

# Secondary Level Catalogue 2011

# Recipe for Success



## A nation's success lies in its children and a child's success lies in a sound education.

That is why at Marshall Cavendish, we are committed to delivering high quality educational solutions that meet the needs of teachers and learners in the 21st century.

We understand that education is shaped by and continuously evolves in response to a dynamic world. We aim to develop educational solutions customised and adapted to suit a variety of contexts and environments for teaching and learning.

For over 40 years, we have taken a holistic approach towards helping learners to excel academically and teachers to teach more effectively.

Globally, we have extended our reach to teachers and learners in more than 46 countries and 6 continents.

## Marshall Cavendish's solutions are used in schools around the world.

Marshall Cavendish is dedicated to raising the quality of learning and teaching through providing comprehensive educational solutions including curriculum publishing, online learning and teacher professional development.



- United States
- Panama
- Trinidad & Tobago
- Brazil
- Chile
- United Kingdom
- France
- Denmark
- Finland
- Germany
- Netherlands
- Libya
- Egypt
- South Africa
- Kenya
- Rwanda
- Mauritius
- Jordan
- Saudi Arabia
- United Arab Emirates
- Qatar
- Oman
- Israel
- Pakistan
- India
- Bangladesh
- Myanmar
- Malaysia
- Indonesia
- Singapore
- Brunei
- Cambodia
- Thailand
- Vietnam
- Philippines
- China
- Hong Kong
- Taiwan
- Korea
- Australia
- Solomon Islands
- Fiji Islands
- Papua New Guinea
- Sri Lanka
- Ghana
- Nigeria
- Mexico
- Sudan
- Turkey
- Botswana
- Japan
- Bahrain

## Curriculum Content

Our comprehensive range of materials adopts a holistic approach towards education and encourages learners to think critically and creatively. From textbooks to supplementary materials, we stimulate learners' minds and inspire learners to greater heights. Our teaching resources facilitate teachers to teach effectively.

With a proven track record for creating well-researched and high quality content, our materials have been approved and endorsed by education ministries in various regions including South East Asia, the Americas and the Caribbean.

In Singapore, we are the preferred co-publisher of the Ministry of Education with the greatest number of textbooks approved. Our materials are used by teachers and learners in most public schools and have contributed to Singapore's consistent top performance in international studies since 1995.

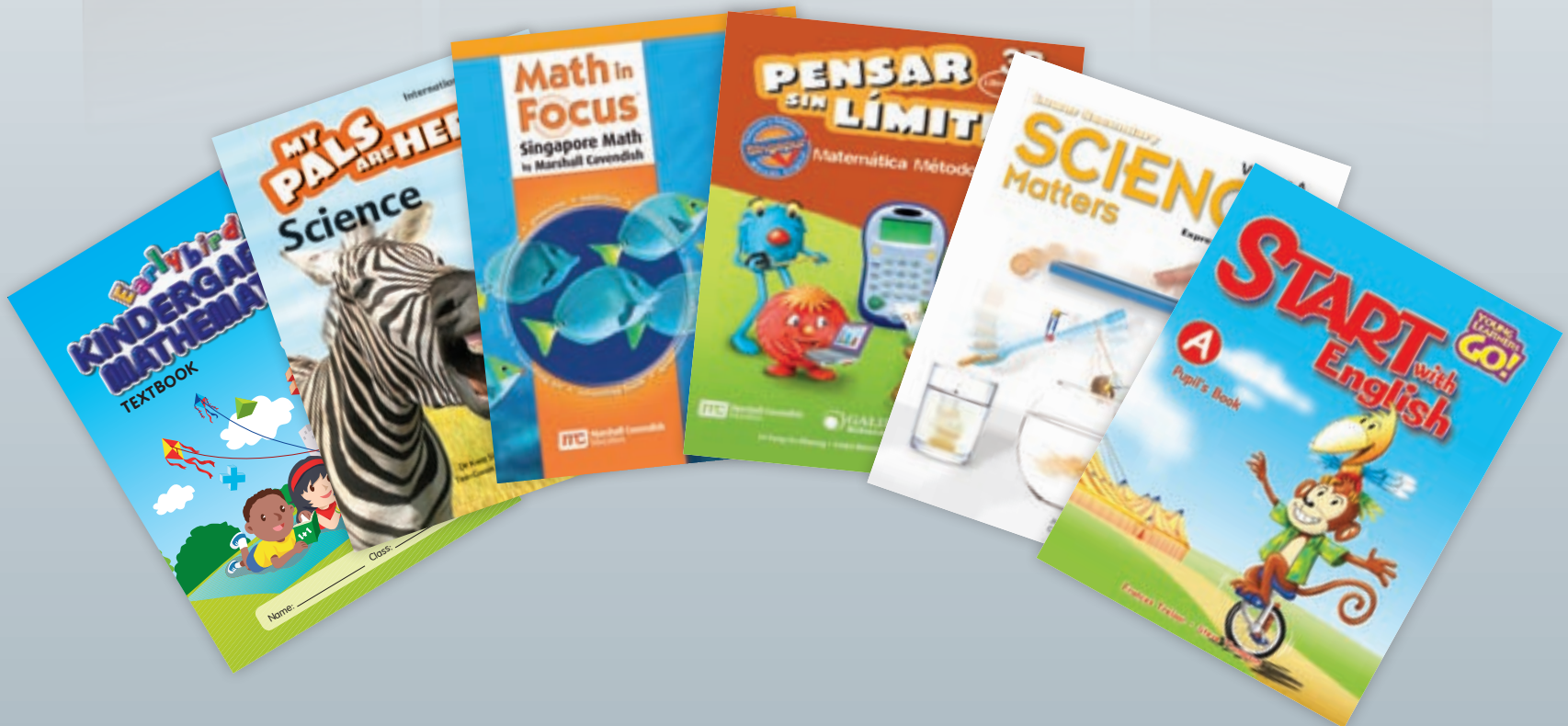
## Singapore Students TOP in International Studies

Trends in International Mathematics and Science Study (TIMSS)  
1995, 1997, 2003, 2007

Progress in International Reading Literacy Study (PIRLS)  
2001, 2006

Global Competitiveness Report  
2009-2010, 2010-2011

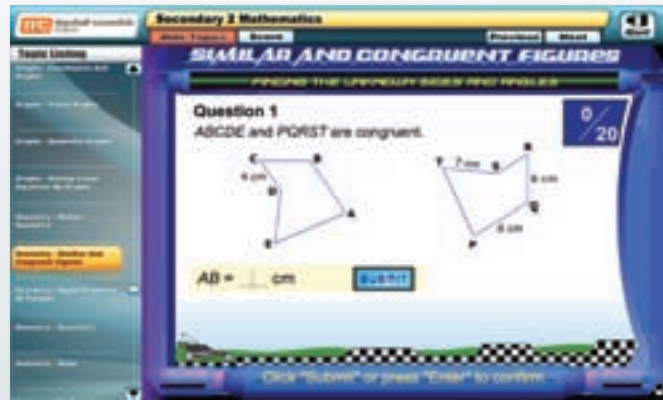
Programme for International Student Assessment (PISA)  
2009



## Technology

We empower learners to acquire knowledge and skills at their own pace, anytime and anywhere.

We invest in research and development to innovate and deliver solutions through a fun and trusted platform. Through our innovations, learners are engaged with high quality interactive content that enriches their learning experience. With engagement, we inspire learners and ignite their imagination and creativity, adding depth and breadth in their learning.



## Teacher Professional Development

Good teaching matters. The quality of teaching greatly influences the quality of education a child receives, and beyond a teacher's knowledge and ability is the support and professional development a teacher gets.

At Marshall Cavendish, we are responsive to the trends in education and the changing needs of educators. Our expert academic teams engage in educational research to develop comprehensive, research-based teacher education programmes. Our partnerships with schools allow us to provide teachers with authentic learning situations and our academic teams with first-hand data. We give teachers the support they need to improve their classroom practice, knowledge in pedagogy and content, and proficiency in the methodology.



# Table of Contents

## English

Step Ahead	2 – 4
English Empowers & English Access	5 – 6
Life Accents	7 – 8
Flights of Fancy	9 – 10
Supplementary Materials	11 – 16

## Mathematics

Mathematics Matters	18 – 20
New Mathematics Counts (2nd Edition)	21 – 22
New Express Mathematics	23
New Additional Mathematics (3rd Edition)	24
Panpac Additional Mathematics	25 – 26
Professional Development Materials	27
Supplementary Materials	27 – 28

## Science

Science Matters	30 – 32
Interactive Science for Inquiring Minds	33 – 36
International Lower Secondary Science	37 – 38
G.C.E 'O' Level Physics Matters	39 – 41
Discover Physics	42 – 44
G.C.E 'O' Level Chemistry Matters	45 – 46
Discover Chemistry	47 – 49
G.C.E 'O' Level Biology Matters	50 – 51
Discover Biology G.C.E 'O' Level	52 – 53
Supplementary Materials	54 – 58

## Humanities

Earth: Our Home	60 – 63
Explore Geography	64 – 67
The Living Past	68 – 70
Crisis and Conflict	71 – 72
Supplementary Materials	73 – 74

## ICT & College

Information and Communications Technology	76
College Titles	77

ENGLISH

ENGLISH

ENGLISH

ENGLISH

ENGLISH

ENGLISH

ENGLISH

**ENGLISH**

ENGLISH

ENGLISH

EARLY

ENGLISH

ENGLISH

ENGLISH

# Step Ahead

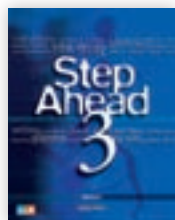
Step Ahead is a complete and integrated package of instructional materials for the teaching and learning of the English Language for secondary schools.

## The package comprises:

- Textbook
- Activity Book
- Textbook – Teacher’s Edition
- Activity Book – Teacher’s Edition
- Audio CD

## Core Curriculum

### Step Ahead Textbook



Using text types as the focusing teaching medium, the Textbooks facilitate confident, competent and effective communication in English through a learning process that is flexible, comprehensive, challenging and yet enjoyable.

- Listening exercises help students to develop their listening comprehension abilities by giving them exposure to a wide range of materials.
- Reading materials from award-winning writers help students develop their reading comprehension, summary writing and language skills.
- Students are guided to speak in an appropriate register within a range of formal and informal contexts.
- Writing section provides a scaffold approach to guide students in their writing.



**Textbook Express/Normal (Academic) 1 (2nd Edition)**  
978-981-420-880-2

**Textbook Express 3**  
978-981-4208-79-6

**Textbook Express/Normal (Academic) 2**  
978-981-271-284-4

**Textbook Express/Normal (Academic) 4/5**  
978-981-271-582-1

# Core Curriculum

## Step Ahead Activity Book

These books are an integral part of the Textbooks. All lessons in the Textbooks have a corresponding exercise in the Activity Books. Students are guided with practice exercises which effectively test understanding and use of text types.



**Activity Book Express 1 (2nd Edition)**  
978-981-420-878-9

**Activity Book Express 3**  
978-981-271-584-5

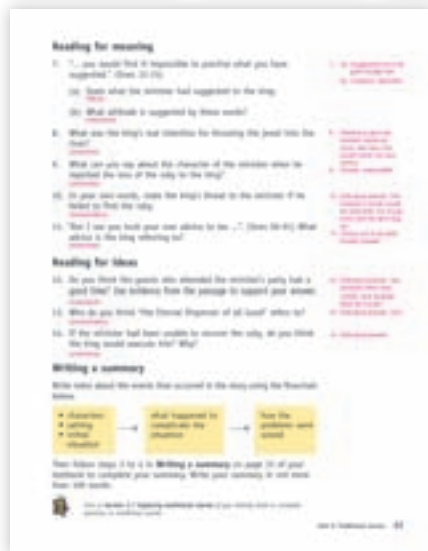
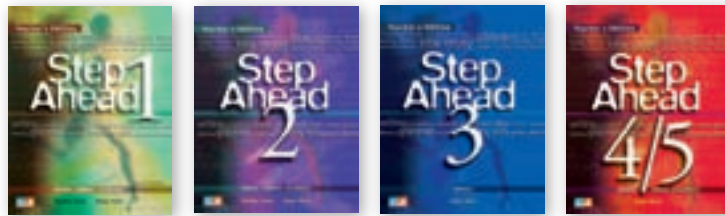
**Activity Book Express 2**  
978-981-271-283-7

**Activity Book Express 4**  
978-981-242-644-4

## Teacher's Resources

### Step Ahead Textbook – Teacher's Edition

These books provide teachers with answers to questions found in the Textbooks. Useful prompts are also available to help teachers guide students on how to cross reference from their Textbooks to their Activity Books for relevant exercises.



**Textbook – Teacher's Edition Express/Normal (Academic) 1 (2nd Edition)**  
978-981-257-836-5

**Textbook – Teacher's Edition Express 3**  
978-981-208-914-4

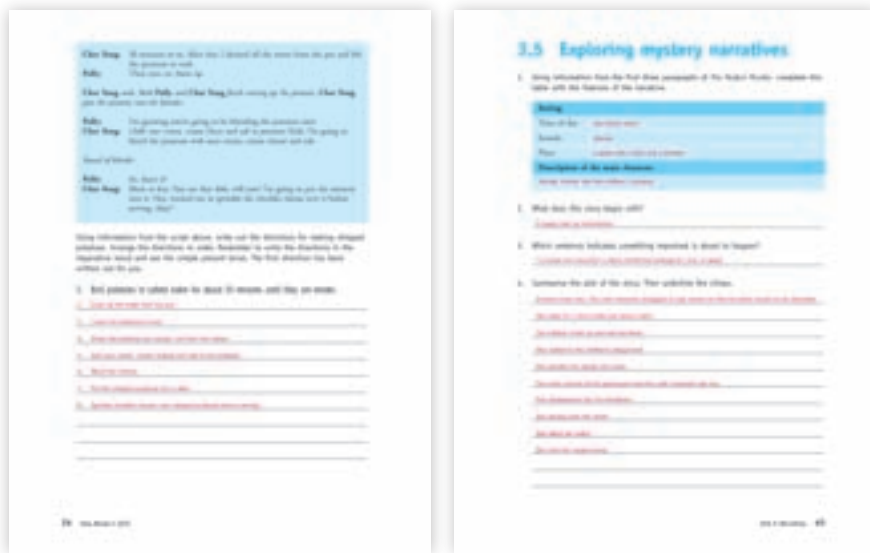
**Textbook – Teacher's Edition Express/Normal (Academic) 2**  
978-981-273-280-4

**Textbook – Teacher's Edition Express/Normal (Academic) 4/5**  
978-981-242-642-0

# Teacher's Resources

## Step Ahead Activity Book – Teacher's Edition

These useful books contain answers for the exercises that are found in the Activity Books. They serve as a point of reference for teachers and facilitate their marking process.



**Activity Book – Teacher's Edition Express 1**  
978-981-208-585-6

**Activity Book – Teacher's Edition Express 3**  
978-981-208-922-9

**Activity Book – Teacher's Edition Express 2**  
978-981-208-778-2

**Activity Book – Teacher's Edition Express 4**  
978-981-242-645-1

## Step Ahead Audio CD

These CDs contain the listening component of the lessons. A wide variety of carefully chosen material is used to familiarise students with the text type taught. The material, together with the listening exercises, enable students to develop their listening comprehension skills.



**Audio CD Express/Normal (Academic) 1**  
978-981-208-801-7

**Audio CD Express 3**  
978-981-242-624-6

**Audio CD Express/Normal (Academic) 2**  
978-981-4116-03-9

**Audio CD Express/Normal (Academic) 4/5**  
978-981-242-659-8

# English Empowers

English Empowers is a series of integrated skills-based, thematic Learner's Books and teacher's resources designed for the teaching and learning of English in secondary schools. Based on the requirements of the English Language Syllabus 2010 set by the Ministry of Education, Singapore, it is a comprehensive course that prepares students for the Cambridge G.C.E. 'O' Examination.

