can sense changes in breathing, movement and body temperature, and make exactly the right adjustments to heart rate. The battery in the pacemaker is usually replaced every year or so, under local anaesthetic.

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Cambridge IGCSE & O Level Science

Cambridge IGCSE & O Level Complete Biology Student Book (Fourth Edition)

**OXFORD IMPACT EVALUATED**

## Effectively prepare students for IGCSE exam success

An Oxford impact study\* was undertaken to discover to what extent Oxford's Complete Science for IGCSE Third Edition publications contributed to students achieving improved attainment in externally accredited examinations.

This product has been evaluated using the Oxford Impact Framework. The Framework is a systematic approach to evaluating the impact of Oxford University Press products and services, developed through a unique collaboration with the National Foundation for Educational Research (NFER) and supported by the Oxford University Department of Education.

**OXFORD IMPACT FRAMEWORK**  
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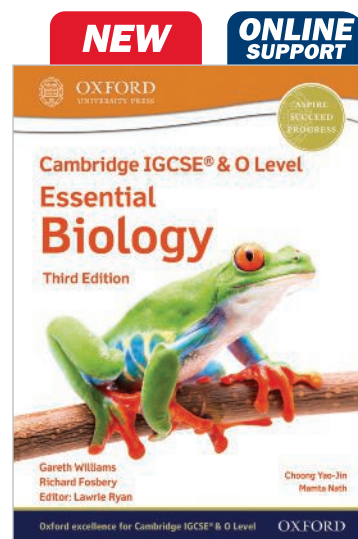
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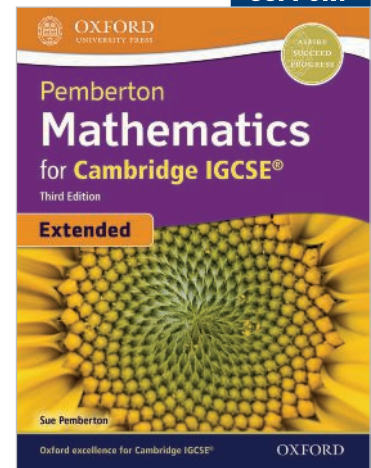
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Cambridge IGCSE

Mathematics

### Expanding more than two brackets

**THIS SECTION WILL SHOW YOU HOW TO**

- Expand more than two brackets
- Sketch graphs of cubic functions

To expand three brackets, you must first expand a pair of brackets to create a 'new' bracket and then you must expand the third bracket with your 'new' bracket. It does not matter which pair of brackets that you multiply first. (The examples in this section all start by multiplying the 2nd and 3rd brackets first.)

Consider the expansion of  $(2x + 3)(x + 2)(x + 4)$ :

$$\begin{aligned} &(2x + 3)(x + 2)(x + 4) && \text{expand the second and third brackets} \\ &= (2x + 3)(x^2 + 4x + 2x + 8) && \text{simplify} \\ &= (2x + 3)(x^2 + 6x + 8) && \text{expand by multiplying each term in the new bracket} \\ & && \text{first by } 2x \text{ and then by } 3 \\ &= 2x^3 + 12x^2 + 16x + 3x^2 + 18x + 24 && \text{simplify} \\ &= 2x^3 + 15x^2 + 34x + 24 \end{aligned}$$

Alternatively, the expansions could be shown in table form:

	$x$	$+4$		$x^2$	$+6x$	$+8$
$x$	$+x^2$	$+4x$	$2x$	$+2x^3$	$+12x^2$	$+16x$
$+2$	$+2x$	$+8$	$+3$	$+3x^2$	$+18x$	$+24$
				$2x^3 + 15x^2 + 34x + 24$		

**EXAMPLE** Expand and simplify  $(2x - 5)(x + 1)(x - 2)$ .

$$\begin{aligned} &(2x - 5)(x + 1)(x - 2) && \text{expand the second and third brackets} \\ &= (2x - 5)(x^2 - 2x + x - 2) && \text{simplify} \\ &= (2x - 5)(x^2 - x - 2) && \text{expand the first bracket with the new bracket} \\ &= 2x(x^2 - x - 2) - 5(x^2 - x - 2) && \text{simplify} \\ &= 2x^3 - 2x^2 - 4x - 5x^2 + 5x + 10 \\ &= 2x^3 - 7x^2 + x + 10 \end{aligned}$$

Alternative method:

	$x$	$-2$		$x^2$	$-x$	$-2$
$x$	$+x^2$	$-2x$	$2x$	$+2x^3$	$-2x^2$	$-4x$
$+1$	$+x$	$-2$	$-5$	$-5x^2$	$+5x$	$+10$
				$2x^3 - 7x^2 + x + 10$		

Expanding more than two brackets 463

**EXAMPLE** Expand and simplify  $(x + 4)^3$ .

$$\begin{aligned} (x + 4)^3 &= (x + 4)(x + 4)(x + 4) && \text{expand the second and third brackets} \\ &= (x + 4)(x^2 + 4x + 4x + 16) && \text{simplify} \\ &= (x + 4)(x^2 + 8x + 16) && \text{expand the first bracket with the new bracket} \\ &= x(x^2 + 8x + 16) + 4(x^2 + 8x + 16) && \text{simplify} \\ &= x^3 + 8x^2 + 16x + 4x^2 + 32x + 64 \\ &= x^3 + 12x^2 + 48x + 64 \end{aligned}$$

**EXERCISE 10.11**

- Expand and simplify.
 

a $x(x + 2)(x + 4)$	b $2x(x + 1)(x - 5)$	c $3x^2(2x - 5)(x - 2)$
d $7x(2x - 1)(5 - 7x)$	e $3xy(x - 2)(y + 4)$	f $2xy^2(1 - 3x)(2 - 5y)$
- Expand and simplify.
 

a $(x + 2)(x + 1)(x + 5)$	b $(x + 4)(x + 3)(x + 2)$
c $(2x + 1)(x + 2)(x + 1)$	d $(2x + 3)(3x + 2)(x + 5)$
- Expand and simplify.
 

a $(x + 2)(x - 1)(x + 4)$	b $(x - 1)(x - 3)(x + 2)$
c $(2x - 5)(x - 3)(x - 1)$	d $(5x + 1)(3x - 1)(x + 3)$
- Expand and simplify.
 

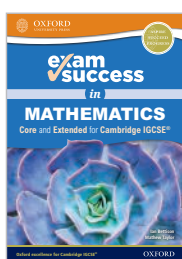
a $(3 - x)(2x - 1)(1 - 3x)$	b $(x + 5)(1 - 2x)(3 - 2x)$
c $(x^2 + 1)(4 - x^2)(3x + 2)$	d $(3 - x^2)(2 - 5x)(2x + 1)$
- Expand and simplify.
 

a $(x + 1)(x + 3)^2$	b $(x - 2)(2x + 1)^2$	c $(3x + 2)(x - 5)^2$
d $(x - 2)^3$	e $(x - 1)^3$	f $(2x - 5)^3$
- $3x^2 - 21x^2 + 21x + 45 = a(x + 1)(x - 3)(x + b)$   
Find the value of  $a$  and the value of  $b$ .
- $2x^3 + 13x^2 + 25x + 14 = (ax + b)(x + 2)(x + 1)$   
Find the value of  $a$  and the value of  $b$ .
- $8x^3 + 12x^2 - 236x - 118 = a(x + b)(2x + 1)(x - 5) + 2$   
Find the value of  $a$  and the value of  $b$ .
- Expand and simplify.
 

a $(x + 1)(x + 2)(x + 3)(x + 4)$	b $(x - 1)(x + 1)(x + 2)^2$
c $(2x + 1)(x - 1)(x + 5)(x + 2)$	d $(1 - x)(2x - 1)(3x + 1)(2 - x)$
e $(x + 1)^4$	f $(3 - 2x)^4$

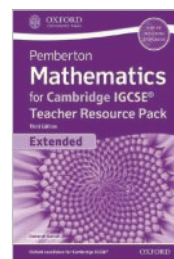
UNIT 10 464 UNIT 10

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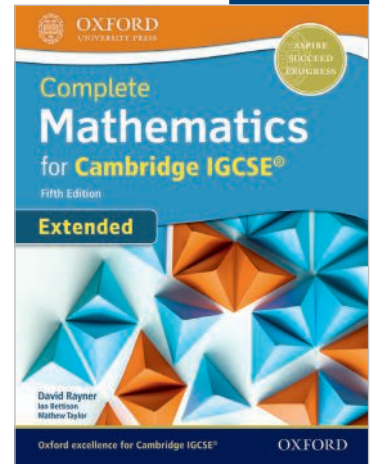
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7.  $\epsilon$  = {positive whole numbers from 1 to 20}, F, P and T are sets of positive whole numbers, such that  $F = \{1, 2, 3, 5, 8, 13\}$ ,  $P = \{2, 3, 5, 7, 11, 13, 17, 19\}$ , and  $T = \{3, 6, 9, 12, 15, 18\}$ .
- Illustrate these three sets in a Venn diagram.
  - Calculate
    - $p(F \cap P)$
    - $p(F \cup T)$
    - $p(P \cap T)$
    - $p(F \cup P)$
    - $p(F \cup T)$

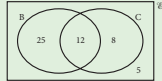
## 10.6 Conditional probability

A *conditional probability* is the probability of an event, given that another event has occurred. The probability of event A, given that event B has already occurred, is called the probability of A given B and is written  $p(A|B)$ . There are many ways to calculate conditional probabilities, including tree diagrams, Venn diagrams, and just common sense combined with a basic knowledge of probability.

Sometimes it can be useful to use the formula  $p(A|B) = \frac{p(A \cap B)}{p(B)}$

### Example

On one floor of a bookshop is a café. Some people go into the shop just to use the café, some just to buy a book, some to do both, and some do not do either. The Venn diagram shows what a group of 50 people did in the bookshop.



$\epsilon$  = {the group of 50 people}  
 B = {those who bought a book}  
 C = {those who used the café}

Work out

- $p(B|C)$
- $p(C|B)$

a)  $p(B|C) = \frac{\text{the number of people who buy a book and use the café}}{\text{the number of people who use the café}} = \frac{12}{20}$

b)  $p(C|B) = \frac{\text{the number of people who buy a book and use the café}}{\text{the number of people who buy a book}} = \frac{12}{25}$

Notice that  $p(B|C)$  and  $p(C|B)$  are not the same.