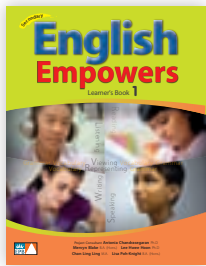
The package comprises:

- Learner's Book
- Teacher's Resource

## Core Curriculum

### English Empowers Learner's Book

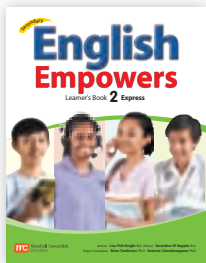
Express/  
Normal (Academic)



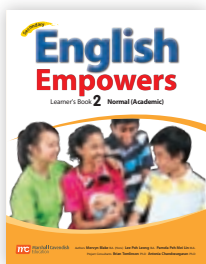
Organised into themes which centre around topics that students can relate to, each Learner's Book is arranged according to different skills such as listening, reading, speaking and writing to build effective language skills.

- Heuristics enable critical mastery of thinking and language skills of the 21<sup>st</sup> century.
- Overarching themes and sub-themes transcend Areas of Language Learning, and centre on topics that interest students.
- A rich variety of authentic texts with a blend of topics, styles and genres help to cultivate an appreciation of the English language.
- Ample scaffolding and explicit teaching of language enable learners to perform in reading, viewing, listening, speaking and writing.
- Grammatical structures and vocabulary are explained within context, enabling students to learn how to use language appropriately in real-life situations.

Express



Normal (Academic)



Theme 3: Impressions and Reflections | Sub-theme 3: Significant People and Deeds

### HOW TO Provide Back-channelling

A good approach to learn when speaking to somebody is the technique of back-channelling. Back-channelling is a way of showing the person you are speaking to that you are listening to him and empathising with his or her experience, often through body language and short utterances.

#### 1. The Right Body Language

Adopting the right body language is very important in a conversation.

Do's	Don'ts
• Make your interviewee feel comfortable.	• Don't bring back to mind any embarrassing incidents.
• Use appropriate body language.	• Don't bring up any sensitive issues.
• Don't interrupt your interviewee.	• Don't ask too many questions.
• Don't ask too many questions.	• Don't ask too many questions.
• Don't ask too many questions.	• Don't ask too many questions.

#### 2. Short Utterances

Use short utterances to demonstrate that you are listening to your interviewee.

- These are often words just to indicate that you are engaged and listening, such as "okay," "uh-huh," "mhmhm," "really," and "I see."
- You can show that you understand your interviewee by repeating or paraphrasing his or her words:

36 Lessons 15 & 16 Section 1.1

Theme 8: Man and Society | Sub-theme 2: Systems of Governance

### Language in Action (Grammar and Vocabulary)

Understanding how countries maintain law and order

### Developing a Rich Vocabulary

Building and Enriching Vocabulary

- Develop a rich vocabulary through:
  - extensive reading
  - learning words specific to content areas or subjects
  - using a dictionary and/or online resources routinely

This theme has many new words for you, so it is a good idea to deposit the new words into your vocabulary notebook, just like you deposit money into real banks!

However, just collecting new vocabulary is not enough for you to fully learn the words. The best way to remember new words is to use them!

Developing a Rich Vocabulary 15

Learner's Book Express/Normal (Academic) 1  
978-981-280-945-2

Learner's Book Express 2  
978-981-285-601-2

Learner's Book Normal (Academic) 2  
978-981-285-602-9

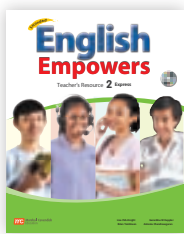
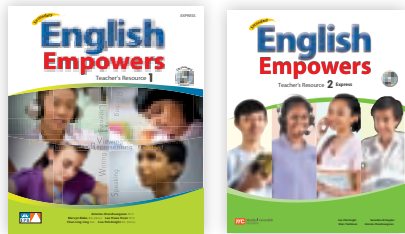
# Teacher's Resources

## English Empowers Teacher's Resource

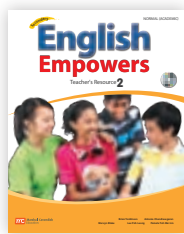
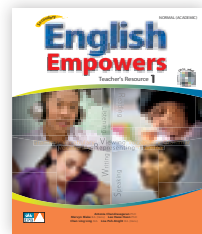
These useful resources are designed to facilitate the teaching of English in class. The integrated skills-based, thematic approach helps teachers relate language teaching and development to authentic and meaningful contexts.

- Differentiated learning strategies are suggested at appropriate junctures. The best students are challenged to excel, while those who require more help are supported.
- Additional notes related to the Teaching Notes are provided to aid classroom teaching.
- Unit Plans summarise the lessons, resources, as well as Skills, Strategies, Attitudes and Behaviour in each sub-theme. The materials are linguistically integrated and organised thematically, illustrating the natural communicative links that exist between the four language skills.
- Wide range of teacher's resource sheets and activity sheets to accompany teaching suggestions to support learning.

### Express



### Normal (Academic)



• Teach students how to identify these three parts, pointing out where the various plot elements are usually found.

• Point out that stories can feel unsatisfying if these three parts are not well balanced. For example:

- If any part is too short, the reader will feel like the story lacks development and suspense.
- If any part lasts too long, the reader can lose interest.

• Introduce storyboarding to students as a good way to see how the various scenes in a story form a beginning, middle and end.

• Explain the steps in storyboarding:

- Highlight how students should start with identifying the major events in a story and what type of plot element they constitute.
- Students should then illustrate the scene in the form of a storyboard.
- They should then arrange the scenes together and look at the story as an overview. From there, they should be able to identify the beginning, middle and end of the story by grouping the scenes together.

• Illustrate with the completed example from the story 'Home for Grandma', which students read in **Lessons 7 and 8**.

• Next, get students to work in pairs to read the **Leamer's Book, page xx - Look at This** for the first part of the story of 'Last Yamseng For A Daughter'.

- First, ask students to read for gist and to come up with adjectives to describe the mother and daughter in the story.
- Discuss the adjectives the class has come up to describe the characters. Expect the following adjectives:
  - **Mai Lan:** weak-willed, meek, quiet, lenient, docile, sweet-natured, obliging, kind, pathetic.
  - **Honey:** self-control, selfish, egotistic, spoilt, pampered, insensitive, inconsiderate, brimboic, immature, disrespectful.
- Read through the text with the class again, this time pointing out the language features as well as the organisational features, getting the students to appreciate how the story illustrates the plight of a neglected mother.

**4. DRAW A STORYBOARD**

• Refer students to the beginning of the storyboard which illustrates the first two scenes shown in the excerpt. Explain to students that the class will now read the whole text of the story to complete the storyboard.

• Divide the class into nine groups to illustrate a scene from the story, each starting from Scene 2.

• Distribute copies of **Teacher's Resource Sheet 1.3.2 - Last Yamseng For a Daughter (Continued)** but do not assign the scenes yet.

• Point out to the groups that the story has already been segmented out into key scenes.

• They are to read the full story scene by scene using reciprocal teaching. Assign group members the following roles:

- **Summariser:** to summarise the scene for the group.
- **Questioner:** to ask the group questions about the text (including those in the annotations).
- **Clarifier:** to try and answer the questions or solve any confusion. You can appoint more clarifiers if you have more than four members.
- **Predictor:** the predictor to guess what will happen in the next scene.

• Get students to identify the plot elements from Scene 3 onwards (Note: It cannot be orientation or complication, which have already been labelled).

• Get students to carry out reciprocal teaching scene by scene.

- After the group discusses each scene, proceed to highlight the language features found in the scene.

Theme 1: Family and Lifestyle      Sub-theme 3: Ties that Bind **19**

**TEACHER'S RESOURCE SHEET 1.1.1**  
LESSONS 7 AND 8: Reading and Thinking

### Guess Their Thoughts

Photograph

**Vocabulary**

Get students to refer to their vocabulary list for words to use. Also highlight to students that the story uses a number of unfamiliar words so they should be prepared to add these to the notebook.

**Differentiation**

Try changing the group roles for every scene so that the students can experience different roles.

It may be better to use hand notes for low progress students as a aid to add to the confusion. You may want to pre-assign the group before the lesson so that each group has a strong reader who can guide the group at a clarifier. You may wish to avoid the process with the first scene (Scene 1).

**Guiding Questions (Suggested Answers):**

(a) **Who are the people in this photograph and how are they related?**  
A mother and her two sons.

(b) **What do you think is happening in the photograph?**  
The mother is happily playing with her younger son as her older son looks on. Based on the intense look on his face, the older son may feel left out or jealous. (Note to students that this photograph alone only captures a moment in time, so they should be careful not to accuse the mother of favouritism.)

(c) **Fill in the thought bubbles for each of these people:** Free response

Teacher's Resource Sheet 1.1.1

**Teacher's Resource Express 1**  
978-981-280-947-6

**Teacher's Resource Normal (Academic) 1**  
978-981-280-948-3

**Teacher's Resource Express 2**  
978-981-285-604-3

**Teacher's Resource Normal (Academic) 2**  
978-981-280-605-0

# Life ACCENTS

Life Accents is an exciting English Language and literacy course designed and developed to meet the needs of upper secondary students and teachers. Life Accents supports the achievement of the learning outcomes identified in the latest English Language Syllabus.

The package comprises:

- Textbook
- Activity Book
- Reading Comprehension Skills
- Writing Skills

## Core Curriculum

### Life Accents Textbook

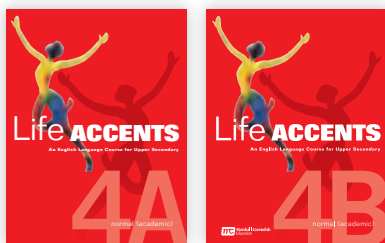
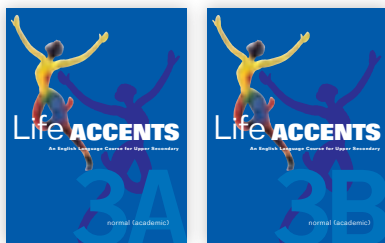
#### Express



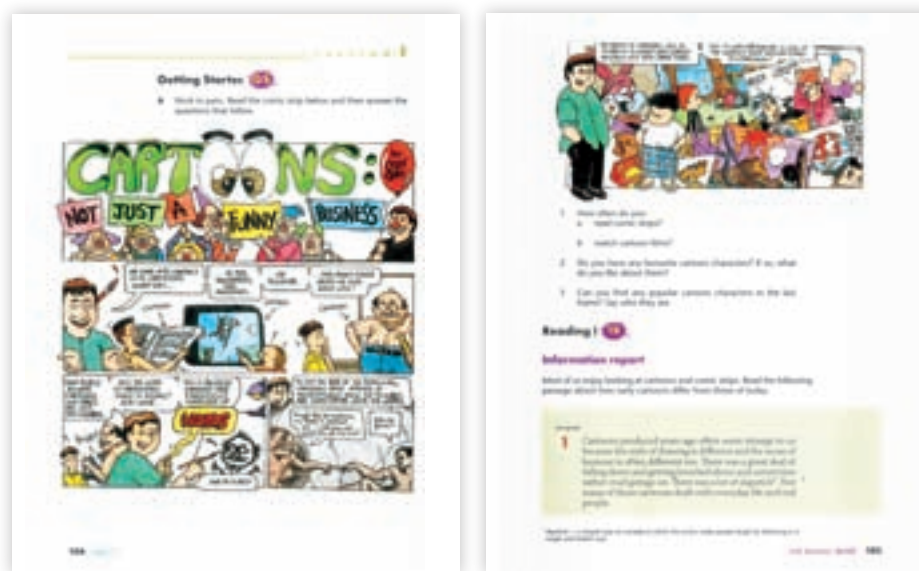
These Textbooks focus on developing students' communicative competence and critical literacy skills so that they are able to participate equally effectively in school, examination and real life contexts.

- Each unit is organised around a topic of interest and appeal for target learners.
- Topics in the units are discussed through reading and listening to two or three texts belonging to different text types.
- Grammar and vocabulary explored at the word, sentence and text level through a sequence of spiral progression.

#### Normal (Academic)



#### Express/Normal (Academic)



**Textbook Express 3A**  
978-981-01-7072-1

**Textbook Express 3B**  
978-981-01-9286-0

**Textbook Normal (Academic) 3A**  
978-981-01-7074-5

**Textbook Normal (Academic) 3B**  
978-981-01-9288-4

**Textbook Normal (Academic) 4A**  
978-981-01-9300-3

**Textbook Normal (Academic) 4B**  
978-981-01-9301-0

**Textbook Express/Normal (Academic) 'O' Level Book A**  
978-981-01-9296-9

**Textbook Express/Normal (Academic) 'O' Level Book B**  
978-981-01-9297-6

# Core Curriculum

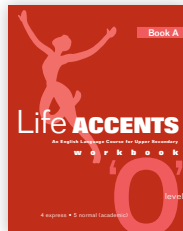
## Life Accents Workbook

These books correlate directly to each unit of the Textbooks. The lessons and activities in the Workbooks reinforce the skills and language items introduced in the Textbooks, and provide extra opportunities for independent learning.

### Express

### Normal (Academic)

### Express/Normal (Academic)



---

**Workbook**  
**Express 3A**  
978-981-01-7073-8

---

**Workbook**  
**Express 3B**  
978-981-01-9287-7

---

**Workbook**  
**Normal (Academic) 3A**  
978-981-01-7084-4

---

**Workbook**  
**Normal (Academic) 3B**  
978-981-01-9289-1

---

**Workbook**  
**Normal (Academic) 4A**  
978-981-01-9302-7

---

**Workbook**  
**Normal (Academic) 4B**  
978-981-01-9303-4

---

**Workbook**  
**Express/Normal (Academic) 'O' Level Book A**  
978-981-01-9298-3

---

**Workbook**  
**Express/Normal (Academic) 'O' Level Book B**  
978-981-01-9299-0

---

## Life Accents Reading Comprehension Skills



This book is designed to help lower secondary students establish a strong foundation in reading comprehension skills. It offers detailed advice and guided practice to extend students' ability to apply their reading comprehension skills.

---

**Reading Comprehension Skills**  
978-981-01-9446-8

---

## Life Accents Writing Skills



This book complements existing textbooks and instructional programmes by focusing on essential writing skills for lower secondary students. It provides focused practice in developing writing skills for different text types. A review of the writing process and a glossary of grammatical terms are included to facilitate learning.

---

**Writing Skills**  
978-981-9448-2

---

# Flights OF Fancy

The Flights of Fancy series is designed to help lower secondary students develop specialised skills of analysis and interpretation of literary texts. Students can expect to read a rich body of poetry, prose and drama texts carefully selected from both local as well as world-renowned authors both locally and internationally.

Students will appreciate the world of literature through a myriad of fun and creative activities where the themes centre on everyday life situations and global issues.

This series equips students with the skills and competencies necessary in a knowledge-based economy, namely, an ability to critique complex texts and to present ideas in a coherent manner, as well as a sensitivity for nuances in the English Language.

## The package comprises:

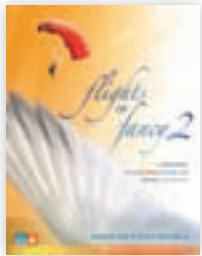
- Textbook
- Teacher's Guide

## Core Curriculum

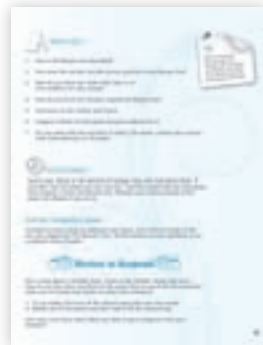
### Flights of Fancy Textbook



Focusing on the students, these Textbooks use creative activities to encourage students to bring their own experiences and articulate a personal response to literary texts. Creative thinking is the central theme of the activities that encourage students to acquire different perspectives of the world, with a compilation of a wide range of literary works from various countries and time periods.



- Students are required to further examine literary elements and practise the investigative skills they have acquired through the activities.
- Literary concepts and features are introduced through clear and simple explanations.
- A combination of activities are available for students to further demonstrate and secure their understanding of concepts and skills.
- Group work encourages students to engage in interesting topics related to the themes of the chapters and present their collaborated responses to the class.
- Ample writing exercises provides students with the opportunity to hone their skills in writing literature compositions.



**Textbook 1 (2nd Edition)**  
978-981-273-669-7

**Textbook 2 (2nd Edition)**  
978-981-273-777-9

# Teacher's Resources

## Flights of Fancy Teacher's Guide



These informative books allow teachers to plan their lessons in advance. Skills are highlighted at the start of every chapter with possible approaches to make lessons concise and effective. Step-by-step guidelines are available to facilitate teachers in conducting classroom activities.

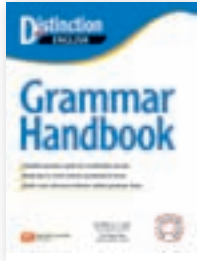
- Variable activities and suggestions to make the learning of literature interesting and enjoyable.
- Additional worksheets and exercises for further practice on the concepts learnt.
- The guides are planned in an organised manner for ease of reference.

Teacher's Guide 1 (2nd Edition)  
978-981-273-779-3

Teacher's Guide 2 (2nd Edition)  
978-981-273-097-8

# Supplementary Materials

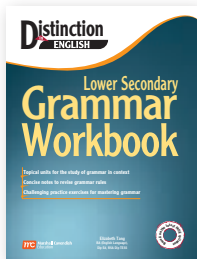
## Distinction in English: Grammar Handbook



An essential grammar resource for secondary school students, this comprehensive handbook helps students to master English grammar for success in the Cambridge G.C.E. 'N' and 'O' Level Examinations. Each unit begins with an introduction of grammar items within a context familiar to students. Grammatical rules and structures are further illustrated by examples that show students the grammar item in use. Practice exercises at the end of each unit provide ample opportunities for students to revise and consolidate their understanding of the grammar skills learnt.

**Grammar Handbook**  
978-981-01-1319-3

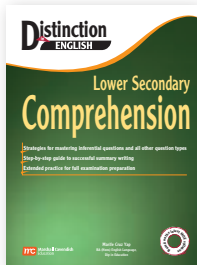
## Distinction in English: Lower Secondary Grammar Workbook



This book provides comprehensive practice for students who wish to better understand English grammar as well as improve in fluency and accuracy in their language use. The context-based exercises generate interest in students and allow them to practise grammar usage in different genres such as recounts, narratives, news reports, etc. Presence of graded exercises help students to build fluency and confidence in grammar usage.

**Lower Secondary Grammar Workbook**  
978-981-01-1500-5

## Distinction in English: Lower Secondary Comprehension



For lower secondary students who want to prepare early for the Cambridge G.C.E. 'O' Level English Examination, this book focuses on mastery of the skills and techniques required for the comprehension section of the examination. In addition to step-by-step guidance in summary writing, students will learn valuable strategies for mastering inferential questions and gain confidence by practising on examination-format questions.

**Lower Secondary Comprehension**  
978-981-01-1573-9

## Distinction in English: 'O' Level Comprehension

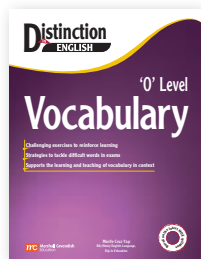


The ideal study companion for students looking to distinguish themselves in the Cambridge G.C.E. 'O' Level English Examination, this book focuses on mastery of skills and techniques required for the comprehension section. Students will learn to analyse and perfect their approach to all question types, while benefiting from step-by-step summary writing guidance as well as ample practice in examination-format questions.

**'O' Level Comprehension**  
978-981-01-1571-5

# Supplementary Materials

## Distinction in English: 'O' Level Vocabulary

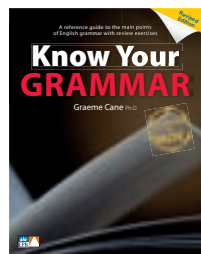


The words we choose to use when we communicate reveal a lot about our character and education, which is why building a wide and varied vocabulary will serve students well not just in examinations but throughout life. This useful book combines stimulating study of the meanings of words and phrases with exercises in context, preparing students for the Cambridge G.C.E. 'O' Level Examination. Students will benefit from the useful tips for vocabulary-building and word formation, and the varied exercises designed to encourage application of their knowledge of new words accurately and effectively.

**'O' Level Vocabulary**  
978-981-01-1572-2

---

## Know Your Grammar



This book contains clear and comprehensive explanations of grammatical points using real-life communicative contexts. The wide range of innovative exercises that includes interviews, news reports and other activities help develop linguistic and communicative competence in students. This handbook is recommended by the Ministry of Education, Singapore.

**Know Your Grammar**  
978-981-285-361-5

---

## Stay Ahead: The English Grammar Handbook



This book helps with the learning of grammar usage to convey meaning. It covers all grammar needed for success in the Cambridge G.C.E. 'N' and 'O' Level Examinations. It is designed principally for use by secondary level students from Secondary 1 to Secondary 5. This handbook is recommended by the Ministry of Education, Singapore.

**The English Grammar Handbook**  
978-981-273-875-2

---

## Grammar Supplementary for Lower Secondary



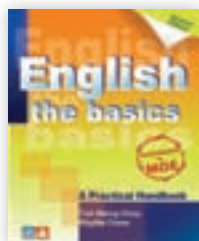
Students often find themselves struggling to make sense of grammar rules. This book can help students gain a better understanding of these rules so that students will know how the language works and how to use it effectively. This book is recommended by the Ministry of Education, Singapore.

**Grammar Supplementary for Lower Secondary (Revised Edition)**  
978-981-280-602-4

---

# Supplementary Materials

## English The Basics – A Practical Handbook



The mechanics of writing paragraphs, compositions, summaries and letters are clearly explained in this book, along with useful guidelines and realistic samples of writing styles. Numerous examples are used to reflect the everyday usage of English Language, which students can relate to both school and everyday contexts. This book is recommended by the Ministry of Education, Singapore.

---

### English The Basics – A Practical Handbook

978-981-208-969-4

---

## Reading Rites

This four-book series is specially tailored towards aiding secondary school students in building up their confidence in reading, through a wide range of reading strategies. It is designed in accordance with the English Language Syllabus by the Ministry of Education, Singapore.



---

### Reading Rites Secondary (Revised Edition) Secondary 1

978-981-421-0201

---

### Reading Rites Secondary (Revised Edition) Secondary 2

978-981-421-0218

---

### Reading Rites Secondary (Revised Edition) Secondary 3

978-981-421-0225

---

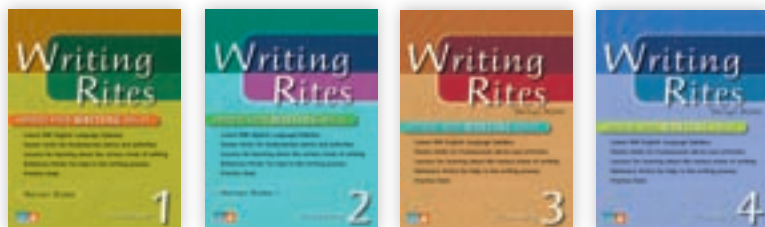
### Reading Rites Secondary (Revised Edition) Secondary 4

978-981-421-0249

---

## Writing Rites

These books cover all areas of secondary school composition writing. Designed in accordance with the English Language Syllabus set by the Ministry of Education, Singapore, this series deals with the structure of text types and the skills of composition writing, vocabulary and grammar. It effectively develops secondary school students' ability to write well in all the text types for examination purposes.



---

### Writing Rites Secondary 1 (Revised Edition)

978-981-421-025-6

---

### Writing Rites Secondary 2

978-981-421-028-7

---

### Writing Rites Secondary 3

978-981-421-029-4

---

### Writing Rites Secondary 4

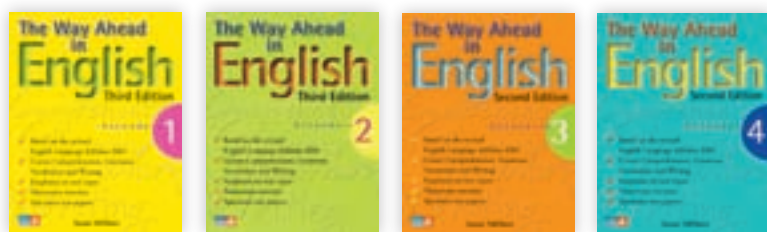
978-981-421-030-0

---

# Supplementary Materials

## The Way Ahead in English

This series of four books is written according to the latest English Language Syllabus with an emphasis in the use text types. Students' language skills can be assessed through the numerous exercises and specimen papers. The Glossary will reinforce students' grasp of the English language and prepare them thoroughly for the examination.



**The Way Ahead in English Secondary 1 (3rd Edition)**  
978-981-242-787-8

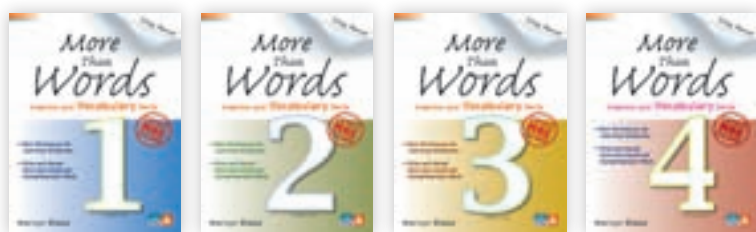
**The Way Ahead in English Secondary 3 (2nd Edition)**  
978-981-242-789-2

**The Way Ahead in English Secondary 2 (3rd Edition)**  
978-981-242-788-5

**The Way Ahead in English Secondary 4 (2nd Edition)**  
978-981-242-790-8

## Stay Ahead: More Than Words

This series of books focuses on the learning of vocabulary. Students will acquire the best techniques for learning specific vocabulary that they will use in their daily lives rather than a random selection. Available across four levels, these books aim to help students build a wide vocabulary that is practical and functional throughout secondary school.



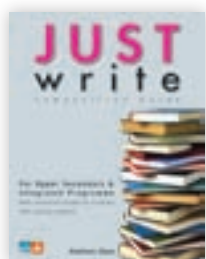
**More Than Words Secondary 1**  
978-981-271-918-8

**More Than Words Secondary 3**  
978-981-271-920-1

**More Than Words Secondary 2**  
978-981-271-919-5

**More Than Words Secondary 4**  
978-981-271-921-8

## Just Write Composition Guide for Upper Secondary & Integrated Programme

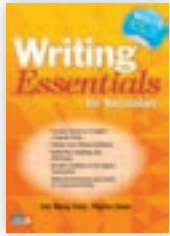


This handy guide is essential to help improve writing through the numerous examples of successful writing by students from various schools and junior colleges. The guide pays particular attention to expository essays, argumentative essays, descriptive essays and narrative essays. Specific tips and strategies are given for each of these genres. It also contains useful appendices on quotations and descriptive phrases for descriptive and narrative essays.

**Just Write Composition Guide for Upper  
Secondary & Integrated Programme**  
978-981-271-399-5

# Supplementary Materials

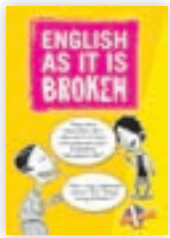
## Writing Essentials for Secondary



This book is written to help students establish a firm foundation in writing, to sustain interest and to enable self-learning. The mechanics of good writing are illustrated and explained in great detail. This book offers many good writing models. These models challenge the student to create in writing, a product which can match them in both quality and style.

**Writing Essentials for Secondary**  
978-981-280-028-2

## English As It Is Broken



This series is a selection and compilation of questions and answers from the weekly column in The Sunday Times, a Singapore newspaper, regarding the usage of the English language in Singapore. These publications address common errors and areas of confusion under the categories of Usage, Vocabulary and Grammar through examples and explanations.

**English As It Is Broken**  
978-981-273-049-7

**English As It Is Broken 2**  
978-981-280-285-9

## Study Partners: Get It Right! Grammar

This series of four guidebooks covers the most important aspects of English grammar and provides complete and coordinated reference for secondary school students. Because each unit is presented in a graduated manner that takes students from basic concepts to more complex ones, students can systematically build their English Language skills, no matter their initial ability. The material combines the best of traditional and modern learning methodologies with a wide variety of exercises. Students will find that these guidebooks feature expert tips for avoiding common mistakes and simple explanations for effortless understanding.



**Get it Right! Grammar Secondary 1**  
978-981-01-7785-0

**Get it Right! Grammar Secondary 3**  
978-981-01-7753-9

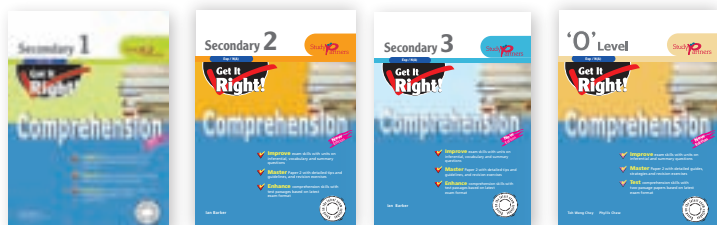
**Get it Right! Grammar Secondary 2**  
978-981-01-7786-7

**Get it Right! Grammar Secondary 4**  
978-981-01-7752-2

# Supplementary Materials

## Study Partners: Get It Right! Comprehension

This series of four guidebooks helps students build and improve the core skills necessary for success in English comprehension. Employing a skills-based approach, these guidebooks contain important notes and useful strategies for comprehension – skimming, scanning, looking for contextual clues, anticipating, making predictions, looking for discourse markers and summary skills. These helpful guidebooks include inferential, vocabulary and summary questions, as well as a range of interesting and stimulating practice tests based on the latest examination format.



**Get It Right! Comprehension Secondary 1**  
978-981-01-9502-1

**Get It Right! Comprehension Secondary 2**  
978-981-01-9528-1

**Get It Right! Comprehension Secondary 3**  
978-981-01-8425-4

**Get It Right! Comprehension 'O' Level**  
978-981-01-9340-9

## Study Partners: Get It Right! Writing



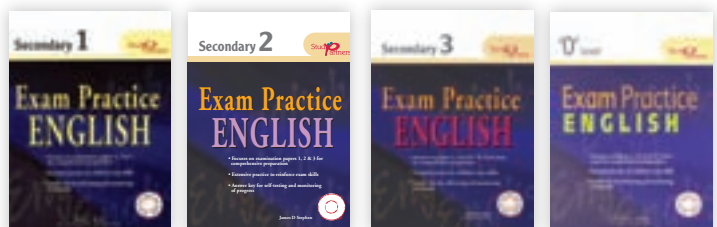
This series of two guidebooks is formulated to help students improve their writing skills with effective techniques and strategies that are applicable to a wide variety of composition types. Unlike most other writing guidebooks, the books focus on both creative and functional writing to consolidate core writing skills. Each chapter begins with guidelines that help to highlight learning outcomes. Step-by-step pointers throughout the chapter provide guidance for every writing type.