Conditional probability 381

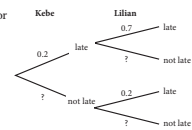
### Exercise 6

- A regular pack of playing cards contains 26 red cards and 26 black cards. If you are asked to pick a card at random, what is the probability that you will choose a red card, given that one black card has already been removed from the pack and not replaced?
- A bag of sweets contains 3 red sweets, 4 green sweets and 2 orange sweets. Harjit chooses a sweet at random and eats it. Satpal then chooses a sweet.
  - What is the probability that Satpal chooses a green sweet, given that
    - Harjit's sweet was orange
    - Harjit's sweet was red?
  - What is the probability that they both chose green sweets?
- A group of 50 people went to a restaurant for a meal. They each chose a main course and a dessert. Their choices are shown in the following table.

	Cheesecake	Ice-cream	Total
Pizza	17	9	26
Chicken curry	10	14	24
Total	27	23	50

What is the probability that a randomly selected member of the group will have chosen

- chicken curry
  - ice-cream
  - cheesecake, given that they chose pizza
  - chicken curry, given that they chose ice-cream
  - ice-cream, given that they chose chicken curry?
4. If Kebe is late for school, the probability that Lilian is late for school is 0.7.
- If Kebe is not late for school, there is still a probability of 0.2 that Lilian will be late. The probability that Kebe will be late for school is 0.2. Here is a tree diagram illustrating this information.



382 Probability

Complete Mathematics for Cambridge IGCSE Extended Student Book (Fifth Edition)

# Encourage top results with exam-focused guidance

1.1 Number
1.1

**You need to:**

- Be able to identify and use
  - natural numbers
  - integers
  - prime numbers
  - square and cube numbers
- common factors and common multiples
- rational and irrational numbers
- real numbers
- reciprocals

**Key skills**

You need to be able to write any number as the product of prime factors.

**Exam tip**

Use a factor tree to help you.

**Exam tip**

Give your answer using index notation rather than written out in full.

Section 1.7 covers index notation and the rules of indices

**Apply**

Make a list of

- the first 15 prime numbers
- the first 15 square numbers
- the first 8 cube numbers.

**Recap**

**Natural numbers** are the numbers you use to count. So the natural numbers are 1, 2, 3, 4, ...

**Integers** are 'whole numbers'. They can be positive, or negative (with zero in between). So the integers are the numbers ...-3, -2, -1, 0, 1, 2, 3, ...

**Positive integers** are the numbers 1, 2, 3, 4, ...

**Negative integers** are the numbers -1, -2, -3, -4, ...

**Prime numbers** A prime number has only two (different) factors (i.e. 1 and itself). So 1 is not a prime number. The prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, ... (The number of primes is infinite).

**Worked example**

Express 504 as the product of prime factors. [2 marks]

Divide 504 by the smallest possible prime number, in this case 2. Continue until you have only prime numbers in your tree.

Hence  $504 = 2^3 \times 3^2 \times 7$

**Recap**

**Square numbers**

$1^2 = 1, 2^2 = 4, 3^2 = 9, \dots$  so the numbers 1, 4, 9, ... are square numbers.

$1 = 1 \times 1 \quad 4 = 2 \times 2 \quad 9 = 3 \times 3$

**Cube numbers**

$1^3 = 1, 2^3 = 8, 3^3 = 27, \dots$  so the numbers 1, 8, 27, ... are cube numbers.

**Recap**

**Common factor** 3 is a common factor of 9 and 12 since 3 is a factor of both 9 and 12.

**Common multiple** 30 is a common multiple of 6 and 15 since 30 is a multiple of both 6 and 15.

**Worked example**

Find the highest common factor and lowest common multiple of 60 and 504. [4 marks]

$60 = 2^2 \times 3 \times 5$   
 $504 = 2^3 \times 3^2 \times 7$

The highest common factor is the product of the prime factors common to both numbers

In this case,  $2^2$  and 3.  
 $HCF = 2^2 \times 3 = 12$

The lowest common multiple is the product of the largest power of each prime that appears in either number.

In this case,  $2^3, 3^2, 5$  and 7.  
 $LCM = 2^3 \times 3^2 \times 5 \times 7 = 2520$

**Recap**

A **rational number** is a number which can be expressed in the form  $\frac{p}{q}$  where  $p$  and  $q$  are whole numbers.

- All decimals which recur are rational. For example,  $0.3 = 0.333333\dots$  is rational since  $0.3 = \frac{3}{10}$ .
- All decimals which terminate (i.e. which end) are rational. For example,  $0.625$  is a rational number since  $0.625$  can be written as  $\frac{625}{1000} = \frac{5}{8}$ .

An **irrational number** is a number which cannot be expressed in the form  $\frac{p}{q}$  where  $p$  and  $q$  are integers.

For example  $\pi, \sqrt{2}$  and  $\sqrt[3]{7}$  are all irrational numbers.

**Recap**

A **real number** is any rational or irrational number that can be represented on a number line.

**Key skills**

You need to be able to work out the **Highest Common Factor (HCF)** and the **Lowest Common Multiple (LCM)** of two numbers.

**Exam tip**

Write both numbers as the product of prime factors first.

**Exam tip**

$2^2$  is common to both numbers, but not  $2^3$ . Likewise, 3 is common to both numbers, but not  $3^2$ .

**Watch out!**

$\sqrt{\frac{1}{4}}$  doesn't look rational but it is since  $\sqrt{\frac{1}{4}} = \frac{\sqrt{1}}{\sqrt{4}} = \frac{1}{2}$

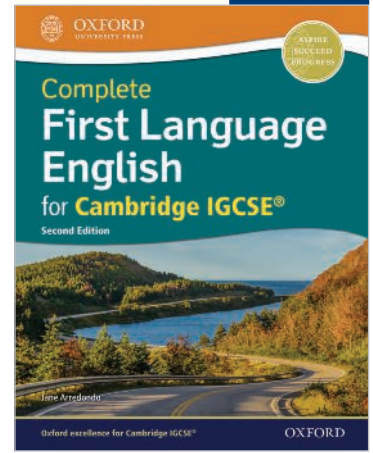
Chapter 1
Chapter 1

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# Develop advanced skills with a stretching approach

## Preparing for your exams

**Question 10) of Paper 1 Reading** will ask you to write a summary of a text in no more than 120 words. Follow these simple points for success.

1. **Keyword the question.** Identify what information you need to select. Is it from all of the text or only part of it?
2. **Mentally convert the task into a question.** This may help you to select relevant points.
3. **Re-read the text, selecting and underlining details.** Number the details in the margin. Use letters (a/b/c) as well if there are two aspects to the question.
4. **Decide how to present these details in your summary.** It may not be the same as in the text.
5. **Write the summary, ticking off each point as you go** to avoid overlooking anything. Do not include an introduction or conclusion. Be concise. Use complex sentences to combine details with a colon or semi-colon when possible.
6. **Count the number of words.** If you have over 120 words, rephrase sentences to shorten them. If you have under or about 100 words, something is missing.
7. **Proofread and correct spelling, punctuation and grammar.**
8. **Finally, ask yourself:** Will this get 10/10 for understanding the text and 5/5 for summary style and use of language? To achieve 5/5 for summary style, you need to have made all the points clearly and concisely in your own words.

### Writing summaries

Re-read the exam-style question from page 165, then do the task that follows.

Using information in the article on pages 164–165 about Amber Owen, summarise how the young elephant Ning Nong may have saved her life.

Use your own words as far as possible. Write no more than 120 words.

### The best of three ...

Here are three students' summaries for this question. Read them carefully and decide:

- which is good about their writing
- which one will not get very high marks, and why
- which one will get very good marks, and why

### Response A

Four year old Ning Nong was an elephant he who had strong in surging water to save Amber's life. Amber Owen was a girl from England on holiday with her parents in Thailand when the tsunami waves started. Ning Nong instinctively knew something was wrong and his actions saved her life. Ning Nong was swimming and trying to get away up the beach from his trainer away from the water. It started coming in, fast then he started to run and all Amber could do was cling to his back. Instead of throwing her off he swam through the swirling current up the beach to a wall where Amber jumped off. She was saved because Ning Nong knew what was going on. (120 words)

### Response B

When Amber Owen was eight she was on holiday with her parents in Phuket, Thailand. Each day she went down to the beach to ride a four year old elephant named Ning Nong. She was there with the elephants when the tsunami struck the beach. Ning Nong's instinct would have told it there was a disaster coming because he tried to get away from his trainer pulling him up the beach. As the water swirled round their feet Ning Nong he got away, nuzzling up the beach away from the water with Amber clinging tightly to his back. Instead of trying to get out of her through, he hit found a wall and let her jump off onto it. The elephant saved the girl's life. (125 words)

### Response C

Eleven years old Amber Owen was in Phuket on holiday when the terrible tsunami struck while she was enjoying a ride on a young elephant named Ning Nong. The water receded so far fish were stranded and the elephant knew by instinct this meant something was wrong. He started trying to pull his trainer up the beach and swaying too and fro with distress. Amber clinging to his back as the water swirled around his feet. But instead of trying to get her off he charged up the beach away from the rising incoming waves and didn't stop until he reached a high wall where Amber could get off to safety. The elephant almost certainly saved her life. (125 words)

## Unit 7 Literature extension

### The Great Frost

Between 1560 and 1660 there was a period now known as 'The Little Ice Age' that particularly affected northern Europe. Read the following extract about the effect of weather conditions in England in the early 17th century. Decide whether you think it is fiction or literary non-fiction.

1. Identify words and phrases that suggest this is an informative account for non-fiction.
2. Identify words and phrases that suggest this is descriptive writing for fiction.
3. Read the extract again and decide whether it is fiction or non-fiction. Write a paragraph to explain your views. Remember to quote from the extract to support your ideas.

### The Great Frost

From *Orlando* by Virginia Woolf (1928)

THE Great Frost was, historians tell us, the most severe that has ever visited these islands. Birds froze in mid-air and fell like stones to the ground. At Norwich a young countrywoman started to cross the road in her usual robust health and was seen by the onlookers to turn visibly to powder and be blown in a puff of dust over the roofs as the icy blast struck her at the street corner. The mortality among sheep and cattle was enormous. Corpses froze and could not be drawn from the sheets. It was no uncommon sight to come upon a whole herd frozen immovable upon the road. The fields were full of shepherds, ploughmen, teams of horses, and little bird-scaring boys all struck stark in the act of the moment, one with his hand to his nose, another with the bottle to his lips, a third with a stone raised to throw at the raven who sat, as it stuffed, upon the hedge within a yard of him. The severity of the frost was so extraordinary that a kind of purification sometimes ensued, and it was commonly supposed that the great increase of rocks in some parts of Derbyshire was due

to no eruption, for there was none, but to the solidification of unfortunate wayfarers who had been turned literally to stone where they stood. The Church could give little help in the matter, and though some landowners had these relics blessed, the most part preferred to use them either as landmarks, scratching-posts for sheep, or when the form of the stone allowed, drinking troughs for cattle, which purposes they serve, admirably for the most part, to this day.

But while country people suffered the extremity of want, and the trade of the country was at a standstill, London enjoyed a carnival of the utmost brilliance. The Court was at Greenwich, and the new King seized the opportunity that his coronation gave him to curry favour with the citizens. He directed that the river, which was frozen to a depth of twenty feet and more for about six or seven miles on either side, should be swept, decorated and given all the semblance of a park or pleasure ground with arbours, mazes, alleys and drinking booths etc. at his expense.

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### 1 Preparing for Paper 1 - Reading

**Keywording and answering Question 1 (a)–(e)**

**Activity**

Read **Text A, Silence**, and then answer **Question 1 (a)–(e)**

**Question 1**

(a) Give **two** examples of 'bad silence', according to the text.

When a joke is met with silence not laughter  
When an audience doesn't clap after a concert or play

(b) Using your own words, explain what the writer means by:

(i) A Victorian parent's 'children should-be-seen-and-not-heard silence' (line 3)

When a very strict parent stops children from talking or behaving in a normal way

(ii) the 'silencing' of censorship (line 5)

When people are prevented from speaking freely

(c) Re-read paragraph 2 ('Most of us ... everyone is staring at you'). Give **two** reasons why actors and musicians might like and dislike silence (one reason for like and one for dislike).

It shows the audience are listening.  
It also shows they do not like what they hear or see.

(d) Re-read paragraphs 3, 4 and 5 ('Gross goes on to say ... silence perhaps isn't natural for other human beings').

(i) Identify **one** example of an author who works well amid the 'bustle' of a café, according to the text.

J.K. Rowling

(ii) Explain why parents of small children might be confused about the need for silence at bedtime, according to the text.

Parents think babies need silence to sleep or stay asleep because they (the parents) do last research shows babies sleep in noise and a gentle rhythm is like the sounds in the world.

(e) Re-read the whole text.

Using your own words, explain why most people have 'ambivalent attitudes' to silence, according to the text.

People both like and dislike silence. Sometimes it can be peaceful and help you to work, but it can also mean disapproval of a joke or your beliefs, as in censorship, and people do not like this.

### 1 Unit 1: Preparing for Paper 1 - Reading

**Skimming, scanning and annotating texts**

To find the information in the texts and answer the questions, you need to use your skimming and scanning skills, and annotate the text.

Look below at how the student used the text to find answers for Question 1(a)–(e).

There are various options for Question 1(a), but you are only asked for two. This student chose not to repeat 'the silencing of censorship' for Question 1(a) because it forms part of Question 1(b). In this way, the student shows understanding of the text and the vocabulary.

Question 1(c) asks for two reasons: only one for like and one for dislike. You need to show you understand what is implied by 'you-could-hear-a-pin-drop' in this context and the use of the word 'deafly'.

Question 1(d) wants you to find the word 'bustle' and explain who can write in the 'hubbub' of a noisy place.

**Annotating Text A**

**Text A: Silence**

This text is about different types of silence.

According to the poet Philip Gross, writing in the Spring issue of *The Author*, when one says the word 'silence' it 'feels like noise'. He then goes on to list 'a whole crowd of meanings' related to 'silence'. There is, he says, 'Angry Silence, a Victorian parent's children-should-be-seen-and-not-heard silence. Worse, the bad silence of secrets in the family. There is the "silencing" of censorship. But there is also the joy of silence, such as when a poet can feel an audience's "deep listening".'

Most of us have ambivalent attitudes to silence. On the one hand, it is desirable – we need it to be creative or to focus clearly on a task in hand – like writing or revision – but in other ways it is to be feared. There's that awful moment after you tell someone something and there's no response: a joke that's met with silence or the unspoken words of sensible fear. There's the you-could-hear-a-pin-drop anticipation of an audience waiting for a performance to begin and the deathly, unwelcome silence when there's no applause. There's the gift of silence as you see a glorious view for the first time and hear yourself sigh; there's the appalling silence when you realise everyone is staring at you.

Gross goes on to say that most writers 'can only breathe and write in silence', but many writers can work well amid the bustle and hubbub of cafés. J.K. Rowling wrote most of her first Harry Potter story in a café so that's testament to that.

Then there is the conundrum of caring for babies: most parents are afraid a sudden din might wake a sleeping infant, yet one of the best ways to soothe a fretful baby is to place it near a loaded washing machine – apparently rumbling white noise reminds them of the womb.

So, much as I love the absence of commotion in any form, I have to accept that silence perhaps isn't natural for other human beings.

**Annotations:**

- Q1a – bad
- Q1a
- Q1a & b – preventing freedom of speech
- Q1c – ambivalent
- Q1a – bad silence
- Q1c – expectation
- Bad silence for performers
- Q1d
- Q1d(i)
- Ironical opposites

22 Unit 1

Unit 1 23

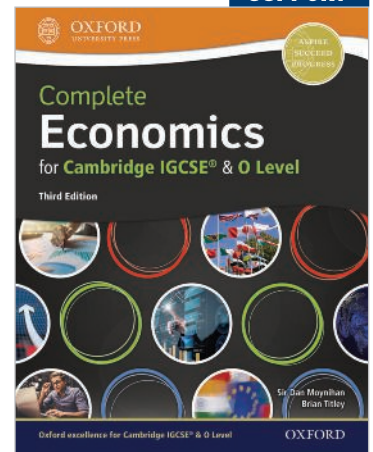


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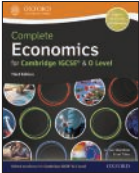
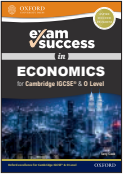
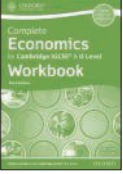

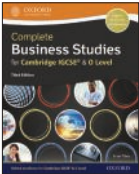
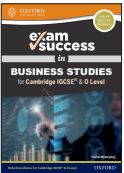
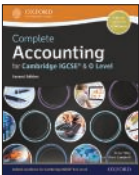
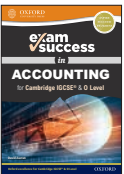
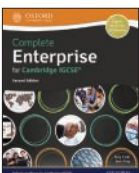
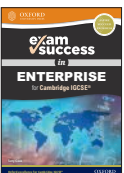
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## 5.5 Analysis of accounts

- 5.5.1 Profitability
- 5.5.2 Liquidity
- 5.5.3 How to interpret the financial performance of a business

### Key POINTS

- ▶ Ratio analysis can be used to monitor the performance of a business over time and to compare the performance of different businesses.
- ▶ An **accounting ratio** or **financial ratio** involves comparing two figures in the financial statements of a business. A financial ratio is produced by dividing one figure by another and producing a value to measure performance.
- ▶ Performance ratios measure how well a business is using its assets to generate profits.
  - The **gross profit margin** measures how much gross profit a business has earned as a proportion of its total revenue from sales.
  - The **profit margin** is a measure of how much profit a business has earned as a proportion of its total revenue from sales.
  - The **return on capital employed (ROCE)** expresses the profit of a business as a percentage of its long-term capital employed in assets.
- ▶ **Liquidity ratios** measure the ability of a business to pay its short-term debts – or current liabilities – from its holdings of cash and other current assets.
  - A **current ratio** of less than one means a business has negative working capital and does not have enough current assets to meet its current or short-term liabilities.
  - The **acid test ratio** measures whether or not a business is able to meet its short-term liabilities without having to sell off its inventories.

### Business BUZZWORDS

**Ratio analysis** – using accounting ratios to measure, monitor and compare the financial performance of a business over time and with other businesses.

**Performance ratios** – measures of how well a business is using its assets to earn profits.

**Gross profit margin** – gross profit as a percentage of revenue.

**Profit margin** – profit before tax as a percentage of revenue.

**Return on capital employed (ROCE)** – profit expressed as a percentage of the capital employed in a business.

**Liquidity ratios** – or solvency ratios, measure the ability of a business to settle its current liabilities from its cash and other current assets.

**Liquidity** – a measure of the ability of a business to raise cash from its current assets to meet its immediate and short-term debts.

**Illiquid** – term used to describe a business that has insufficient cash or other current assets it can convert quickly and easily to cash.

**Current ratio** – the value of current assets expressed as a ratio of the value of current liabilities.

**Acid test ratio** – current assets less inventories expressed as a ratio of current liabilities.

404 Financial information and decisions

### Interpreting financial performance

**Ratio analysis involves comparing information in the financial statements of a business to measure its performance**

If a business is to survive and grow it must make a profit and have enough cash to pay its bills. However, simply measuring how much profit a business makes each period and how much cash it has doesn't tell us very much about its financial strength or performance.

Most businesses aim to make a profit and calculate their profit as the difference between their revenues and costs each period using an income statement. However, some businesses are able to generate more profit from their resources than others. For example, compare the financial information on the two companies below.

Better Buy plc	year to June	Smart Buy plc	year to June
		(\$m)	
profit	2	profit	2
Capital employed	10	Capital employed	4
Cash	3	Cash	1
Liabilities falling due	4	Liabilities falling due	0.5

Both Better Buy plc and Smart Buy plc each made the same amount of profit last year. However, Better Buy plc is a much larger business organization than Smart Buy plc.

The owners of Better Buy have invested \$10 million of capital in their business. A profit of \$2 million therefore represents a return of 20% on their investment.

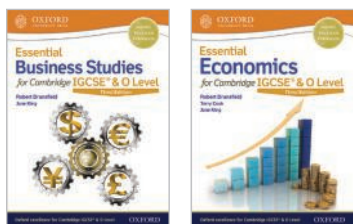
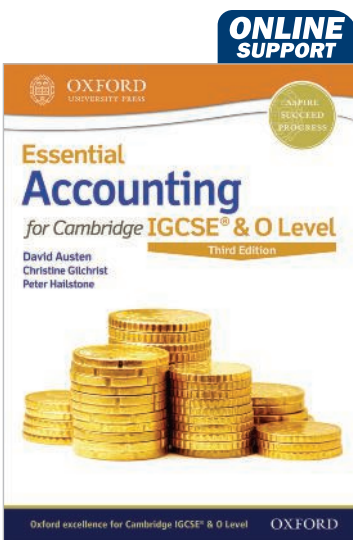
In contrast, the owner's capital invested in Smart Buy is just \$4 million. A profit of \$2 million therefore provides its owners with a 50% return on their investment. Smart Buy is therefore a more profitable business because it generates more profit from each \$1 invested in its capital than Better Buy.