**Get It Right! Writing 2**  
978-981-01-7518-4

**Get It Right! Writing 'O' Level**  
978-981-01-5967-2

## Study Partners: Exam Practice English

These essential study aids offer secondary school students extensive examination preparation through a series of ten examination papers in each book based on the latest English Language Syllabus. Through this indispensable series of four practice books, students will gain an in-depth understanding of the skills required to succeed in writing, reading, grammar, summary writing and oral communication, while developing essential examination skills. The detailed answer key provided in every book enables these to serve as excellent self-study guides.



**Exam Practice Secondary 1**  
978-981-01-6507-9

**Exam Practice Secondary 2**  
978-981-01-6327-3

**Exam Practice Secondary 3**  
978-981-01-6326-6

**Exam Practice 'O' Level**  
978-981-01-9342-3



# MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

MATHEMATICS

# Mathematics Matters

Written in a simple and easy-to-understand style, Mathematics Matters, a series for the secondary levels, focuses on conceptual understanding, critical thinking and process skills in mathematical problem-solving. The development of these skills is infused into the content with carefully selected graded problems and worked examples so that students of various proficiencies can learn effectively and develop their mathematical skills.

## The Package comprises:

Express

- Textbook
- Teacher's Guide
- Question Bank Book

Normal (Academic)

- Textbook
- Workbook
- Teacher's Guide
- Workbook – Teacher's Edition

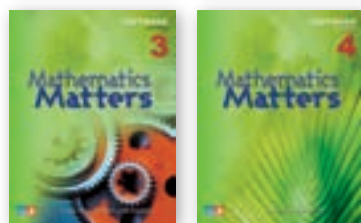
## Core Curriculum

### Mathematics Matters Textbook

Express



Mathematics Matters Express is a series of four course books, specially written for secondary school students preparing for the Cambridge G.C.E. 'O' Level Examination. It emphasises the understanding and application of mathematical concepts, as well as students' proficiency in problem solving and higher-order thinking skills.



Mathematics Matters Normal (Academic) series is available for students preparing for the Cambridge G.C.E. 'N' Level Examination. Mathematics concepts in this series are presented in a systematic way – from the fundamentals to the more complex. There are numerous graded questions and activities for students of mixed abilities to test their mastery of mathematical concepts.

Normal (Academic)



- Practice questions are provided to create opportunities for students to apply the mathematical processes, practise and hone their newly-acquired mathematical skills. There are different levels of difficulty to cater to the diverse learning needs of students.
- Interesting factoids and tidbits related to Mathematics are included to promote an appreciation of Mathematics and cultivate a positive learning attitude through Maths Vitamins; a feature found in the Textbooks.
- Fully worked examples are provided to develop students' process skills and metacognition.
- Journal Writing gives students opportunities to reflect in their learning journey.



<b>Textbook Express Secondary 1</b> 978-981-273-882-0	<b>Textbook Express Secondary 4</b> 978-981-271-728-3	<b>Textbook Normal (Academic) Secondary 3</b> 978-981-273-885-1
<b>Textbook Express Secondary 2</b> 978-981-271-727-6	<b>Textbook Normal (Academic) Secondary 1</b> 978-981-273-884-4	<b>Textbook Normal (Academic) Secondary 4</b> 978-981-271-315-5
<b>Textbook Express Secondary 3</b> 978-981-273-883-7	<b>Textbook Normal (Academic) Secondary 2</b> 978-981-271-311-7	<b>Textbook Normal (Academic) Secondary 5</b> 978-981-273-479-2

# Core Curriculum

## Mathematics Matters Workbook

Complementing the Textbooks, the Workbooks provide exercises consisting of graded questions to reinforce the concepts learnt.

### Normal (Academic)



**Workbook Normal (Academic) Secondary 1**  
978-981-271-159-5

**Workbook Normal (Academic) Secondary 3**  
978-981-271-161-8

**Workbook Normal (Academic) Secondary 5**  
978-981-273-480-8

**Workbook Normal (Academic) Secondary 2**  
978-981-271-312-4

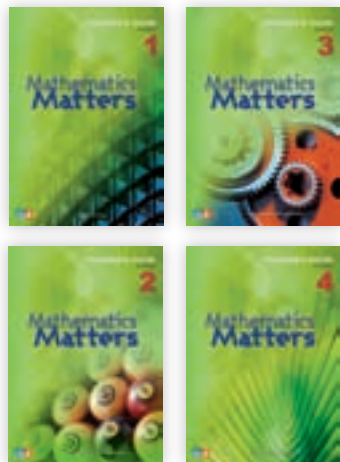
**Workbook Normal (Academic) Secondary 4**  
978-981-271-316-2

## Teacher's Resources

### Mathematics Matters Teacher's Guide

These effective guides provide detailed Scheme of Work to facilitate lesson planning. These guides also list out key concepts that students should learn by the end of each chapter under Learning Objectives for greater focus and clarity of learning expectations. Important concepts are highlighted in Key Teaching Notes for effective learning. Common mistakes and relations between Mathematics and everyday life are highlighted. Extra sources of activities are provided to strengthen and enrich students' learning experience.

### Express



### Normal (Academic)



Chapter 11: Algebraic Manipulation

**Scheme of Work**

Topic	Chapter Objectives	Learning Objectives	Resources	Duration	Thinking Skills	MS
11.1	Understand		<ul style="list-style-type: none"> <li>Chapter Objective</li> <li>Learning Objectives</li> </ul>		<ul style="list-style-type: none"> <li>Analysing</li> <li>Communicating</li> <li>Connecting</li> <li>Problem Solving</li> <li>Reasoning</li> <li>Representing</li> </ul>	
11.1.1		<ul style="list-style-type: none"> <li>Expand the product of two linear algebraic expressions</li> </ul>	<ul style="list-style-type: none"> <li>MSB, sec 1, pp 1-12</li> </ul>	<ul style="list-style-type: none"> <li>MSB, Ch 1, pp 12-15</li> <li>MSB, Workbook 11, pp 1</li> </ul>		
11.1.2		<ul style="list-style-type: none"> <li>Recognise and apply the special products</li> </ul>	<ul style="list-style-type: none"> <li>MSB, sec 1, p 17</li> <li>MSB, MSB, Workbook 11, pp 1</li> </ul>	<ul style="list-style-type: none"> <li>MSB, Ch 1, p 16</li> <li>MSB, Workbook 11, pp 1-5</li> </ul>		
11.1.3		<ul style="list-style-type: none"> <li>Expand algebraic expressions of the form <math>(a + b)(c + d)</math></li> </ul>	<ul style="list-style-type: none"> <li>MSB, sec 1, p 14</li> <li>MSB, MSB, Workbook 11, pp 1</li> </ul>	<ul style="list-style-type: none"> <li>MSB, Ch 1, p 17</li> <li>MSB, Workbook 11, pp 5-16</li> </ul>		
11.1.4		<ul style="list-style-type: none"> <li>Expand algebraic expressions of the form <math>(a + b)(c - d)</math></li> </ul>		<ul style="list-style-type: none"> <li>MSB, Ch 1, p 16</li> <li>MSB, Workbook 11, pp 1-5</li> </ul>		
11.1.5		<ul style="list-style-type: none"> <li>Expand algebraic expressions of the form <math>(a + b)^2</math> and <math>(a - b)^2</math></li> </ul>	<ul style="list-style-type: none"> <li>MSB, MSB, Workbook 11, pp 1-17</li> <li>MSB, sec 1, pp 15-17</li> <li>MSB, MSB, Workbook 11, pp 1-5</li> <li>MSB, MSB, Workbook 11, pp 1-5</li> </ul>	<ul style="list-style-type: none"> <li>MSB, Ch 1, p 17</li> <li>MSB, Workbook 11, pp 1-5</li> </ul>		
11.1.6		<ul style="list-style-type: none"> <li>Expand algebraic expressions of the form <math>(a + b)(c + d)</math> and <math>(a - b)(c + d)</math></li> </ul>	<ul style="list-style-type: none"> <li>MSB, MSB, Workbook 11, pp 1-17</li> <li>MSB, sec 1, pp 15-17</li> <li>MSB, MSB, Workbook 11, pp 1-5</li> <li>MSB, MSB, Workbook 11, pp 1-5</li> </ul>	<ul style="list-style-type: none"> <li>MSB, Ch 1, p 17</li> <li>MSB, Workbook 11, pp 1-5</li> </ul>		

**Teacher's Guide Express Secondary 1**  
978-981-271-729-0

**Teacher's Guide Express Secondary 4**  
978-981-273-302-3

**Teacher's Guide Normal (Academic) Secondary 3**  
978-981-271-694-1

**Teacher's Guide Express Secondary 2**  
978-981-273-301-6

**Teacher's Guide Normal (Academic) Secondary 1**  
978-981-271-693-4

**Teacher's Guide Normal (Academic) Secondary 4**  
978-981-271-318-6

**Teacher's Guide Express Secondary 3**  
978-981-271-730-6

**Teacher's Guide Normal (Academic) Secondary 2**  
978-981-271-314-8

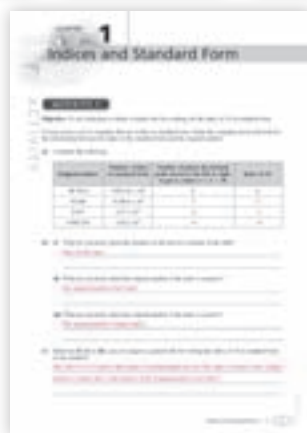
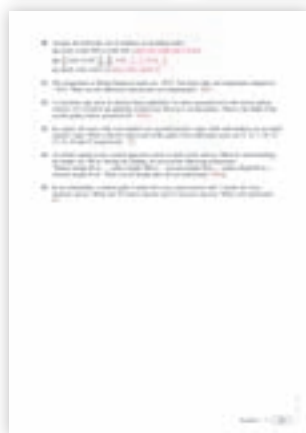
**Teacher's Guide Normal (Academic) Secondary 5**  
978-981-273-483-9

# Teacher's Resources

## Mathematics Matters Workbook – Teacher's Edition

The Teacher's Editions include all the answers to the questions in the Workbooks.

### Normal (Academic)



**Workbook – Teacher's Edition  
Normal (Academic) Secondary 1**  
978-981-271-622-4

**Workbook – Teacher's Edition  
Normal (Academic) Secondary 3**  
978-981-271-624-8

**Workbook – Teacher's Edition  
Normal (Academic) Secondary 5**  
978-981-273-418-5

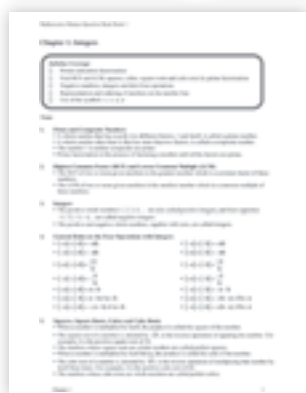
**Workbook – Teacher's Edition  
Normal (Academic) Secondary 2**  
978-981-271-313-1

**Workbook – Teacher's Edition  
Normal (Academic) Secondary 4**  
978-981-271-317-9

## Mathematics Matters Question Bank Book

These books provide hundreds of basic and challenging questions for additional practices.

### Express



**Question Bank Book Express  
Secondary 1**  
978-981-280-171-5

**Question Bank Book Express  
Secondary 2**  
978-981-280-172-2

**Question Bank Book Express  
Secondary 3**  
978-981-280-173-9

**Question Bank Book Express  
Secondary 4**  
978-981-280-174-6

# New Mathematics Counts 2nd Edition

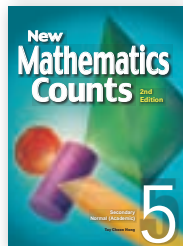
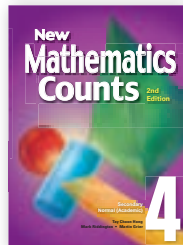
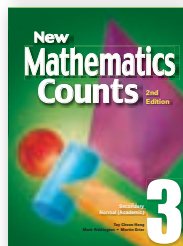
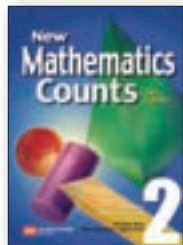
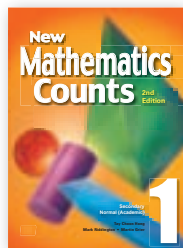
This Mathematics Textbook series is designed to engage secondary students in a way that makes Mathematics easy to learn. Conforming to the requirements of the latest syllabuses for the Cambridge G.C.E. 'N' Level and G.C.E. 'O' Level Examinations, this course of five textbooks progressively takes students on a learning journey to prepare them to excel in their examinations.

## The Package comprises:

- Textbook
- Teacher's Resources CD-ROM

## Core Curriculum

### New Mathematics Counts Textbook (2nd Edition)



Ample Exercise questions that are carefully graded according to the level of difficulty, are found at the end of every section. Challenging questions and past-year examination questions have also been incorporated to induce higher-order thinking skills and build confidence in the examination.

- A post-diagnostic 10 Minutes Concept Check assesses students on their understanding of each section within a chapter. This helps students identify areas they are weak in.
- A Discover! section, found at the beginning of each chapter, consists of a set of learning outcomes that defines the framework of learning.
- Concepts are presented in a simple, clear and logical manner. The use of diagrams, figures and models help students visualise mathematical concepts and ideas more clearly.
- Key Ideas are clearly differentiated and placed in coloured boxes within each section. These may include definitions or mathematical formulae.
- Note alerts students to pertinent points throughout the learning process. They are also used to highlight common errors or remind students of prerequisite concepts.

**10 MINUTES CONCEPT CHECK**

You have 10 minutes to answer the following questions. Choose the most appropriate answer.

**3.1** 1. For the given triangle, which of the following is true?  
 A.  $a^2 + b^2 = c^2$   
 B.  $a^2 + c^2 = b^2$   
 C.  $b^2 + c^2 = a^2$   
 D.  $a^2 + b^2 + c^2 = (a + b + c)^2$

**3.1** 2. What is the value of  $x$  in the triangle?  
 A. 18  
 B. 15  
 C. 19  
 D. 21

**3.1** 3. In the diagram shown on the right,  $O$  is the centre of the circle. If the perpendicular distance from  $O$  to  $AB$  is 8 cm, what is the radius of the circle?  
 A. 4 cm  
 B. 8 cm  
 C. 8 cm  
 D. 16 cm

**3.1** 4. For triangle  $PQR$  below, which of the following statements is true for the marked  $\angle R$ ?  
 A.  $PQ$  is the hypotenuse and  $QR$  is the opposite side.  
 B.  $PQ$  is the hypotenuse and  $PR$  is the adjacent side.  
 C.  $PR$  is the hypotenuse and  $PQ$  is the adjacent side.  
 D.  $QR$  is the hypotenuse and  $PQ$  is the opposite side.

**3.1** 5. The right-angled triangle shown is isosceles. The value of  $\tan 45^\circ$  is  
 A. 0.5  
 B. 1  
 C. 1.5  
 D. 2

**6 Basic Geometry**

**DISCOVER!**

The study of geometry began with the ancient Greeks. The Greek words 'geo' means 'earth' and 'metron' means 'to measure'. So the word 'geometry' originally meant 'to measure the earth'. Using the early rules and principles of geometry which included the concepts of lengths and angles, people learned to build complex structures and travel around the world, and in outer space, without getting lost.

Geometry can be found everywhere from nature and art to man-made structures. Take a look at one very cool Egyptian. It is an excellent example of how geometry is used in construction and architectural design.

**How to:**

- represent points, line segments and planes geometrically
- draw and name angles
- distinguish between types of angles (right, acute, obtuse and reflex angles)
- measure angles of various sizes
- identify complementary angles, supplementary angles, adjacent angles on a straight line, vertically opposite angles and angles at a point
- identify the different types of angles formed by parallel lines and a transversal such as corresponding angles, alternate angles and interior angles
- use the various properties of angles to find unknown angles

**3.5 Increasing or Decreasing a Quantity by a Given Percentage**

**3.5.1 Increasing a Quantity by a Given Percentage**

We have seen in Section 3.3 that when a quantity increases, we can express the increase as a percentage of the original value. Likewise, a quantity can be increased by a given percentage.