However, Better Buy held more cash than Smart Buy last year but it also had far bigger debts or liabilities to pay off than Smart Buy. In fact, Better Buy had a liquidity problem because it didn't have enough cash or other assets it could convert to cash to pay off all its debts in need of settlement that year.

Simply looking at the amount of profit each business makes and how much cash it holds therefore tells us nothing about their **profitability** or **liquidity**. Analysing financial information from business accounts by comparing two or more figures, such as profit as a percentage of capital employed or the ratio of cash to current liabilities, provides a much better picture of business performance and is called **ratio analysis**.

Analysis of accounts 405

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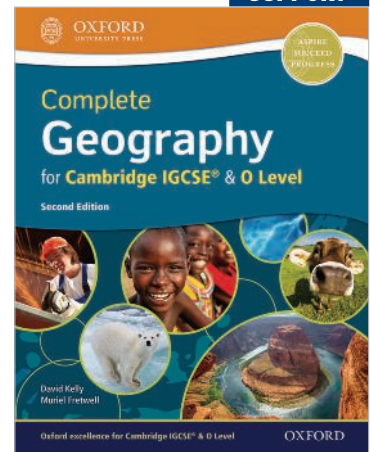
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Geography

### 8 Development

#### Transnational corporations (TNCs)

Transnational corporations are large companies that operate (as producers or sellers) in many countries or continents. They are willing to change the suppliers of their raw materials and components – and the locations of their activities – to wherever conditions for production or sales are most favourable. These companies control an increasing proportion of the global economy.

**RESEARCH** List the TNCs that operate in your local area. Remember that some of them could operate through petrol stations or supermarkets. Also remember that not all are involved in manufacturing. Companies like the travel company Tui (which owns Thomson Holidays and First Choice) and the accountancy and audit firm PricewaterhouseCoopers are service industry TNCs.

**Fig. 8.13** The global brands of one TNC, Volkswagen

The world's top ten companies (as measured by their sales) are shown in Table 8.5. They each have annual sales that are greater than the gross domestic product (GDP) of many entire countries.

TNCs have a strong influence on LEDCs, where they often locate activities like production. There has been some criticism of this, but the presence of TNCs in LEDCs can lead to both advantages and disadvantages for those countries.

#### Advantages of a TNC for the LEDC

- A TNC provides jobs for local people.
- It provides a guaranteed income for people.
- It improves people's skills.
- It brings in foreign currency, which helps the country to develop.
- The increased employment also increases the demand for consumer goods in the LEDC and helps other industries to develop there.
- It can lead to the development of local raw materials, such as mining minerals or growing crops.
- It often leads to the development of infrastructure projects, such as roads, dams, airports, schools, and hospitals.

Rank	Name	Industry	Sales (million US\$)	Number of employees	Location of headquarters
1	Walmart	Retail	485 873	2 300 000	USA
2	State Grid	Utilities	315 199	926 067	China
3	Sinopec Group	Petroleum refining	267 518	713 288	China
4	China National Petroleum	Petroleum refining	262 573	1 512 048	China
5	Toyota	Motor vehicles	254 694	364 445	Japan
6	Volkswagen	Motor vehicles	240 264	626 715	Germany
7	Royal Dutch Shell	Petroleum refining	240 033	89 000	Netherlands UK
8	Berkshire Hathaway	Insurance	223 604	367 700	USA
9	Apple	Computers and office equipment	215 639	116 000	USA
10	Exxon Mobil	Petroleum refining	205 004	72 700	USA

**Table 8.5** The world's top ten companies, as measured by their sales, in 2016

#### Disadvantages of a TNC for the LEDC

- Most of the profits go abroad and are not reinvested in the LEDC.
- The numbers of local people employed can be small.
- The TNC might suddenly decide to leave the LEDC, if conditions inside or outside the country change. This decision is made outside the LEDC.
- Raw materials, such as minerals, are often exported and not processed in the LEDC.
- Levels of pay are lower than elsewhere in the world.
- The operations of the company may cause environmental damage.

#### Impacts in MEDCs

- Areas involved in manufacturing industries have suffered when TNCs have moved production to places with cheaper labour, often in LEDCs. This has led to unemployment and the economic decline of some regions in a MEDC.
- TNCs have often located their headquarters in "world cities" from where global brands are managed. This has increased skilled employment in management, accountancy, legal services, marketing, and IT. Economic growth has occurred in these cities.

**CASE STUDY**

#### Toyota – a leading motor vehicle manufacturer

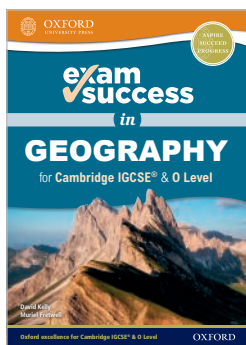
**Toyota worldwide**  
The Toyota Motor Corporation of Japan has around 40% of the Japanese motor vehicle market, but it manufactures and sells its vehicles in 170 countries. It is the world's biggest car manufacturer (see Table 8.6) and the world's fifth largest company by the value of its sales (see Table 8.5). It conducts its business with 51 overseas manufacturing companies in 26 countries (see Fig. 8.14 and Table 8.7).

The country outside Japan in which most Toyota vehicles were assembled in 2016 was the USA, with a production of more than 1 380 000. China was the second largest overseas producer, with nearly 1 100 000. With more than 600 000, Canada ranked third. By contrast, only 127 000 vehicles were assembled in the whole of the continent of Africa.

Of the ten Toyota plants in China, three assemble vehicles while the other seven make engines and components to supply the assembly plants.

**Fig. 8.14** Toyota operates all over the world. (Toyota's factory locations in Japan itself are shown in Figs. 8.15 and 8.16, plus Tables 8.8 and 8.9.)

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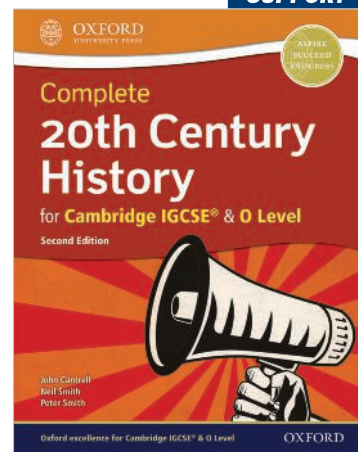
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History

### In what ways was the United States to blame?

Revisionist historians thus place the bulk of the blame for starting the Cold War on the United States. Two major lines of argument have emerged among historians who blame the United States for the breakdown in superpower relations.

Argument 1: US policy was influenced by the need to create global free markets for US goods

- The United States ended its Lend-Lease arrangements with the Soviet Union in 1945.
- Marshall Aid was not designed to prevent European economies from collapsing; its true purpose was to provide a market for US goods and to ensure the preservation of a capitalist, free market system.
- The creation of Bizonia and later introduction of a new currency into the western zones was a clear breach of the Potsdam agreement, and was an attempt to impose a capitalist system across the whole of Germany.

Argument 2: US policy was influenced by important personalities such as President Truman

- Truman had been very aggressive in his dealings with Molotov, the Soviet Foreign Minister, during meetings in April 1945.
- Truman believed the US atomic monopoly would allow it to dictate terms at the Potsdam Conference.
- The Truman Doctrine and Marshall Aid were regarded by the Soviet Union as highly provocative and designed to isolate the Soviet Union.

SOURCE 13

Extract from the Novikov telegram, an interpretation of US foreign policy written by the Soviet Ambassador to the US, Nikolai Novikov, 27 September 1946.

*The foreign policy of the United States, which reflects the imperialist tendencies of American monopolistic capital, is characterized in the post-war period by a striving for world supremacy. This is the real meaning of the many statements by President Truman and other representatives of American ruling circles; that the United States has the right to lead the world. All the forces of American diplomacy—the army, the air force, the navy, industry, and science—are enlisted in the service of this foreign policy. For this purpose broad plans for expansion have been developed and are being implemented through diplomacy and the establishment of a system of naval and air bases stretching far beyond the boundaries of the United States, through the arms race, and through the creation of ever newer types of weapons.*

◀ Fig. 4.10 Arguments blaming the US for the breakdown in superpower relations

#### QUICK QUESTION 7

When do you think the Cold War began? What would this suggest about the main cause, or culprit, behind the start of the Cold War?

SOURCE 14

Malenkov, a senior Soviet politician, presents his view of the US containment policies, September 1947.

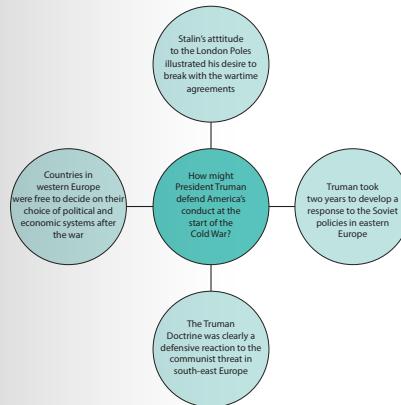
*The ruling clique of American imperialists has taken the path of outright expansion, of enslaving the weakened capitalist states of Europe. It has taken the path of hatching new war plans against the Soviet Union and the new democracies. The clearest and most specific expression of the policy is provided by the Truman-Marshall plans.*

#### DISCUSSION

How useful is Malenkov's view as evidence of the US being blamed for the origins of the Cold War?

### How can the role of the United States be defended?

Despite these arguments condemning the behaviour of the United States, there are still some arguments that support the actions taken by American leaders at this time.



▲ Fig. 4.11 Arguments in support of the US



◀ Fig. 4.12 A cartoon by Daniel Fitzpatrick of the St. Louis Post-Dispatch commenting on the purpose of the Marshall Aid programme, 20 July 1947

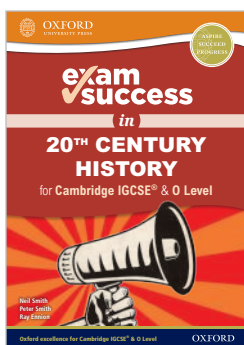
#### DISCUSSION

1. Why would Truman believe that the Soviet Union threatened peace in Europe after the Second World War?
2. Explain why the Soviet Union was more badly affected by the experiences of the Second World War than the United States.
3. Study sources 1–7 in this chapter. How far do they suggest that Stalin was mostly to blame for the start of the Cold War between 1945 and 1949?

#### QUICK QUESTION 8

Why was Figure 4.12 published in 1947? Use the source and your own knowledge to answer this question.

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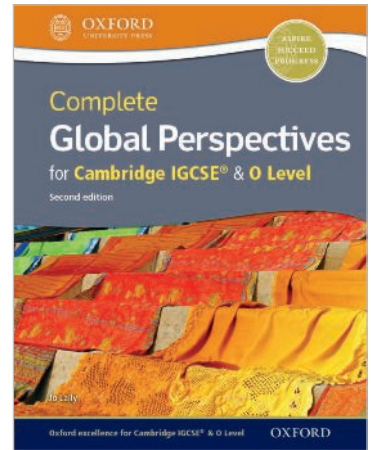
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Cambridge IGCSE & O Level

Global Perspectives

Section B: Team project

### 7 Tradition, culture and identity

Some of the key issues include:

- Global vs. local culture and tradition
- Everyday culture
- Relationship between knowledge and culture
- Is tradition outmoded?
- Technology and culture
- Migration, culture and identity
- Intangible cultural heritage
- Changing culture and identity
- National identity
- Art and culture
- Relationship between tradition, culture, identity
- Global identity

Do some of these comments and questions raise more than one issue?

**Activity 1**

- Match the comments and questions below to the issues in the diagram above.
  - Our cultures and traditions are part of the way in which we see reality. They shape our world, and they determine how we act in the world.
  - The cultural values of a country influence its national psychology and identity. Citizens' values and public opinions are conveyed in state leaders through the media and other information channels, both directly and indirectly influencing decisions on foreign policy. The traditional cultural values that influence the psyche of the Chinese people are harmony, benevolence, righteousness, courtesy, wisdom, honesty, loyalty, and filial piety (respect for your father).
  - Intangible cultural heritage does not only represent inherited traditions from the past but also contemporary rural and urban practices in which diverse cultural groups take part.
  - The people who control knowledge in society also control power.
  - When peoples lose this untouchable, fragile fragment of their culture (oral stories, traditional music etc.) – as it daily happens to aboriginal societies all around the world – they lose their reason for living, their past and their future.
- Do any of these comments come from particular cultural perspectives?
  - Think about the possible different cultural perspectives on this issue.
  - Research the issue and identify different cultural perspectives.
- Choose an issue, comment or question that interests you and discuss it with a partner.

**Key vocabulary and language exercises**

**Activity 2**

- What do you understand by the words and phrases below?
- Use dictionaries and online resources to find definitions of these words and phrases. Concentrate on different ways in which these words can be understood – don't stop at the first dictionary definition.

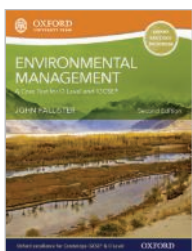
Words and phrases	Definition
a) Intangible cultural heritage	
b) Culture	
c) Identity	
d) National identity	
e) Global identity	
f) Tradition	
g) Reality	
h) Art	

If English is not your first language, avoid using online translation tools. They are often not very good! Your language skills will develop better if you use dictionaries.

**Activity 3**

- Complete the mind map below. Add as many ideas, events, thoughts and feelings that you associate with poverty and inequality as you can think of. Use online resources and dictionaries as necessary. Some initial ideas have been suggested.

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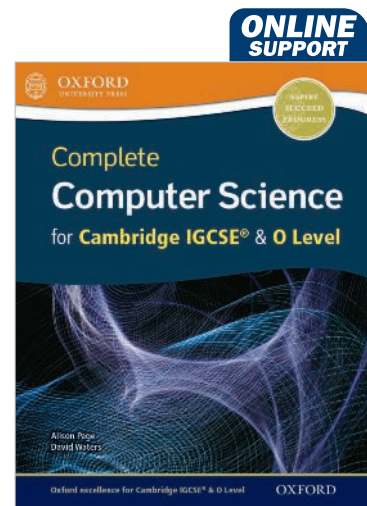


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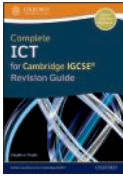
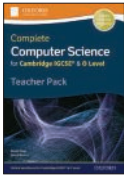
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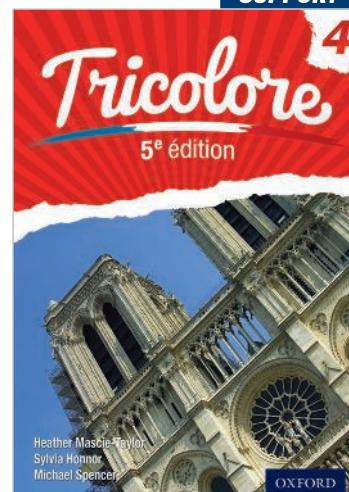
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## unité 3 Bon séjour!

3 Bon séjour!

### 3A Des projets

- talk about future plans
- use expressions of future time

#### 1 On parle des projets

C'est le nouvel an. On pense à ce qu'on fera et à ce qui changera au cours de l'année. Lisez les textes et faites les exercices.

##### a. C'est qui?

- Exemple: 1 Françoise
- Qui sortira s'ils s'en vont à la maison?
  - Qui passera ses vacances loin de la France sur une île tropicale?
  - Qui travaillera dans un hypermarché?
  - Qui espère trouver un petit emploi dans un restaurant ou une station-service?
  - Qui va réviser pour ses examens?
  - Qui partira avec sa sœur chez ses grands-parents?
  - Qui fera du vélo avec son ami?
  - Qui ira en Angleterre?
  - Qui jouera avec son orchestre au Canada?
  - Qui fera du babysitting?

##### b. Trouvez l'équivalent en français.

- If I win enough money, I'll buy ...
- I'll ease up to buy ...
- Let's hope we'll get on well ...
- If I get too bored ...
- With the money I'll earn, I'll buy ...
- I'll be my first visit to ...
- I'll also try to ...
- It'll be brilliant ...

##### c. Traduisez en anglais.

- l'année prochaine
- le semaine prochaine
- cette année
- dans quelques jours
- ce soir
- pendant les vacances
- demain
- après-demain

##### d. Écoutez les conversations et identifiez chaque personne qui parle: Jules, Laura, Clément, Françoise, Karim ou Amin.

Exemple: 1 L (Laura)

Cette année, je vais chercher du travail dans un restaurant ou dans une station-service. Si je gagne assez d'argent, j'achèterai un nouveau portable et puis je ferai des économies pour acheter une moto l'année prochaine.

Jules

Laura

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#### Dossier langue Grammaire 14.9

Using the **futur proche** and the **futur simple**  
Aller + an infinitive (le futur proche) is sometimes used in conversation to say what is going to happen, often fairly soon. This is the same as in English.

Je vais réviser pour les examens demain. I'm going to revise for the exams tomorrow.

The future tense (le futur simple) describes what will happen.

Cet été nous irons en Allemagne. This summer we will go to Germany.

Most verbs form the future tense from the infinitive. Listen for the 'r' sound near the end of the verb.

Some verbs are irregular in the way they form the future stem (the first part), but the endings are always the same.

-er verbs	-ir verbs	-re verbs	Irregular verbs
travailler tu travailleras	partir tu partiras	attendre j'attendrai	aller → j'irai
nous travaillerons	nous partirons	nous attendrons	avoir → j'aurai
vous travaillerez	vous partirez	vous attendrez	être → je serai
ils/elles travailleront	ils/elles partiront	ils/elles attendront	faire → je ferai
			pouvoir → je pourrai
			venir → je viendrai
			voir → je verrai

Look for ten different examples of the future tense on these pages.

#### 2 Qu'est-ce qu'on va faire?

Travaillez à deux. Regardez les projets de quatre jeunes (A-D). Une personne est l'intervenant et l'autre répond. Posez des questions et répondez à tour de rôle.

##### Exemple: A

- Mans, qu'est-ce que tu vas faire à Plaquez?
- À Plaquez, je vais faire un séjour linguistique à Londres. Je vais loger chez une famille anglaise.
- Tu vas prendre le train?
- Oui, je vais prendre l'Eurostar de Paris à Londres.

#### 3 Que feront-ils?

Un ami veut savoir ce que tout le monde fera cette année. Répondez à ses questions avec le futur simple.

##### Exemple: 1 Non, il ne partira pas.

- Est-ce que Clément partira en vacances?
- Et Amin, que fera-t-il?
- Françoise travaillera, je suppose?
- Et Karim, qu'est-ce qu'elle fera le weekend prochain?
- Laura, est-ce qu'elle se cherche correspondante?
- Marc ira en Angleterre sans doute?
- Et Lella, qu'est-ce qu'elle fera le weekend prochain?
- Hassan jouera au rugby, non?
- Et Amélie? Quels sont ses projets?

#### A Marc

Plaquez faire un séjour linguistique à Londres, loger chez une famille anglaise, prendre l'Eurostar.

#### B Lella

le weekend prochain travailler faire du jardinage avec l'argent, acheter une guitare.

#### C Hassan

tourner aller en Écosse avec l'équipe du lycée jouer un match à Aberdeen loger à l'auberge de jeunesse.

#### D Amélie

les vacances de mai aller à un festival de musique avec deux copines prendre le car faire du camping.

#### 4 Des projets

Complétez les phrases.

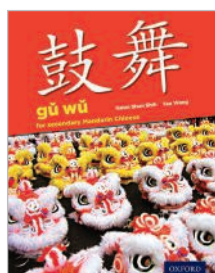
##### Exemple: 1 Dimanche prochain, je dormirai jusqu'à midi.

- Dimanche prochain, je ...
- Le weekend prochain, nous ...
- La semaine prochaine, mon ami(e) ...
- Pendant les vacances, je ...
- Cette année, notre classe ...
- Cannele prochaine, ...
- Dans deux ans, ...
- Un jour, dans l'avenir, ...

#### Pour vous aider

travailler au supermarché ranger ma chambre sortir avec des amis d'ouvrir jusqu'à midi prendre des photos lire des magazines / des BD / des livres aller aux États-Unis / au Canada / en France jouer au tennis / au badminton / me la guitare, etc. faire du sport / du ski / de la cuisine avoir de l'argent pour acheter un ordinateur, etc.