For example, if we increase the original value of a quantity by 5%, we will have

$$\text{New value} = (100\% + 5\%) \text{ of the original value} = 105\% \text{ of the original value}$$

In Singapore, all consumers are charged an additional 5% of the value of goods purchased or services enjoyed. This additional increase of 5% to the original quantity is known as the Goods and Services Tax (GST).

**Example 14**

Sue Secondary School takes in 180 Secondary One pupils every year. Due to an increase in the number of housing estates in the area, the school has decided to increase its intake of Secondary One pupils by 15%. What will the new Secondary One intake be?

**Solution**

Before: 180 Secondary One pupils  
 100%  
 180

After: 7 Secondary One pupils  
 100% + 15% = 115%  
 180 + 27 = 207

New Secondary One intake =  $(100\% + 15\%)$  of the original intake  
 $= 115\%$  of 180 pupils  
 $= \frac{115}{100} \times 180 = 207$  pupils

**Alternative method:**

Increase in Secondary One intake = 15% of 180 pupils  
 $= \frac{15}{100} \times 180 = 27$  pupils  
 $\therefore$  New Secondary One intake = original intake + increase in intake  
 $= 180 + 27 = 207$  pupils

**Textbook Normal (Academic) Secondary 1**  
978-981-01-1228-8

**Textbook Normal (Academic) Secondary 3**  
978-981-01-1229-5

**Textbook Normal (Academic) Secondary 5**  
978-981-01-1242-4

**Textbook Normal (Academic) Secondary 2**  
978-981-01-0993-6

**Textbook Normal (Academic) Secondary 4**  
978-981-01-0994-3

# Teacher's Resources

## New Mathematics Counts Teacher's Resources CD-ROM

These quality teacher's resource materials provide flexibility in allowing teachers to tailor a lesson according to the needs of their students. This helps teachers to focus better on teaching and assessing, as well as on remediating their weaker students.

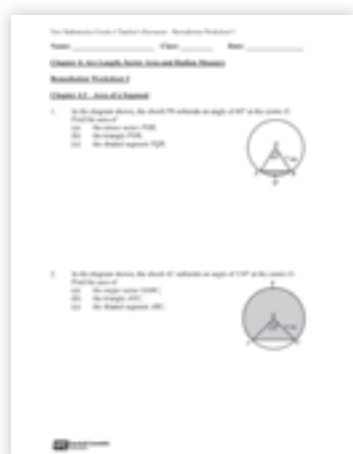
- Scheme of Work shows the learning outcomes, timeframe and all resources available for each chapter to aid teachers in lesson planning.
- Teacher's Guide offers a helpful combination of ideas for lesson starter, lesson notes, handy teaching tips, pointers on common misconceptions and errors, as well as worked solutions to challenging problems and activities in the Textbook.
- Remediation Worksheet promotes conceptual understanding through concept-specific guides and practices to help weaker students.
- Enrichment Worksheet provides opportunities for students to explore mathematical ideas and application beyond the classroom confines. They also infuse National Education, Information Technology and Thinking Skills into the curriculum through related activities.
- Questions Bank provides teachers resources to select and customise questions to prepare worksheets, tests and examinations.



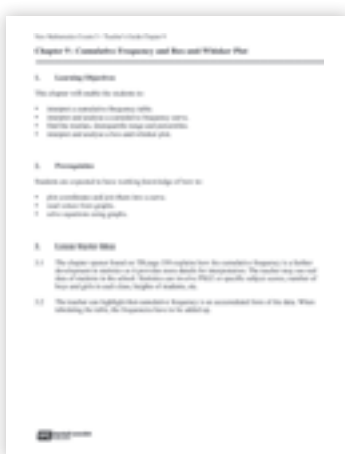
Enrichment Worksheet

Chapter	Topic	Learning Outcomes	Resources
Chapter 1	Number	...	...
Chapter 2	Algebra	...	...
Chapter 3	Geometry	...	...
Chapter 4	Trigonometry	...	...
Chapter 5	Statistics	...	...
Chapter 6	Probability	...	...

Scheme of Work



Remediation Worksheet



Teacher's Guide

**Teacher's Resources CD-ROM 1**  
978-981-01-6805-6

**Teacher's Resources CD-ROM 3**  
978-981-01-6807-0

**Teacher's Resources CD-ROM 5**  
978-981-01-6809-4

**Teacher's Resources CD-ROM 2**  
978-981-01-6806-3

**Teacher's Resources CD-ROM 4**  
978-981-01-6808-7

# Mathematics

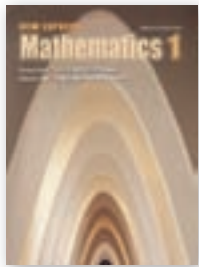
Written by a group of lecturers from the National Institute of Education Singapore, this series is based on the new initiatives spelt out by the Ministry of Education. It is mathematically and pedagogically sound, based on extensive research findings. Its approach is geared towards developing students' mathematical thinking beyond concepts and skills to prepare them for the change in examination format in the near future.

**The package comprise:**

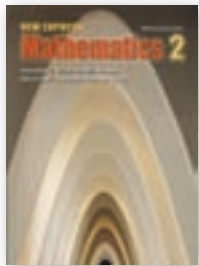
- Textbook

## Core Curriculum

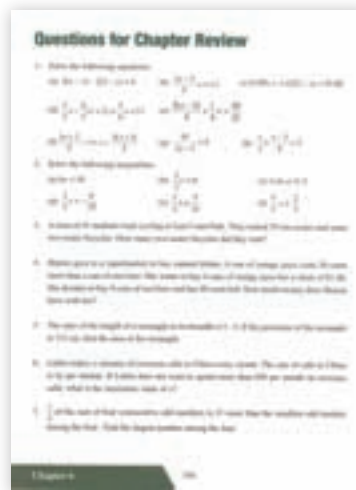
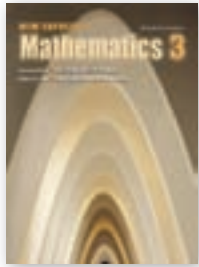
### New Express Mathematics Textbook



The New Express Mathematics Textbook series is designed to prepare pupils for the Cambridge G.C.E. 'O' Level Examination. It guides students to reason logically and communicate mathematically. This series also encourages students to learn independently and cooperatively.



- In-Class Activity consists of different questions for on-the-spot practice which are used to initiate the development of concept and skills.
- Looking Back can be found after some worked examples. It demonstrates an essential step of Polya's problem solving process.
- Exercises at the end of each chapter consist of Group A and B types of questions. Group A questions test concepts and skills. Group B questions deal with application of skills. Some contain Group C questions which are more challenging.
- Questions under Chapter Review provide additional practice for students.
- Exploration and Project Tasks are carefully chosen structured questions which encourage students to stretch themselves mathematically.



**Textbook Secondary 1**  
978-981-056-370-7

**Textbook Secondary 3**  
978-981-056-371-4

**Textbook Secondary 2**  
978-981-057-639-4

**Textbook Secondary 4**  
978-981-057-638-7

# New Additional Mathematics 3rd Edition

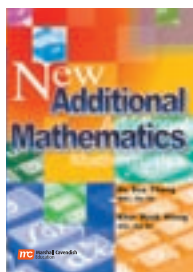
New Additional Mathematics (3rd Edition) is written based on the syllabus issued by the Ministry of Education to meet the needs of secondary school students preparing for the Cambridge G.C.E. 'O' Level Examination.

## The package comprises:

- Textbook
- Teacher's Edition
- IT Worksheets

## Core Curriculum

### New Additional Mathematics Textbook (3rd Edition)



The Textbook contains well-organised content, which is developed clearly through comprehensive illustrations and worked examples. The book also infuses the initiatives of the Ministry of Education – Thinking Skills and Information Technology. It not only teaches the subject itself but also educates one about the power and beauty of Mathematics.

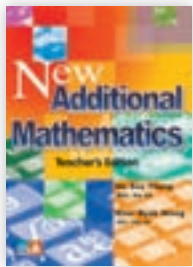
---

**Textbook (3rd Edition)**  
978-981-42-1018-8

---

## Teacher's Resources

### New Additional Mathematics Teacher's Edition (3rd Edition)



Teacher's Edition (3rd Edition) contains useful tips for teachers to assist them in teaching the topics well.

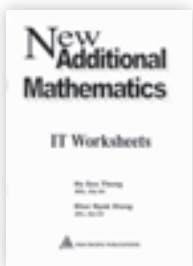
---

**Teacher's Edition (3rd Edition)**  
978-981-208-693-8

---

## Supporting Materials

### New Additional Mathematics IT Worksheets



These worksheets are designed to enrich the users with another type of learning experience. They make use of different open-ended tools such as Graphmatica, Microsoft Excel and the Geometer's Sketchpad. The activities enhance learning and development of mathematical understanding through investigation and exploration, computation and interpretation, and practice and consolidation.

---

**IT Worksheets**  
978-981-208-804-8

---

# Panpac ADDITIONAL MATHEMATICS

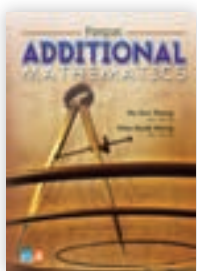
Built on the strength of the well-received 3rd edition of New Additional Mathematics, this series follows a pedagogically sound approach, with in-depth development of concepts and reader-friendly presentation to help students achieve mastery of vital mathematical principles.

## The package comprises:

- Textbook
- Workbook
- Teacher's Guide
- Question Bank Book

## Core Curriculum

### Panpac Additional Mathematics Textbook



This Textbook is specially written for students preparing for the Cambridge G.C.E. 'O' Level Examination. Written by experienced teachers, this book provides comprehensive coverage of the latest Additional Mathematics syllabus implemented by the Ministry of Education, Singapore in 2007.

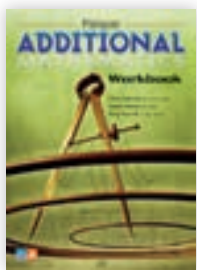
- Graded examples for application of concepts.
- ICT-based activities for exploration and extension.
- Graded questions for students of mixed abilities.
- Questions that develop higher-order thinking skills.
- Graphic organiser for every chapter.



#### Textbook

978-981-280-175-3

### New Additional Mathematics Workbook



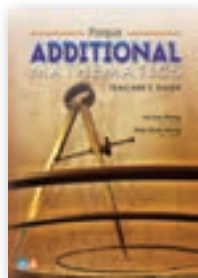
This Workbook consists of a wide range of questions with varying difficulty that caters to students of different abilities. IT activities are included to enhance the learning experiences of students. Important concepts and formulae are highlighted in the overview, using concept maps.

#### Workbook

978-981-280-609-3

# Teacher's Resources

## New Additional Mathematics Teacher's Guide



This effective guide equips and empowers classroom teachers with the latest pedagogical tools and creative ideas to teach concepts in Additional Mathematics efficiently and effectively.

This Teacher's Guide provides solutions to challenging problems for each topic and additional non-routine questions for certain topics. It also comes with solutions to all exercises and problems under the new topic, Plane Geometry. This is done to help teachers who may be new or unfamiliar with the notion of 'mathematical proof' – a prerequisite to proving many geometrical results.

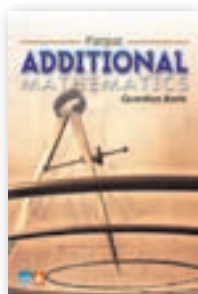
Other than embracing the ideas suggested in the Panpac Additional Mathematics Teacher's Guide, the authors also encourage teachers to tap on other available resources to further enhance their teaching repertoire of Additional Mathematics.



**Teacher's Guide**  
978-981-271-695-8

# Supporting Materials

## New Additional Mathematics Question Bank

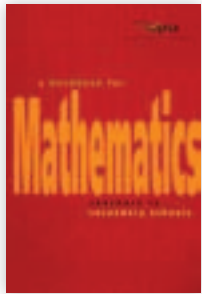


This book contains more than 500 questions, graded according to 3 levels of difficulty – basic, advanced and challenging. Fully worked solutions are accompanied at the end of every chapter. Emphasis is placed on the applications of mathematical concepts and skills.

**Question Bank**  
978-981-280-402-0

# Professional Development

## Teacher Works: A Handbook for Mathematics Teachers in Secondary Level



Teachers will find the many teaching tips, examples, lesson plans and ideas for activities in this engaging book invaluable, making it an essential teaching resource to motivate and engage their students. Teachers may find the new strategies outlined in the teaching of Mathematics a refreshing complement to their existing teaching techniques.

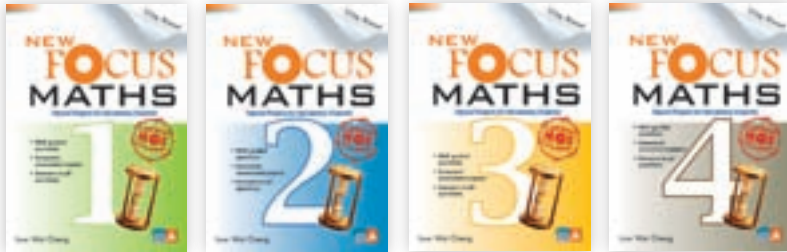
**A Handbook for Mathematics Teachers in Secondary Level**  
978-981-01-9323-2

## Supplementary Materials

### Stay Ahead: New Focus Maths Topical Papers: Express

This series is written based on the latest Mathematics Syllabus. It follows closely to the textbooks used in schools and helps students to master the vital mathematical concepts.

- Well-graded questions from core topics to help students consolidate their learning of mathematical concepts.
- Semestral assessment papers to help students better prepare for their examination.



**New Focus Maths 1**  
978-981-273-101-2

**New Focus Maths 2**  
978-981-280-030-5

**New Focus Maths 3**  
978-981-273-102-9

**New Focus Maths 4**  
978-981-280-031-2

### AHA! MATH

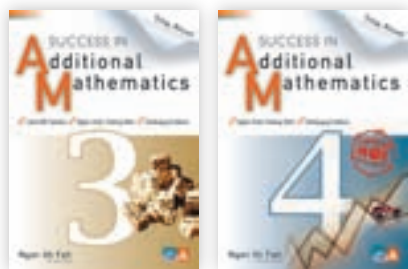


This book aims to meet the mathematical needs of those who are stimulated by the sounds and sights of numbers, while ministering to those who have a negative feeling towards Mathematics in school. To both groups, AHA! MATH hopes to awaken their mathematical consciousness regardless of their prior experiences, propagating the message that Mathematics is actually beautiful and powerful.

**AHA! MATH**  
978-981-271-128-1

# Supplementary Materials

## Stay Ahead: Success in Additional Mathematics



This series is written based on the latest Additional Mathematics Syllabus. It helps students to consolidate their understanding of mathematical concepts and prepares them for their examination.

- Worked examples, followed by graded exercises so that learning occurs in a progressive manner.
- Review exercises for additional practice so as to master key mathematical skills.
- Notes and remarks for easy reference to facilitate learning.
- Alternative methods to promote creative thinking in students.
- Hints for students attempting challenging questions to help build confidence in answering these questions.

---

**Success in Additional Mathematics 3**  
978-981-273-002-2

**Success in Additional Mathematics 4**  
978-981-273-543-0

---

SCIENCE

SCIENCE

SCIENCE

SCIENCE

SCIENCE

SCIENCE

SCIENCE

**SCIENCE**

SCIENCE

SCIENCE

SCIENCE

SCIENCE

SCIENCE

# SCIENCE

## Matters

This engaging course develops scientific knowledge and skills that help students build a strong foundation in Science and to prepare them for further in-depth study of the Science topics at the upper secondary level.