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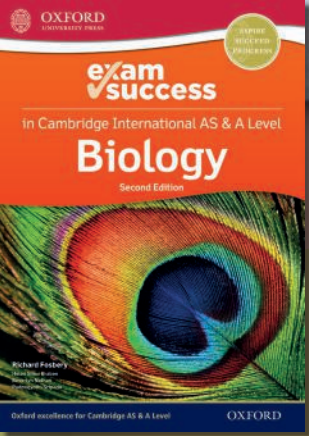
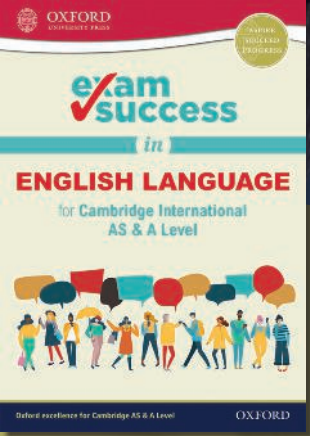
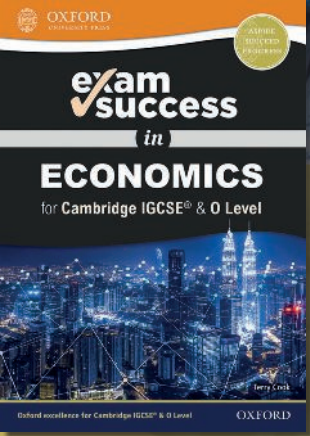
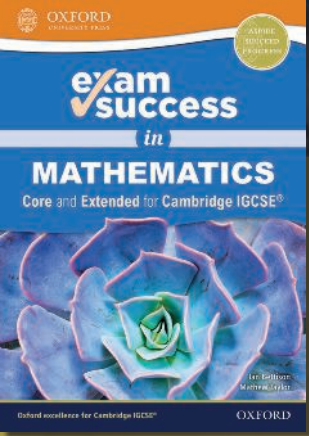
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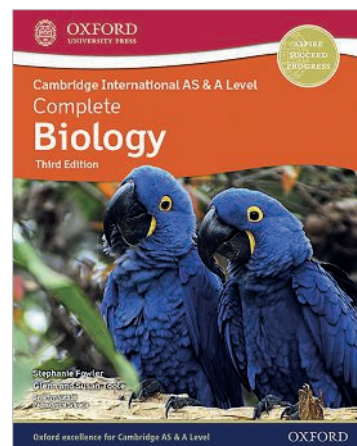


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## 5 Forces and materials

### 5.1 Density

#### Learning Outcomes

- Define density and use the density equation  $\rho = m/V$  in calculations
- Measure the density of liquids and regular and irregular solids

Table 1 Density

Substance	Density/kgm <sup>-3</sup>
Air	1.2
Aluminium	2700
Copper	8900
Gold	19 300
Hydrogen	0.083
Iron	7900
Lead	11 300
Oxygen	1.3
Silver	10 500
Water	1000

#### Density and its measurement

Lead is much more dense than aluminium. Sea water is more dense than tap water. To compare how dense one substance is compared with another, we need to measure the mass of equal volumes of the two substances. The substance with the greater mass in the same volume is more dense. For example, a lead sphere of volume 1 cm<sup>3</sup> has a mass of 11.3 g, whereas an aluminium sphere of the same volume has a mass of 2.7 g.

The density of a substance is defined as its mass per unit volume.

For a certain amount of a substance of mass  $m$  and volume  $V$ , its density,  $\rho$  (pronounced 'rho'), may be calculated using the equation:

$$\text{Density, } \rho = \frac{m}{V}$$

The unit of density is the kilogram per metre<sup>3</sup> (kgm<sup>-3</sup>).

- Rearranging the above equation gives:  $m = \rho V$  or  $V = \frac{m}{\rho}$

#### More about units

Mass 1 kg = 1000 g  
Length 1 m = 100 cm = 1000 mm  
Volume 1 m<sup>3</sup> = 10<sup>6</sup> cm<sup>3</sup>  
Density 1000 kgm<sup>-3</sup> =  $\frac{10^3 \text{ kg}}{10^6 \text{ cm}^3} = 1 \text{ gcm}^{-3}$

Table 1 shows the density of some common substances in kgm<sup>-3</sup>. You can see that gases are much less dense than solids or liquids.

#### Worked example

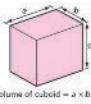
Using the data above, calculate:  
a the mass, in kilograms, of a piece of aluminium of volume  $3.6 \times 10^{-3} \text{ m}^3$ ,  
b the volume, in m<sup>3</sup>, of a mass of 0.50 kg of iron.

**Solution**  
a  $\rho = 2700 \text{ kgm}^{-3}$ ; mass  $m = \rho V = 2700 \text{ kgm}^{-3} \times 3.6 \times 10^{-3} \text{ m}^3 = 9.7 \times 10^{-2} \text{ kg}$   
b  $\rho = 7900 \text{ kgm}^{-3}$ ; volume  $V = \frac{m}{\rho} = \frac{0.50 \text{ kg}}{7900 \text{ kgm}^{-3}} = 6.3 \times 10^{-5} \text{ m}^3$

#### Density measurements

An unknown substance can often be identified if its density is measured and compared with the density of known substances. The following procedures may be used to measure the density of a substance.

- A regular solid. Measure its mass using a top-pan balance; measure its dimensions using Vernier calipers or a micrometer. Calculate its volume using the appropriate formula (e.g. volume of a sphere of radius  $r$  is  $\frac{4}{3}\pi r^3$ ; volume of a cylinder of radius  $r$  and length  $L$  is  $\pi r^2 L$ ). Calculate the density from volume.



i Volume of cuboid =  $a \times b \times c$



ii Volume of cylinder =  $\frac{\pi d^2}{4} \times h$

- A liquid. Measure the mass of an empty measuring cylinder. Fill the cylinder with the liquid and measure the volume of the liquid directly. Measure the mass of the cylinder and liquid to enable the mass of the liquid to be calculated. Calculate the density from  $\frac{\text{mass of liquid}}{\text{volume}}$ .

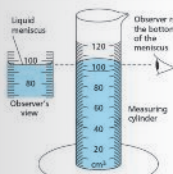


Figure 2 Using a measuring cylinder

- An irregular solid. Measure the mass of the object. Fill a displacement can with water up to the spout, as shown in Figure 3. Place a beaker of known mass under the spout. Immerse the object in the liquid and collect the overflow. Measure the mass of the overflow and overflow. Hence determine the mass of the overflow water and calculate its volume, given the density of water is 1000 kgm<sup>-3</sup>. Calculate the density of the object from  $\frac{\text{its mass}}{\text{the overflow volume}}$ .

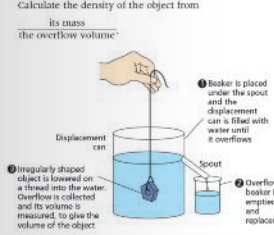


Figure 3 Measuring the volume of an irregularly shaped object

#### Density of alloys

An alloy is a solid mixture of two or more metals. For example, brass is an alloy of copper and zinc which has good resistance to corrosion and wear.

For an alloy that consists of two metals A and B, then for volume  $V$  of the alloy:

- If the volume of metal A is  $V_A$ , the mass of metal A is  $\rho_A V_A$ , where  $\rho_A$  is the density of metal A.
- If the volume of metal B is  $V_B$ , the mass of metal B is  $\rho_B V_B$ , where  $\rho_B$  is the density of metal B.

$$\begin{aligned} \text{Mass of the alloy, } m &= \rho_A V_A + \rho_B V_B \\ \text{Hence the density of the alloy, } \rho &= \frac{m}{V} = \frac{\rho_A V_A + \rho_B V_B}{V} \\ &= \frac{\rho_A V_A}{V} + \frac{\rho_B V_B}{V} \end{aligned}$$

#### Worked example

A brass object consists of  $3.3 \times 10^{-2} \text{ m}^3$  of copper and  $1.7 \times 10^{-2} \text{ m}^3$  of zinc. Calculate the mass and the density of this object. The density of copper is 8900 kgm<sup>-3</sup>; the density of zinc is 7100 kgm<sup>-3</sup>.

#### Solution

Mass of copper = density of copper  $\times$  volume of copper =  $8900 \text{ kgm}^{-3} \times 3.3 \times 10^{-2} \text{ m}^3 = 0.29 \text{ kg}$

Mass of zinc = density of zinc  $\times$  volume of zinc =  $7100 \text{ kgm}^{-3} \times 1.7 \times 10^{-2} \text{ m}^3 = 0.12 \text{ kg}$

Total mass,  $m = 0.29 + 0.12 = 0.41 \text{ kg}$

Total volume,  $V = 5.0 \times 10^{-2} \text{ m}^3$

Density of alloy,  $\rho = \frac{m}{V} = \frac{0.41 \text{ kg}}{5.0 \times 10^{-2} \text{ m}^3} = 8200 \text{ kgm}^{-3}$

#### Check your learning

- A rectangular brick of dimensions 5.0 cm  $\times$  8.0 cm  $\times$  20.0 cm has a mass of 2.5 kg. Calculate:
  - its volume,
  - its density.
- An empty paint tin of diameter 0.150 m and of height 0.120 m has a mass of 0.22 kg. It is filled with paint to within 7 mm of the top. Its total mass is then 6.50 kg. Calculate, for the paint in the tin:
  - the mass,
  - the volume,
  - the density.
- A solid steel cylinder has a diameter of 12 mm and a length of 85 mm. Calculate:
  - its volume (in m<sup>3</sup>),
  - its mass (in kg); the density of steel is 7800 kgm<sup>-3</sup>.
- An alloy tube of volume  $1.8 \times 10^{-4} \text{ m}^3$  consists by volume, of 60% aluminium and 40% magnesium.
  - Calculate the mass, in the tube, of:
    - aluminium,
    - magnesium.
  - Calculate the density of the alloy; the density of aluminium is 2700 kgm<sup>-3</sup>; the density of magnesium is 1700 kgm<sup>-3</sup>.

## Equip your learners to confidently progress

### 3.3 Metallic bonding

On this page you will learn to:

- define and describe metallic bonding

#### STUDY TIP

In Figure 1 the metal ions are shown spaced apart for clarity. In fact metal atoms are more closely packed, and so metals tend to have high densities.

#### STUDY TIP

The word delocalised is used to describe electron clouds that are spread over more than two atoms.

Metals are shiny elements made up of atoms that can easily lose up to three outer electrons, leaving positive metal ions. For example, sodium, Na, 2, 8, 1 (1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>6</sup> 3s<sup>1</sup>) loses its one outer electron, aluminium, Al, 2, 8, 3 (1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>6</sup> 3s<sup>2</sup> 3p<sup>1</sup>) loses its three outer electrons.

#### Bonding in metals

The atoms in a metal element cannot transfer electrons (as happens in ionic bonding) unless there is a non-metal atom present to receive them. In a metal element, the outer shells of the atoms merge. The outer electrons are no longer associated with any one particular atom. A simple picture of metallic bonding is that metals consist of a lattice of positive ions existing in a 'sea' of outer electrons. These electrons are delocalised. This means that they are not tied to a particular atom. Magnesium metal is shown in Figure 1. The positive ions tend to repel one another but this is balanced by the electrostatic attraction of these positive ions for the negatively charged 'sea' of delocalised electrons.

- The number of delocalised electrons depends on how many electrons have been lost by each metal atom.
- The metallic bonding spreads throughout, so metals have giant structures.

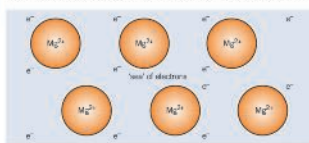


Figure 1 The delocalised 'sea' of electrons in magnesium

#### SUMMARY TEST 3.3

- Write the full electron arrangement of a calcium atom, Ca.
- Which electrons will a calcium atom lose to gain a stable noble gas configuration?
- Show how many electrons each calcium atom will contribute to the delocalised sea of electrons that holds the metal atoms together.

### Covalent bonding and co-ordinate (dative covalent) bonding

Non-metal atoms need to receive electrons to fill the spaces in their outer shells.

#### Covalent bonding

- A covalent bond forms between a pair of non-metal atoms.
- A covalent bond has a shared pair of electrons.
- The atoms share some of their outer electrons so that each atom has a stable noble gas arrangement.

#### Forming molecules by covalent bonding

A small group of covalently bonded atoms is called a molecule. For example, chlorine exists as a gas that is made of molecules, Cl<sub>2</sub>, see Figure 1.

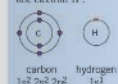
Chlorine has 17 electrons and an electron arrangement 1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>6</sup> 3s<sup>2</sup> 3p<sup>5</sup>. Two chlorine atoms make a chlorine molecule:

- The two atoms share one pair of electrons.
- Each atom now has a stable noble gas arrangement.
- The formula is Cl<sub>2</sub>.
- Molecules are neutral because no electrons have been transferred from one atom to another.

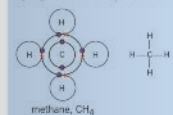
You can represent one pair of shared electrons in a covalent bond by a dash, Cl-Cl.

#### Worked example

**Methane**  
Methane gas is a covalently bonded compound of carbon and hydrogen. Carbon, C, has six electrons with electron arrangement 1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>2</sup> and hydrogen, H, has just one electron 1s<sup>1</sup>.



In order for carbon, to attain a stable noble gas arrangement, there are four hydrogen atoms in every carbon atom.



The formula of methane is CH<sub>4</sub>. The four 2p electrons from carbon and the 1s electron from the four hydrogen atoms are shared.

### 3.4

On these pages you will learn to:

- define covalent bonding
- use dot-and-cross diagrams to describe covalent and co-ordinate bonding
- describe covalent bonds in terms of orbital overlap
- describe how  $\sigma$  and  $\pi$
- explain the idea of hybridisation of orbitals
- define bond energy and bond length

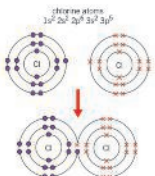


Figure 1 Formation of a chlorine molecule - the two atoms share a 3p electron from each atom

#### STUDY TIP

The hydrogen has a filled outer main level with only two electrons (1s<sup>2</sup>). It fills the first shell to get the structure of the noble gas helium. The carbon atoms have an electron arrangement 1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>2</sup>.

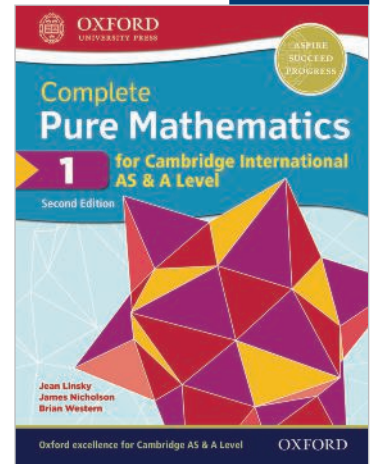
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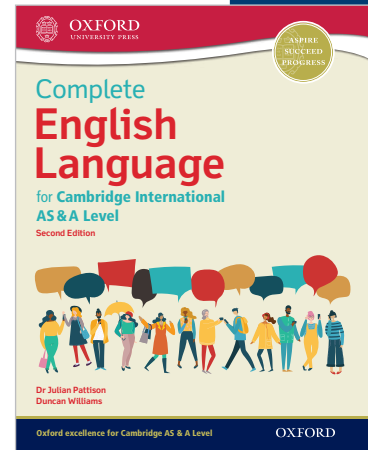
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English Language

## 7 Language change

**This chapter will:**

- look at some attitudes to language change
- develop your understanding of how to deal with historical language data
- explore some of the ways in which the English language has changed between 1500 and the present day
- consider how changes in language reflect changes in society and culture, politics and technology
- explore some of the consequences of language change in English.

**Language change and general knowledge**

Most people have ideas about various ways in which they believe language might have changed or might still be changing. Here is a series of typical statements and questions about Language Change from people with general knowledge of language:

The language of business and finance is everywhere these days. Corporate-speak is changing the way we think.

Allowing American spellings and vocabulary is wrecking the English language.

It's bad English to use slang.

I don't like the way television broadcasters and politicians are using the word 'disinterested' to mean the opposite of 'interested'. It's wrong to do that: look in a dictionary and you can see that the opposite of 'interested' is 'uninterested'. 'Disinterested' means something quite different.

Do I need to use 'her/his' as well as 'his/hers' when I write this sentence: 'The Prime Minister shouldn't just pick his closest friends when he chooses who is to be Home Secretary or Foreign Secretary'?

Official letters - like the ones you get from the Tax inspectors - are friendlier in tone these days. And nurses and doctors use fewer technical words than they used to: they explain things in more patient-friendly language.

Young people are less accurate in the way they use grammar than older people.

Does texting damage people's use of English?

**Activity 7.1**

You're now going to approach each one of these statements and questions with the benefit of your linguistic knowledge. Make a four-column list in which you:

- identify the underlying linguistic issue or concept - e.g. 'correctness' or levels of formality - which may not occur to someone not studying A Level English Language

3

## Language change

- consider whether there's any evidence to support the statement, or to explain why someone might ask the question
  - explore whether there's any misunderstanding going on because general knowledge isn't precise enough to deal with a linguistic issue
  - consider what other factors (societal, political, cultural) might be influencing language choice and thus language change.
- You can copy and complete the columns provided below; or you might prefer to devise your own columns, based on the Chapter objectives.

Number(s) and Issue(s)	Evidence?	Evidence? View limited by lack of linguistic knowledge?	Changes in Culture and Society?
7: formality and tone in 'official' or expert communication			Society becoming more open and egalitarian?
1, 3 and 6: differences according to age and generation	Are there any research studies on how texting affects other aspects of language use?	6: Comment is about 'grammar' - but the general public often use the term 'grammar' when what they really mean to criticise is the accuracy of spelling or punctuation in written communication	
8: 'gendered' language			'Political Correctness' → concern not to offend or exclude groups

**Link**

This links back to semantics (the study of meaning) - Activity 6.2 in the previous chapter.

**Exam tip**

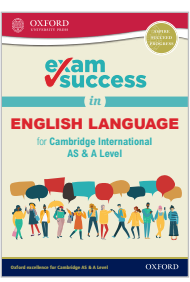
Think back to the Tip about terminology after Activity 6.1 in the last chapter. It's always helpful if you can use more precise terms to describe language use - e.g. you can make a distinction between more formal or more informal language rather than using everyday terms like 'friendly'. But don't make the mistake of thinking that just using a more technical-linguistic term is all you have to do. You need to go on and use that more precise term to help you develop a more detailed analysis.

**Reflecting on language change and general knowledge**

Did you manage to complete the table? You should now make a list of any linguistic issues and/or concepts which emerged from your thinking there. You will have noticed a number of situations in which the general/everyday view of language is limited or mistaken when compared to the view of someone with precise linguistic knowledge. These are situations in which you can now offer a more informed view - being able to refer, for example, to the debate between Prescriptivists and Descriptivists in discussing notions of Bad English and Good English. If you've never come across these distinctions and this terminology before, now is a good time to start your independent research.

4

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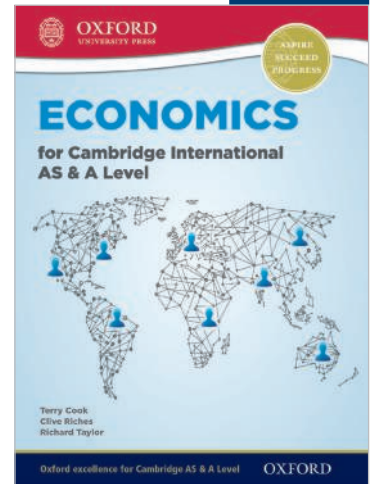
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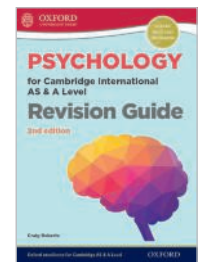
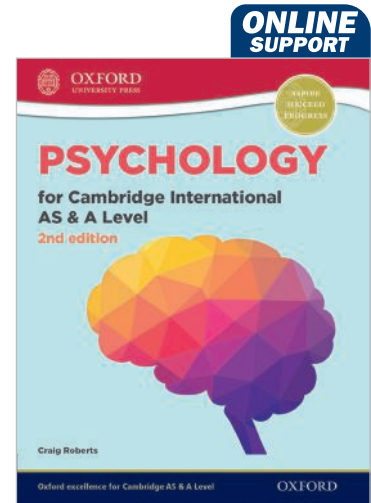
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Psychology

## 15 YAMAMOTO, HUMLE AND TANAKA

Research date: 2012

### BACKGROUND

We know that humans have the ability to show altruistic behaviours. Some psychologists believe this is one way in which we maintain cooperative societies. What of non-humans though? Many studies have shown us why animals may behave altruistically but at the expense of how they do it. Yamamoto and his colleagues believed that the cognitive mechanisms involved in non-human helping behaviour are not well known. By studying these we may then understand the evolution of cooperation. This is because if we ever to deepen our understanding of this potential evolutionary behaviour, we need to know if and how animals understand the goals and intentions of others.

### THE PSYCHOLOGY BEING INVESTIGATED

The main concepts under investigation in this study are:

- ▶ altruism – the willingness to do certain things for others even if it has a disadvantage to yourself
- ▶ prosocial behaviour, which refers to any action or behaviour that has the intention of helping others
- ▶ empathy – the ability to share someone else's emotional state by imagining what it would be like to be in that situation

**ASK YOURSELF**  
Do you think that non-humans help each other out in the same ways as humans? Think of specific examples to enhance your answer.