### The package comprises:

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher’s Edition
- Practical Book – Teacher’s Edition
- Teacher’s Resources CD-ROM

## Core Curriculum

### Lower Secondary Science Matters Textbook



These Textbooks engage students through eye-catching graphics and illustrations that bring concepts alive and allow students to relate to the content. These Textbooks also encourage students to explore in greater depth the scientific concepts in a language that is easy to understand.

- Lively and engaging content: Colourful and stunning visuals make Science engaging and help students relate to Science in everyday life.
- Content facilitates scientific inquiry: Science Matters provides opportunities and resources for teachers to develop the spirit of Science inquiry in their students. The presentation of the content encourages students to exercise critical thinking, as scientists do, to deepen understanding.



Textbook Express/Normal (Academic)

Volume A

978-981-01-8734-7

Textbook Express/Normal (Academic)

Volume B

978-981-01-0955-4

# Core Curriculum

## Lower Secondary Science Matters Workbook



The Workbooks are designed to complement the Textbooks, which offer comprehensive coverage of the latest syllabus from the Ministry of Education, Singapore. While the Textbooks convey theories with real-life examples, the Workbooks strengthen the foundation laid by the Textbooks.

With ample exercises in the form of traditional questions and various graphic organisers, Science Matters Workbooks encourage students to recall and link different concepts taught in the Textbooks. Exercises are styled in a manner that builds examination-confidence.

- Secure Your Basics includes questions that reinforce the basic understanding of topics.
- Map It Out includes graphic organisers that stimulate various thinking skills in students.
- Challenge Yourself includes examination-focused questions and time limits to further challenge students.

---

**Workbook Express/Normal (Academic) Volume A**  
978-981-01-8736-1

**Workbook Express/Normal (Academic) Volume B**  
978-981-01-8737-8

---

## Lower Secondary Science Matters Practical Book



Designed to complement the materials in the Textbooks, these Practical Books provide hand-on activities required to gain a further understanding of Science inquiry. These books encourage students to engage in experimentation in order to gain first-hand experience through concepts taught in the Textbooks.

- Process skills listed to clarify skills being developed in each experiment.
- Inquiry-based activities designed to maintain students' interest while developing inquiring mind.
- End-of-investigation questions designed to reinforce understanding and develop critical thinking skills.

---

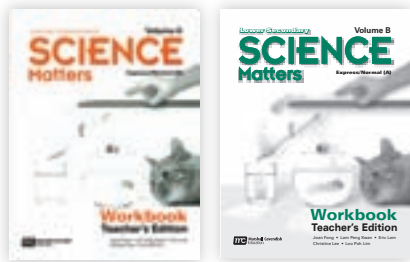
**Practical Book Express/Normal (Academic) Volume A**  
978-981-01-8740-8

**Practical Book Express/Normal (Academic) Volume B**  
978-981-01-8741-5

---

## Teacher's Resources

### Lower Secondary Science Matters Workbook – Teacher's Edition



This edition of the Workbooks contains answers to all questions found in the Workbooks.

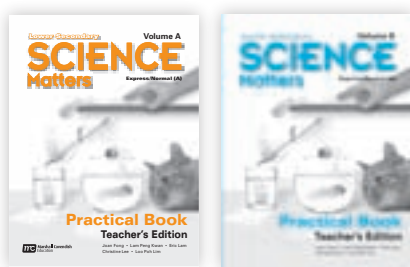
---

**Workbook – Teacher's Edition Express/Normal (Academic) Volume A**  
978-981-01-1396-4

**Workbook – Teacher's Edition Express/Normal (Academic) Volume B**  
978-981-01-1397-1

---

### Lower Secondary Science Matters Practical Book – Teacher's Edition



This edition of the Practical Books contains answers to all questions in the Practical Books.

---

**Practical Book – Teacher's Edition Express/Normal (Academic) Volume A**  
978-981-01-1400-8

**Practical Book – Teacher's Edition Express/Normal (Academic) Volume B**  
978-981-01-1401-5

---

### Lower Secondary Science Matters Teacher's Resources CD-ROM



This interactive CD-ROM provides additional resources to enhance the teaching of Science. It includes the Scheme of Work, Lesson Notes and answers to the Textbook.

---

**Teacher's Resource CD-ROM**  
978-981-01-6810-0

---

# INTERACTIVE SCIENCE

Interactive Science for Inquiring Minds is a comprehensive package written in accordance with the latest syllabus for lower secondary Science.

## The package comprises:

- Textbook
- Theory Workbook
- Practical Workbook
- Theory Workbook — Teacher's Edition
- Practical Workbook — Teacher's Edition
- Teacher's Resource CD-ROM
- Examination Papers
- Higher Order Thinking Questions

## Core Curriculum

### Interactive Science for Inquiring Minds Textbook



The Textbooks aim to provide students with a solid foundation for the learning of Science at upper secondary level and beyond.

With the inquiry approach and interactive nature, students will be motivated and they will accept that Science is relevant and interesting. The books also challenge students to think creatively and critically. In addition, the learning experience is further enhanced through the infusion of Information Technology and National Education.



- Science in Action exposes students to the applications of Science in daily life and in the industry.
- Try This! provides opportunities for students to make inquiries, share ideas and experiences and carry out cooperative learning.
- Connect shows the links between Science and other fields of study.



# Core Curriculum

## Interactive Science for Inquiring Minds Theory Workbook



The Workbooks contain worksheets with questions varying in type and difficulty. These aim to reinforce the concepts learnt in each chapter.

The format of each worksheet is similar to that of the written examination, consisting of a multiple-choice section, a short answer section and a free-response/structured section. This feature will provide students with essential practice in the examination format.

- Activities provide opportunities for students to acquire and develop Science process skills, manipulative skills and creativity in the learning of Science. They also seek to inculcate scientific attitudes in students.
- Portfolio Assessments encourage students to further explore each topic through thought-provoking questions that are closely related to the practical activities.
- Use of Internet resources encourage students to further explore each topic using the inquiry approach and broaden their scientific knowledge.
- Revision worksheets consist of varied question types and questions with different levels of difficulty.

---

**Theory Workbook Express/Normal (Academic) Volume A**  
978-981-271-618-7

**Theory Workbook Express/Normal (Academic) Volume B**  
978-981-280-294-1

---

## Interactive Science for Inquiring Minds Practical Workbook



The Practical Workbooks are designed to help students acquire the essential thinking and process skills. A wide variety of interesting activities and experiments give students ample opportunities to apply concepts learnt. Information Technology is used to familiarise students with instruments such as sensors and data-loggers. Illustrations and clearly-defined aims effectively guide students who need an introduction to Science experiments. Optional activities for the Normal (Academic) course are marked with an icon.

- Experiments that are fully or partially guided to provide opportunities for students to acquire and develop Science process skills and creativity in the learning of Science. They also seek to inculcate scientific attitudes in students.
- Develop skills necessary in the learning of Science.
- Use of information technology (IT) such as computers, sensors and data-loggers where possible.
- Safety Measures provides safety tips and precautions for students to take note of to ensure their own safety as well as the safety of others during Science lessons.

---

**Practical Workbook Express/Normal (Academic) Volume A**  
978-981-271-620-0

**Practical Workbook Express/Normal (Academic) Volume B**  
978-981-280-296-5

---

## Teacher's Resources

### Interactive Science for Inquiring Minds Theory Workbook – Teacher's Edition



The Teacher's Edition of the Theory Workbooks contains answers to all questions in the Theory Workbooks.

**Theory Workbook – Teacher's Edition  
Express/Normal (Academic) Volume A**  
978-981-273-696-3

**Theory Workbook – Teacher's Edition  
Express/Normal (Academic) Volume B**  
978-981-280-295-8

### Interactive Science for Inquiring Minds Practical Workbook – Teacher's Edition



The Teacher's Edition of the Practical Workbooks contain answers to all questions in the Practical Workbooks.

**Practical Workbook – Teacher's Edition  
Express/Normal (Academic) Volume A**  
978-981-273-695-6

**Practical Workbook – Teacher's Edition  
Express/Normal (Academic) Volume B**  
978-981-280-297-2

### Interactive Science for Inquiring Minds Teacher's Resource CD-ROM



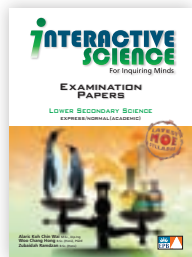
These interactive CD-ROMs provide additional resources to enhance the teaching of Science. The CD-ROMs include Powerpoint slides, experiment videos, virtual manipulatives and animations.

**Teacher's Resource CD-ROM Volume A**  
978-981-273-684-0

**Teacher's Resource CD-ROM Volume B**  
978-981-27-3685-7

# Supporting Materials

## Interactive Science For Inquiring Minds Examination Papers



This book is written for students preparing for lower secondary Science examination and consists of 12 examination papers.

The examination papers are designed to test students' knowledge, understanding and application of Science concepts learnt. Detailed answers are also provided at the end of the book to reinforce students' learning and guide them in their preparation for the examination. Students will be able to face the examination with confidence after working through all the examination papers.

It provides students with the necessary practice to ace the examination and is an essential companion for all lower secondary Science students.

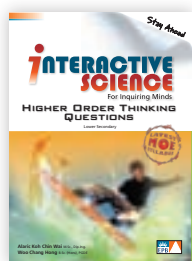
---

### Examination Papers

978-981-27-3689-5

---

## Interactive Science for Inquiring Minds Higher Order Thinking Questions



This book is specially written for lower secondary Science students in the Express stream. It consists of questions which emphasise Higher Order Thinking Skills (HOTS) such as analysis, synthesis and evaluation. Students will be trained to infer, predict and formulate their own conclusions based on the information given. Practice will also be provided for them to compare and discriminate between ideas and give supporting evidence in their arguments. These challenging questions will definitely make the learning of Science fun and exciting for students as they prepare for their examination.

---

### Higher Order Thinking Questions

978-981-27-3690-1

---

# INTERNATIONAL LOWER SECONDARY SCIENCE

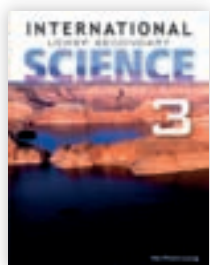
International Lower Secondary Science is specially written in accordance with the United Kingdom National Curriculum. A constructivist approach is used to provide engaging infographics to help teachers and students learn Science in a fun and engaging way.

## The package comprises:

- Textbook
- Workbook
- Teacher's Guide

## Core Curriculum

### International Lower Secondary Science Textbook



These Textbooks encourage students to learn actively, think critically and develop habits of mind and attitudes which are necessary for scientific inquiry. These Textbooks also help students to see the relevance of Science in their daily lives and corrects common misconceptions which students may have.

- Chapter opener introduces the chapter with a full-page coloured photograph.
- Science Tidbits contains interesting snippets of information to grab students' attention.
- Attractive concept cartoons are used to explain various concepts so that students will understand and remember what they learn better.
- Everyday experiences and contexts which students can relate to are used throughout the book.
- News articles / Case studies encourage students to apply what they have learnt to real-life scenarios.



Textbook 1  
978-981-280-810-3

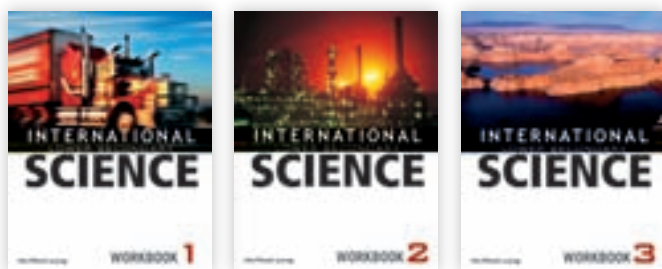
Textbook 2  
978-981-280-811-0

Textbook 3  
978-981-280-812-7

# Core Curriculum

## International Lower Secondary Science Workbook

These Workbooks, intended to be used together with the Textbooks, aim to help students learn Science actively and experientially. Activities in these Workbooks are designed to encourage students to explore and understand the world around them through interesting hands-on activities that will develop essential thinking and process skills.



**Workbook 1**  
978-981-280-813-4

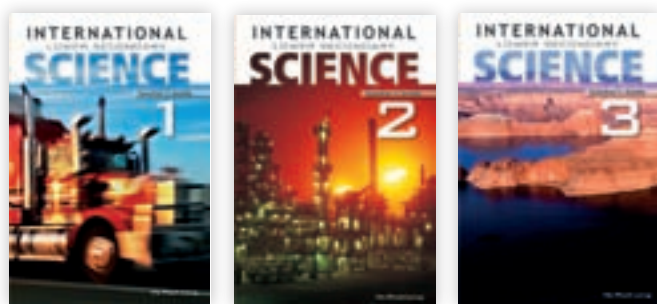
**Workbook 2**  
978-981-280-814-1

**Workbook 3**  
978-981-280-815-8

## Teacher's Resources

### International Lower Secondary Science Teacher's Guide

These effective guides aim to provide teachers with comprehensive resources to aid them in the teaching of Science. The Teacher's Guides consist of Scheme of Work, Internet links, suggestions for project work and answers to all questions found in the Textbooks and Workbooks.



**Instructional strategies**

Textbook/Workbook	Learning strategy/Approach	Description
Textbook p.124	Trigger questions	Changes in weather happen all the time. Some of these changes occur as the heating of the Earth's surface gradually and evenly while others such as lightning and thunder occur with no warning. Some changes can be measured while others cannot. In the learning of knowledge a 'weather change' (how do you feel?)
Textbook p.126	Active learning Socratic method approach	When a teacher or other adult is present at school, the teacher and other adult in a safe and relaxed atmosphere. Explain the earth's heating system and how it can be used to explain other changes brought about by heating.
Textbook p.128 Workbook activity 1.1	Active learning Socratic method approach	Text 1.1.1: Mixing water with gas that is invisible to the human eye. What kind of changes take place when the invisible gas and water are mixed? Describe the changes in the groups' 'temperature' and 'weather' changes.
Textbook p.129	Review	Key Points

**Answers to questions for section 1.1**

1. Think about it, p.129

Observable change	Invisible change
Mixing chalk and water	Mixing between gases and taking water
Mixing cement and water	Mixing cement and water
Mixing iron filings and vinegar	Mixing iron filings and vinegar

**Teacher's Guide 1**  
978-981-280-816-5

**Internet links**

- 1. [www.nasa.gov/mission/eos/earth/earthdata/earthdata.html](http://www.nasa.gov/mission/eos/earth/earthdata/earthdata.html)
- 2. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 3. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 4. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 5. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 6. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 7. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 8. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 9. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)
- 10. [www.met.rdg.ac.uk/~met101/101main.htm](http://www.met.rdg.ac.uk/~met101/101main.htm)

**Project/Field trips**

- 1. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 2. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 3. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 4. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 5. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 6. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 7. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 8. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 9. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.
- 10. Make a weather balloon or other device to measure, such as the force of wind, humidity, temperature and pressure. Research changes may be included to show the effects of these items.

**Teacher's Guide 2**  
978-981-280-817-2

**Answers to workbook questions**

**Activity 1.1: Finding out which solids are soluble in water**

Solids	Observations
Chalk powder	It slowly dissolves in water. The white chalk powder settles at the bottom of the beaker of water.
Baking soda	It does not dissolve in water. The white baking soda settles at the bottom of the beaker.
Flour	It slowly dissolves in water.
Iron filings	It slowly dissolves in water. The iron filings settle at the bottom of the beaker of water.
Sand	It slowly dissolves in water. The sand settles at the bottom of the beaker after stirring.
Copper (II) sulphate	It does not dissolve in water. The copper (II) sulphate does not settle at the bottom of the beaker.