### AIM

1. To investigate whether chimpanzees have the ability and flexibility to help another chimpanzee depending on its specific needs.
2. The research team had noted that chimpanzees seldom help others without being asked and the team wanted to investigate this too.

### METHOD

#### Participants

Five chimpanzees, called Ai, Cleo, Pal, Ayumu and Pan, were participants in the study. They were all socially housed at the Primate Research Institute in Kyoto University. They had all participated in previous studies about helping behaviour. They were paired with kin as follows: Ai (mother) was paired with Ayumu (juvenile); Pan (mother) was paired with Pal (juvenile); Chloe (mother – not tested in the experimental condition) was paired with Cleo (juvenile). All pairs had shown tool-giving interactions in previous research. All were labelled as experts at the tool-use tasks used in this study.

### CHAPTER 15: YAMAMOTO, HUMLE AND TANAKA

#### Design and procedure

The study had been approved by the Animal Care Committee at Kyoto University. The paired chimpanzees were tested in adjacent experimental booths measuring 136 × 142 centimetres and 155 × 142 centimetres; both 200 centimetres high. A hole measuring 12.5 × 35 centimetres was in the wall divider separating the two chimpanzees. It was about 1 metre above the floor. The experiment was designed so that it required the chimpanzees to select and transfer an appropriate tool to a conspecific partner so the partner could solve a task and obtain a drink of juice as a reward. The recipient chimpanzee could not reach any of the available tools in the adjoining booth. This chimpanzee could show that it wanted a tool by poking an arm through a hole in the panel that separated the two booths. The helper chimpanzee had to select a tool from a box of seven objects (a stick, a straw, a hose, a chain, a rope, a brush and a belt) to help the other chimpanzee complete the task. Only the straw or the stick could help "solve" the task to gain the juice reward. Before the experimental phase of the study, there were eight, five-minute trials (one per day) that allowed the chimpanzees to explore the seven items. Figure 15.1 shows the three conditions, which are explained below.

Yamamoto noted the following about the design of the study:

- ▶ The chimpanzees were all trained to solve the problem presented to them but no other training or shaping of behaviour had been conducted on them.
- ▶ The chimpanzees were allowed to communicate "naturally" to one another without symbols or any form of artificial communication techniques.

Each chimpanzee went through three tasks:

1. The first "Can see" condition. One chimpanzee was placed in a booth with a box full of seven different objects, including, for example, a stick, a straw, a brush and some paper clips connected together. Another chimpanzee was in an adjacent booth and could be seen. This chimpanzee needed to be given a tool that could help it to obtain some juice that was just out of reach. There was a hole in the wall

can see (1<sup>st</sup>)

cannot see

can see (2<sup>nd</sup>)

▶ **Figure 15.1** The first "Can see", the "Cannot see" and the second "Can see" conditions  
Source: Yamamoto, Humle and Tanaka (2012: 3580)

between the two chimpanzees that objects could be passed through. The box of objects was out of reach of the chimpanzee that wanted the juice but it could put its arm through the hole to request a tool. This chimpanzee needed the stick first to reach the juice and then the straw so that it could drink the juice.

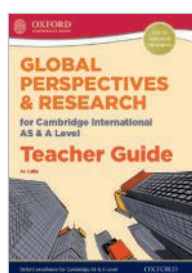
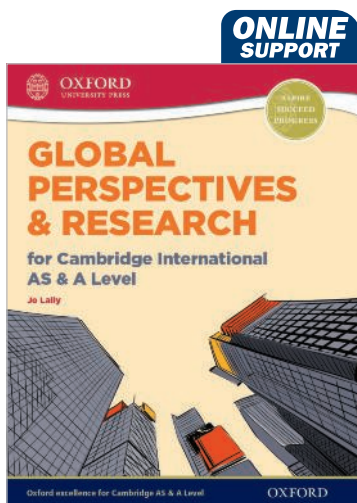
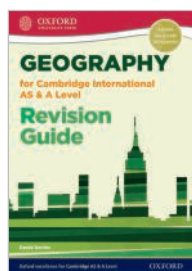
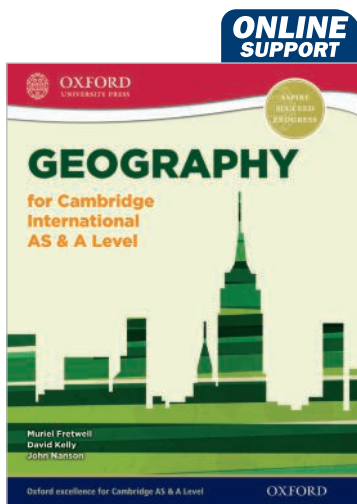
2. The "Cannot see" condition. This was the same set-up but the wall between the two booths was opaque so that the helper chimpanzee could not see what the other chimpanzee required. However, there was

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### Sorting some unusual animals


In this lesson you will learn about some animals that are not easy to sort into groups.

Some animals look as if they belong to one group. But look closely and you will have to think again!


**Think back**  
Talk to your partner about the features you used to group vertebrates.

Look at each picture. Decide which vertebrate class each animal belongs to. Why are the animals unusual?


I live in the sea. I must come to the surface to breathe. I feed my offspring on milk. Which group do I belong to?




I live in the sea for half my life. I must come to the surface to breathe. I have feathers. Which group do I belong to?



I have wings. I can fly. I have fur. Which group do I belong to?



### Bird feeders



You are going to set up bird feeders to attract different types of birds.

- 1 Make feeders like the ones in the pictures.
- 2 Look at your feeders every morning and afternoon. Do this for 3 days.
- 3 Write down how many different types of bird visit your feeders. Take photographs if you can.
- 4 Try to sort the birds into smaller groups.
- 5 Were any of the birds unusual and difficult to group?

**Stretch zone**  
Find out the features that scientists use to divide the class of birds into smaller groups.

**Be a scientist**  
Scientists make observations at different times of the day and over many days.  
▶ page 9

**Key idea**  
Some animals with unusual features are more difficult to sort.

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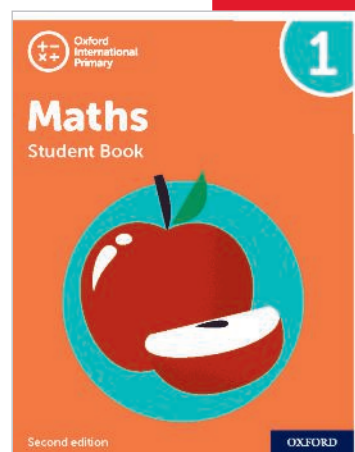
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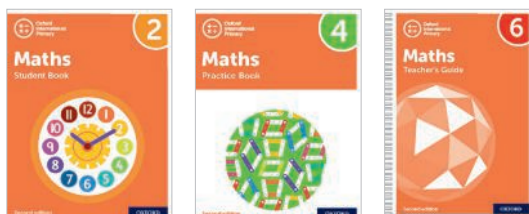
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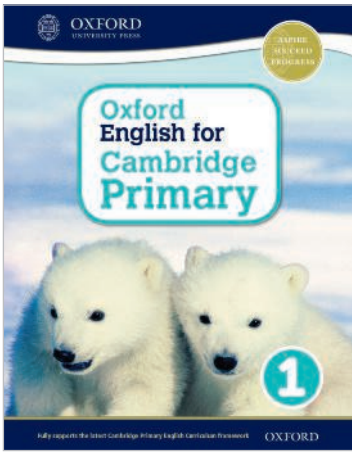


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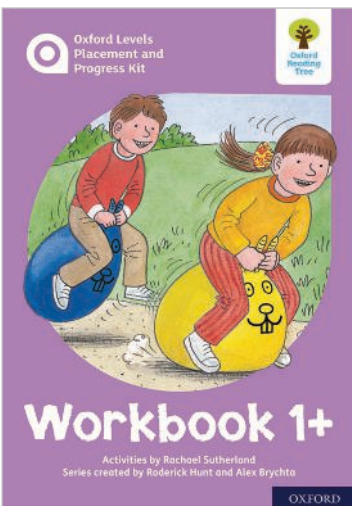
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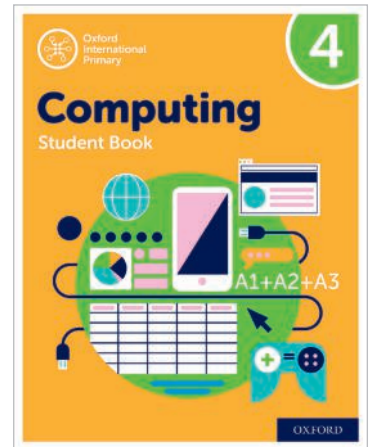


# Oxford International Primary Computing

## Teach vital computing skills for today's digital world

Equip your students with the skills they need to safely and confidently apply their knowledge to real-life situations.

- More project-based work better **promotes active learning and enquiry**, encouraging every student to participate in lessons
- The new spiral approach to learning revisits key concepts to **build students' digital literacy skills**
- New in-built, three-level differentiation allows teachers **to cater to the needs of every student**



### 1 The nature of technology: Computers around us

**You will learn**

- that computer power improves how devices such as TVs and cars work
- how computers and technology improve the way people work
- about computer storage and why it is important.

Computer power is used to improve the way that devices work at home, at work and at school. TVs, cars, mobile devices, smartphones and fridges are all powered by computers. Computers are changing the way we live.



**Talk about...**  
If all computers disappeared tomorrow...

- what would you miss about computers in your home life?
- what would you miss about computers at school?



**Learning outcomes:** Describe how computers may be used in the world of work. Identify a range of modern devices which contain computer processors, for example, embedded processors. Describe what storage is and why it is important.

**Class activity**

Make a list of the types of computers you use at home and at school. For example, do you use a tablet computer? Do you use different types of computers to do different things?

microprocessor  
robot sensors  
storage drive  
data file back-up file  
flash drive



**Digital citizen of the future**

Computers can improve the way we learn, work and enjoy our spare time. However, not everyone can afford to buy a computer. Some charities collect computers that are no longer used. These computers are given to people who cannot afford to buy their own. Would you donate a computer you no longer use?

**Did you know?**

In 2015, scientists at Michigan University created Michigan Micro Mote, the world's smallest computer. The Mote measures 2mm x 2mm x 4mm. That's smaller than a grain of rice! The Mote is being used in medical implants and in driverless cars.

1 The nature of technology: Computers around us

Oxford International Primary Computing Student Book 4

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