**Activity 1.2: Solids which are soluble in water**

Solids which are soluble in water	Solids which are insoluble in water
Baking soda	Chalk powder
Copper (II) sulphate	Flour
	Iron filings
	Sand

**Teacher's Guide 3**  
978-981-280-818-9

# PHYSICS Matters

This upper secondary Science package has been designed for teachers who desire a systematic and pedagogically sound approach to the teaching of Physics. It also meets the needs of students who long for a motivating and effective approach to the learning of Physics.

The fundamental are emphasised and presented in a lively and engaging manner for effective concept development. Authentic examples and hand-on activities are provided to motivate students through the learning process. Sufficient exercises for students are provided for reinforcement of key ideas and preparation for examination.

## The package comprises:

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Practical Book – Teacher's Edition
- Teacher's Resources CD-ROM

## Core Curriculum

### G.C.E. 'O' Level Physics Matters Textbook



The Textbook simplifies learning through ample hands-on activities, real-life examples and stunning visuals. Thought-provoking facts, activities and inquiring questions are designed to stimulate interest and aid conceptual understanding while challenging worked examples and questions from past examinations boost confidence in examination.

- Engage and stimulate learning: Attractive photographs and illustrations are used to arouse students curiosity. Pictures selected not only serve to complement the text, they inspire students to inquire and go on a journey of self discovery.
- Encourage independent learning: Worked examples illustrate the application of concepts, strengthen students' understanding of Physics principles and encourage students to be independent learners.
- Facilitate understanding of key concepts: Infographics help to explain concepts that are otherwise hard for students to visualise.

**Unit 3 Forces**

**3.1 Forces**

**Learning Outcomes**

**What is a force?**

**What types of forces are there?**

**Conditions for equilibrium**

**Worked Example 3.2**

Textbook G.C.E. 'O' Level  
978-981-01-9499-4

## Core Curriculum

### G.C.E. 'O' Level Physics Matters Workbook



The two volumes of the Workbook are written to complement the Textbooks. They contain worksheets that reinforce concepts, help students check their understanding of the topic and highlight their areas of weakness. Past-year examinations and data-analysis questions provide abundant practice for students.

---

**Workbook G.C.E. 'O' Level Volume 1**

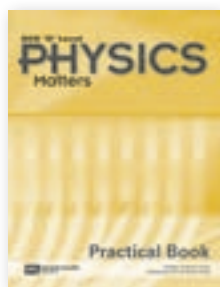
978-981-01-1160-1

**Workbook G.C.E. 'O' Level Volume 2**

978-981-01-6467-6

---

### G.C.E. 'O' Level Physics Matters Practical Book



Specially written to complement the Textbook, this Practical Book is designed to help students develop laboratory skills and prepare them for the Science Practical Assessment (SPA).

---

**Practical Book G.C.E. 'O' Level**

978-981-01-6468-3

---

## Teacher's Resources

### G.C.E. 'O' Level Physics Matters Workbook – Teacher's Edition



The Teacher's Edition of the Workbooks contains answers to all questions in the Workbooks.

---

**Workbook – Teacher's Edition G.C.E. 'O' Level Volume 1**

978-981-01-0956-1

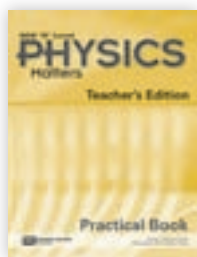
**Workbook – Teacher's Edition G.C.E. 'O' Level Volume 2**

978-981-01-0957-8

---

## Teacher's Resources

### G.C.E. 'O' Level Physics Matters Practical Book – Teacher's Edition



The Teacher's Edition of the Practical Book contains answers to all questions in the Practical Book.

---

#### Practical Book – Teacher's Edition G.C.E. 'O' Level

978-981-01-0960-8

---

### G.C.E. 'O' Level Physics Matters Teacher's Resources CD-ROM



Providing teachers with professional development support, including Scheme of Work, Lesson Notes and classroom demonstration ideas, this comprehensive teaching support package helps teachers to teach Physics in a lively and engaging manner.

---

#### Teacher's Resources CD-ROM

978-981-01-6812-4

---

# Discover PHYSICS

Discover Physics for G.C.E. 'O' Level Science is the revised edition of the highly acclaimed Comprehensive Physics for G.C.E. 'O' Level Science (2nd Edition). It facilitates the effective learning of Physics and makes the subject inspiring and riveting for students.

The content is lively and engaging, offering thought-provoking facts, activities and inquiry questions to stimulate student's interest and simplifies learning. Challenging worked examples build students' confidence and prepare them for examination.

## The package comprises:

For Express

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Practical Book – Teacher's Edition
- Teacher's Resources CD-ROM

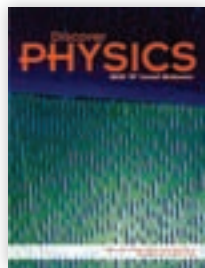
For Normal (Academic)

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Practical Book – Teacher's Edition
- Teacher's Resources CD-ROM

## Core Curriculum

### Discover Physics Textbook

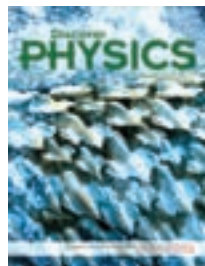
#### Express



These Textbooks are the revised edition of the highly acclaimed Comprehensive Physics for G.C.E. 'O' Level Science (2nd edition). Covering the latest Cambridge G.C.E. 'O' Level Science (Physics) syllabus set by the Ministry of Education, Singapore, these Textbooks facilitate the effective learning of Physics and make the subject inspiring and riveting for students.

- Worked Examples: Found in every chapter, they comprise a good selection of challenging questions to illustrate application of concepts and strengthen students' understanding of Physics principles.
- Take Note: Highlights the common mistakes and misconceptions to students, clarifies new concepts and emphasises points that are important in the examinations.
- Practice Questions: Located at the end of each chapter, they provide opportunities for students to solve challenging and examination-oriented problems.

#### Normal (Academic)



**Conditions for equilibrium**

We have learnt in Unit 2. Forces that for a stationary object, the forces acting on it are balanced, i.e. **resultant force is zero**.

Similarly, we have just learnt from the Principle of Moments that when an object is not turning, the clockwise and anticlockwise moments acting on it are balanced, i.e. **resultant moment is zero**. Thus, an object in equilibrium must satisfy both conditions as follows:

1. All forces acting on it are balanced, i.e. resultant force is zero.
2. The resultant moment about the pivot is zero, i.e. the Principle of Moments must apply.

**WORKED EXAMPLE 5.2**

Figure 5.9 shows a hand which the hand which is used to move a load of 3000 N. What is the minimum effort (best) required to turn the drum?

**Solution**

Draw a simple diagram to represent the problem. Use a straight line to represent the hand which act down in the basin and their distances from the cable drum (Figure 5.10).

The pivot is at the centre of the cable drum. The effort  $F$  will cause an anticlockwise moment about the pivot. The load  $L$  will cause a clockwise moment about the same pivot. The anticlockwise moment by  $F$  must overcome the opposing clockwise moment by  $L$ .

**Step 1**

We calculate the turning effect of load  $L$ . The moment of  $L$  about the pivot is  $\times$  perpendicular distance of  $L$  from pivot,  $F \times 2 = 2 \times 3000 \text{ Nm}$

**Step 2**

We calculate the turning effect of effort  $F$ . The moment of  $F$  about the pivot is  $\times$  perpendicular distance of  $F$  from pivot,  $F \times 150 = 150F$

**Step 3**

The moment of the effort must be equal to or greater than the moment of the load in order to turn the drum. Therefore, the minimum effort required is 1500 N.

**LEARNER TIP**

Use energy instead of force to avoid a stationary object, the forces acting on it are balanced, i.e. resultant force is zero.

**Efficiency**

From the Principle of Conservation of Energy, we know the total energy output by a machine must be equal to the energy input. However, we also know that the energy output is always less than the energy input, as energy is dissipated in the process. The dissipated energy is usually due to friction. This energy usually takes the form of thermal and sound energy. The energy that is lost to the surroundings is considered wasted energy output (energy that is not put to good use).

The energy equation, which is based on the Principle of Conservation of Energy, is as follows:

$$\text{Energy input} = \text{useful energy output} + \text{wasted energy output}$$

We measure the efficiency of a machine using the ratio:

$$\text{Efficiency} = \frac{\text{useful energy output}}{\text{energy input}} \times 100\%$$

**Key Ideas**

1. Energy is the capacity to do work.
2. Energy can be converted from one form to another.
3. The Principle of Conservation of Energy states that energy can neither be created nor destroyed in any process. It can be converted from one form to another or transferred from one body to another but the total amount remains constant.

**Test Yourself 6.1**

1. A football player kicks a ball into the air and catches it on the way down. State the energy conversions that take place.
2. A cyclist pedals up to the top of a hill at a steady speed. What kind of energy is being used to do work against gravity? State the type of energy the cyclist has at the top of the hill. When the cyclist moves downhill without pedalling, what type of energy does he gain?
3. Using the Principle of Conservation of Energy, explain:
  - (a) what happens to the stored chemical energy of a dry cell when it is connected to a light bulb,
  - (b) why a ball thrown from a certain height above the Earth bounces up to a lower and lower height until it finally comes to a stop.

**Practice Questions**

**Section A Multiple-Choice Questions**

1. A door requires a minimum moment of 5.2 N m to open it.
  - (a) What is the minimum force on the handle not greater than 50 N?
    - A. 0.35 m
    - B. 0.65 m
    - C. 0.77 m
    - D. 1.54 m
2. A driver's foot presses on a pedal in a car with a force of 20 N as shown.
  - (a) How much force is the spring pushing?
    - A. 2.5 N
    - B. 100 N
    - C. 160 N
    - D. 800 N
3. A non-uniform rod is balanced as shown. Given that the centre of gravity of the rod is 0.25 m from the end marked A, what is the mass of the rod?
  - (a) 40 g
  - (b) 100 g
  - (c) 1000 g
  - (d) 1400 g

**Section B Structured Questions**

1. (a) What is meant by the moment of a force? How can it be measured? Name its unit.
  - (i) Figure 5.41 shows the plan view of a door hinged at A. If a man applies a force  $F$  of 40 N at the end marked B, calculate the moment of this force about A. What is the minimum force  $F$  that must be applied at C in order to stop the door from turning? Name the principle applied to solve the problem.

Textbook G.C.E. 'O' Level Science  
978-981-01-9500-7

Textbook Normal (Academic) 3N/4N  
978-981-01-1198-4

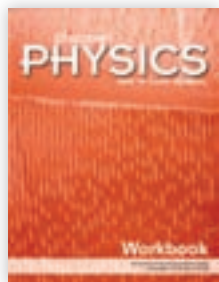
Textbook Normal (Academic) 5N  
978-981-01-9501-4

# Core Curriculum

## Discover Physics Workbook

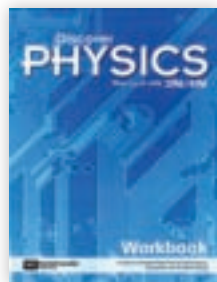
The Workbooks consist of examination-style questions for students' practice to prepare them for examination. A time limit is given to put students in a simulated examination setting where quick thinking and good time management are crucial.

### Express



**Workbook G.C.E. 'O' Level Science**  
978-981-01-1162-5

### Normal (Academic)



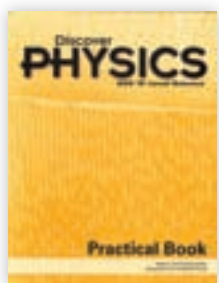
**Workbook Normal (Academic) 3N/4N**  
978-981-01-1163-2

**Workbook Normal (Academic) 5N**  
978-981-01-1199-1

## Discover Physics Practical Book

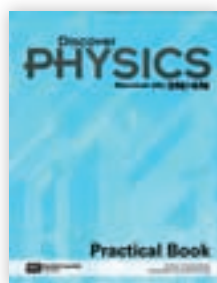
Specially written to complement the Textbooks, these Practical Books are designed to help students master laboratory skills and prepare them for practical examination.

### Express



**Practical Book G.C.E. 'O' Level Science**  
978-981-01-6470-6

### Normal (Academic)



**Practical Book Normal (Academic) 3N/4N**  
978-981-01-6472-0

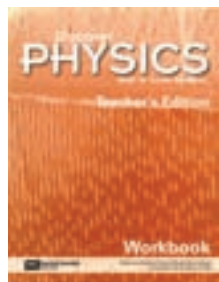
**Practical Book Normal (Academic) 5N**  
978-981-01-1201-1

## Teacher's Resources

### Discover Physics Workbook – Teacher's Edition

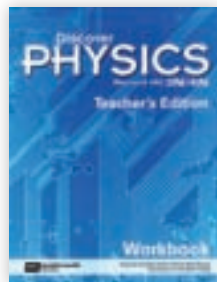
The Teacher's Edition of the Workbooks contains answers to all questions in the Workbooks.

### Express



**Workbook – Teacher's Edition G.C.E. 'O' Level Science**  
978-981-01-0958-5

### Normal (Academic)



**Workbook – Teacher's Edition Normal (Academic) 3N/4N**  
978-981-01-0959-2

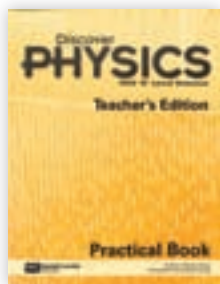
**Workbook – Teacher's Edition Normal (Academic) 5N**  
978-981-01-1200-4

## Teacher's Resources

### Discover Physics Practical Book – Teacher's Edition

The Teacher's Edition of the Practical Books contains answers to all questions in the Practical Books.

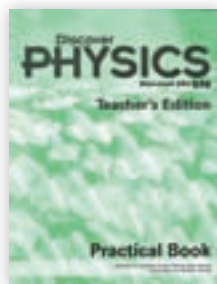
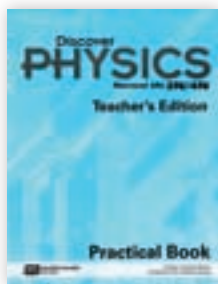
#### Express



---

**Practical Book – Teacher's Edition**  
**G.C.E. 'O' Level Science**  
978-981-01-0961-5

#### Normal (Academic)



---

**Practical Book – Teacher's Edition**  
**Normal (Academic) 3N/4N**  
978-981-01-0962-2

---

**Practical Book – Teacher's Edition**  
**Normal (Academic) 5N**  
978-981-01-1202-8

---

### Discover Physics Teacher's Resources CD-ROM



Providing teachers with professional development support, including Scheme of Work, Lesson Notes and classroom demonstration ideas, this comprehensive teaching support package helps teachers to teach Physics in a lively and engaging manner.

---

**Teacher's Resources CD-ROM**  
978-981-01-6815-5

---

# CHEMISTRY

## Matters

The G.C.E. 'O' Level Chemistry Matters package is structured for effective concept development, reinforcement and extension. It also emphasises the fundamentals of Chemistry while providing in-depth information to enhance understanding.

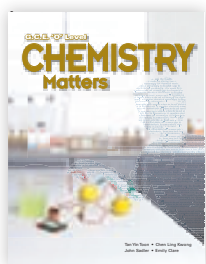
Learning is extended through hands-on activities and the use of information technology. Higher order thinking skills are strengthened through systematic evaluation, while exposure to various question types builds students' examination-confidence.

### The package comprises:

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Teacher's Resources CD-ROM

## Core Curriculum

### G.C.E. 'O' Level Chemistry Matters Textbook



This Textbook meets the requirements of the latest Cambridge G.C.E. 'O' Level Chemistry Syllabus. It is designed for effective concept development, reinforcement and extension.

- Content is related to students' everyday life.
- Infographics help explore concepts that are not easily visualised.
- Learners are encouraged to think critically and independently.
- Concept maps reinforce student learning.



**Melting**  
When a substance changes from a solid to a liquid, we say that it is **melting**.

**What happens to the particles of a solid that is heated until it melts?**

**Lowest temperature**

**High temperature**

**Fig. 1.3 Effect of heat on the particles of a solid**

The temperature at which a solid becomes a liquid is called its **melting point**. Different substances have different melting points. The melting points of some common substances are shown in Table 1.2.

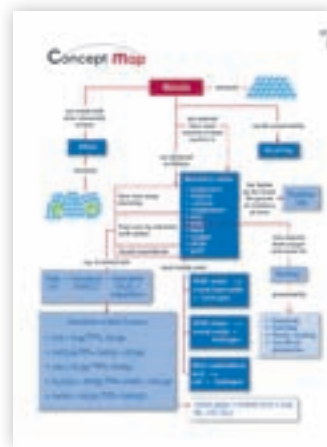
Substance	melting point/°C
oxygen	-253
ice	0
iron	1535

Table 1.2 The melting points of oxygen, ethanol, ice and iron

**Tie-Bin**  
Naphthalene is a white solid that has a strong odour. It is used in mothballs to keep clothes away from moths.

**How does the temperature of a solid change when it melts?**  
The set-up shown in Fig. 1.8 can be used to study the changes in temperature when a solid melts. The solid being studied here is naphthalene. The temperature of naphthalene is recorded at half-minute intervals until all the naphthalene has melted.

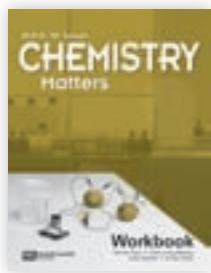
**Fig. 1.8** To investigate the changes in temperature when naphthalene melts



Textbook G.C.E. 'O' Level  
978-981-01-6463-8

## Core Curriculum

### G.C.E. 'O' Level Chemistry Matters Workbook



This companion to the Textbook provides diagnostic questions linked to the relevant sections of the Textbook to test students' mastery of key concepts and identify areas of weakness. The Workbook is an excellent bank of traditional and innovative examination-type questions.

---

**Workbook G.C.E. 'O' Level**  
978-981-01-1164-9

---

### G.C.E. 'O' Level Chemistry Matters Practical Book (Revised Edition)



Providing a complete practical course to accompany the Textbook, this book builds skills to prepare students for the Science Practical Assessment (SPA).

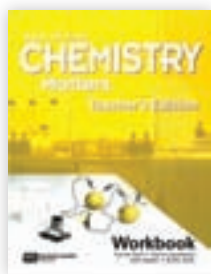
---

**Practical Book G.C.E. 'O' Level (Revised Edition)**  
978-981-01-1404-6

---

## Teacher's Resources

### G.C.E. 'O' Level Chemistry Matters Workbook – Teacher's Edition



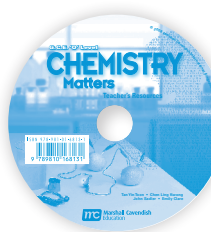
The Teacher's Edition of the Workbooks contains answers to all questions in the Workbook.

---

**Workbook – Teacher's Edition G.C.E. 'O' Level**  
978-981-01-0971-4

---

### G.C.E. 'O' Level Chemistry Matters Teacher's Resources CD-ROM



Providing teachers with professional development support, including Scheme of Work, lesson slides, teacher's guide to the Textbook and web links, this comprehensive teaching support package helps teachers to teach Chemistry in a lively and engaging manner.

---

**Teacher's Resources CD-ROM**  
978-981-01-6813-1

---

# Discover CHEMISTRY

Discover Chemistry aims to provide the best possible foundation for success in the study of Chemistry. Designed for effective concept development and reinforcement, this series presents the fundamentals of Chemistry in an engaging and accessible manner.

There are problem-solving questions based on everyday applications of Chemistry that stimulate thinking and engage students' interest. This comprehensive content is presented clearly and concisely to enhance learning.

## The package comprises:

For Express

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Practical Book – Teacher's Edition
- Teacher's Resources CD-ROM

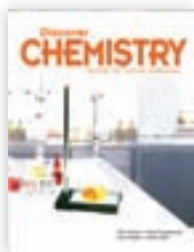
For Normal (Academic)

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Practical Book – Teacher's Edition
- Teacher's Resources CD-ROM

## Core Curriculum

### Discover Chemistry Textbook

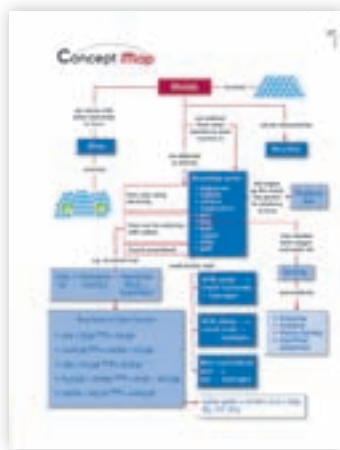
#### Express



These Textbooks meet the requirements of the latest Syllabus. Designed for effective concept development and reinforcement, it presents the fundamentals of Chemistry in an engaging and accessible manner.

- Key Ideas: Key points are summarised at the end of each section.
- Test Yourself: Placed at the end of each section after Key Ideas to help students test their understanding. Comprises Worked Example accompanied by Questions.
- Concept Map: Summary-at-a-glance at the end of every chapter that links and reinforces the key concepts learnt.
- Exercise: Examination-type questions at the end of each chapter, arranged into Foundation and Challenge sections to suit different levels of testing.

#### Normal (Academic)



Textbook G.C.E. 'O' Level Science  
978-981-01-9532-8

Textbook Normal (Academic) 3N/4N  
978-981-01-9535-9

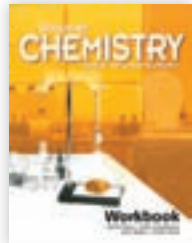
Textbook Normal (Academic) 5N  
978-981-01-9537-3

## Core Curriculum

### Discover Chemistry Workbook

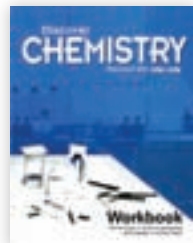
The Workbooks allow students to develop their understanding of theoretical concepts through active participation in hands-on activities and experiments. Guidance and reinforcement within experiments help students hone scientific skills.

#### Express

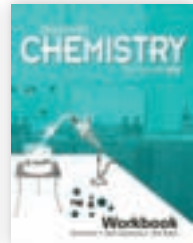


**Workbook G.C.E. 'O' Level Science**  
978-981-01-1165-6

#### Normal (Academic)



**Workbook Normal (Academic) 3N/4N**  
978-981-01-1166-3



**Workbook Normal (Academic) 5N**  
978-981-01-9538-0

### Discover Chemistry Practical Book

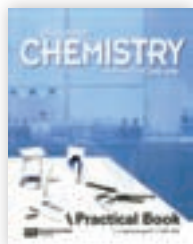
The Practical Books provide a complete practical course to complement the Chemistry Textbooks. The investigations in these Practical Books have been selected to reinforce fundamental concepts in Chemistry.

#### Express

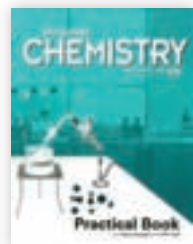


**Practical Book G.C.E. 'O' Level Science**  
978-981-01-1405-3

#### Normal (Academic)



**Practical Book Normal (Academic) 3N/4N**  
978-981-01-9539-7



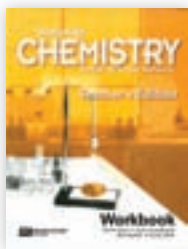
**Practical Book Normal (Academic) 5N**  
978-981-01-1217-2

## Teacher's Resources

### Discover Chemistry Workbook – Teacher's Edition

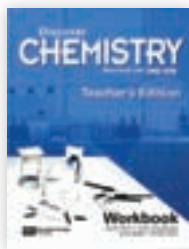
The Teacher's Edition of the Workbooks contains answers to all questions in the Workbooks.

#### Express



**Workbook – Teacher's Edition**  
**G.C.E. 'O' Level Science**  
978-981-01-0975-2

#### Normal (Academic)



**Workbook – Teacher's Edition**  
**Normal (Academic) 3N/4N**  
978-981-01-0973-8



**Workbook – Teacher's Edition**  
**Normal (Academic) 5N**  
978-981-01-1218-9

### Discover Chemistry Teacher's Resources CD-ROM



Providing teachers with professional development support, including Scheme of Work, Lesson Notes and classroom demonstration ideas, this comprehensive teaching support package helps teachers to teach Chemistry in a lively and engaging manner.

**Teacher's Resources CD-ROM**  
978-981-01-6816-2

# BIOLOGY Matters

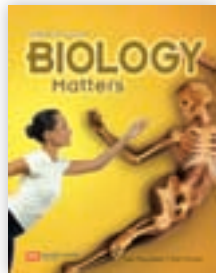
G.C.E. 'O' Level Biology Matters is a comprehensive and engaging package for students of Cambridge G.C.E. 'O' Level Biology. Structured for effective concept development, reinforcement and extension, this package emphasises the fundamentals of Biology while providing in-depth information to enhance understanding.

## The package comprises:

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Teacher's Resources CD-ROM

## Core Curriculum

### G.C.E 'O' Level Biology Matters Textbook



This Textbook meets the requirements of the latest Cambridge G.C.E. 'O' Level syllabus specified by the Ministry of Education of Singapore. Building on the strengths of the popular Biology: A Course for 'O' Level, this Textbook has been designed for effective concept development, reinforcement and extension.

- Concrete examples are used to reinforce understanding of biological concepts. Students also learn how to explain events using their new knowledge.
- Flowcharts, concept maps and annotated diagrams present information clearly to allow students to grasp complex concepts easily.
- Key concepts are summarised, allowing teachers to aid explanation and helping students to retain information effectively.

**Chapter 13: The Nervous System**

**What happens when your hand touches a hot object?**

- Spatial cord**  
In your spinal cord, the nerve impulses are transmitted first across a synapse to the relay neurone, and then across another synapse to the motor neurone. At the same time, nerve impulses are transmitted to the brain.
- Motor neurone**  
Nerve impulses leave your spinal cord along the motor neurone to the effector.
- Effector muscle contracts**  
The effector in your biceps muscle which then contracts. This causes your hand to withdraw suddenly.
- Receptors in skin**  
The heat on the object stimulates the nerve endings (receptors) in your skin.

Because the reflex action happened so fast, the brain receives the nerve impulses only after the effector has reacted. That is when you feel the pain from touching the hot object.

**Chapter 7: Nutrition in Plants**

**What happens to the glucose that is formed during photosynthesis?**

The rates of glucose formed during photosynthesis are summarised in Figure 7.1.5.

**Glucose is either used immediately or stored**

- Glucose is used immediately by plant cells**  
Glucose is first used by the cells during tissue respiration to provide energy for cellular activities.  
Glucose is also used for the formation of cellulose cell walls.
- Glucose is converted into sucrose or into starch in leaves**  
Excess glucose is converted into sucrose and transported to storage organs, for example the seeds, stem tubers or root tubers. The sucrose is converted into starch or other forms of storage compounds, depending on the plant.  
During the day, the rate of photosynthesis is so great that sugars are formed faster than they can be removed. Glucose in the leaf is converted into starch for temporary storage in the leaf.  
At night, photosynthesis stops and the starch is reconverted by enzymes in the leaf into glucose. The starch may also be
- Glucose is used to form amino acids and proteins**  
The glucose in the leaf can react with nitrates brought to the leaf to form amino acids.  
The amino acids are combined to form proteins, which are converted into new protoplasm within the cells.  
Excess amino acids are carried to all parts of the plant, especially the growing regions of the plant. Here, amino acids are used to build new protoplasm or stored as proteins.
- Glucose is used to form fats**  
Fats are also formed from glucose in the leaves. Some of the sugars that reach the storage organs may also be converted into fats for storage.  
Fats may be used in cellular respiration or for forming new protoplasm, for example the cell surface membrane.

**Chapter 6: Nutrition in Animals**

**What happens when you eat a piece of bread?**

**Physical digestion**  
Physical digestion is the mechanical breakdown of food into smaller particles. Physical digestion increases the surface area to volume ratio of the food so that digestive enzymes can act on it more efficiently.

**Chemical digestion**  
Chemical digestion refers to the hydrolysis of large food substances by digestive enzymes into small soluble molecules.

**Enzymes**  
In the mouth, food is broken up by chewing and the action of salivary amylase.

**Food passes down the oesophagus by peristalsis.**

Organ of digestion	Secretion	Source	Enzyme	Action
Mouth	saliva	salivary glands	amylase	starch → maltose
	gastric juice	gastric glands	ptyalin	protein → polypeptides
	bile	liver	lipase	soluble → insoluble emulsion emulsify bile salts emulsify fats
Stomach	pancreatic juice	pancreas	amylase lipase trypsin	starch → maltose protein → polypeptides
	gastric juice	gastric glands	pepsin	protein → polypeptides
Small intestine	intestinal juice	intestinal glands	lactase sucrase maltase	lactose → glucose and galactose sucrose → glucose and fructose maltose → glucose
	pancreatic juice	pancreas	trypsin lipase	protein → amino acids fat → fatty acids and glycerol
	bile	liver	lipase	fat → fatty acids and glycerol

**TEST YOURSELF!**

- Proteins are converted into the amino acids that are used for protein synthesis. How is this done?
- Describe the structure of a protein. How is it related to its function?
- Which three organs produce enzymes that digest proteins?
- What are the final products of protein digestion?
- How are they absorbed into the blood?

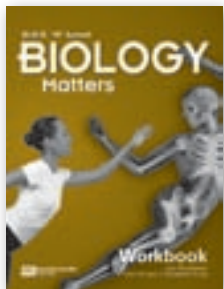
**PROTEINS**

4. An experiment was set up as shown below. The water in the beaker was covered with a thin layer of oil. When sulphur powder was sprinkled into the beaker, the powder settled on the layer of oil and did not sink. However, when a little bile was added into the beaker, the sulphur powder sank into the water. Explain what happened.

Textbook G.C.E. 'O' Level  
978-981-01-7724-9

## Core Curriculum

### G.C.E. 'O' Level Biology Matters Workbook



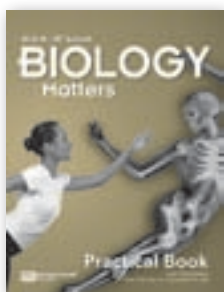
The worksheets in this book correlate to the Textbook and provide a systematic review and essential practice for students preparing for the Cambridge G.C.E. 'O' Level Biology Examination.

---

**G.C.E. 'O' Level Workbook**  
978-981-01-1167-0

---

### G.C.E. 'O' Level Biology Matters Practical Book



Providing a complete practical course to accompany the Biology Matters Textbook, this book builds skills to prepare students for the Science Practical Assessment (SPA).

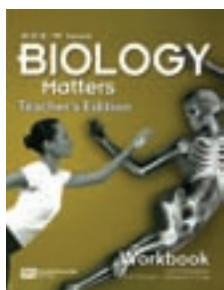
---

**G.C.E. 'O' Level Practical Book**  
978-981-01-9517-5

---

## Teacher's Resources

### G.C.E. 'O' Level Biology Matters Workbook – Teacher's Edition



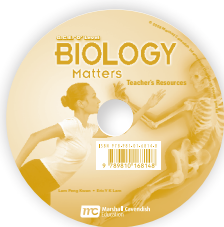
The Teacher's Edition of the Workbook contains answers to all questions in the Workbook.

---

**Workbook – Teacher's Edition G.C.E. 'O' Level**  
978-981-01-9563-2

---

### G.C.E. 'O' Level Biology Matters Teacher's Resources CD-ROM



Providing teachers with embedded professional development support, including Scheme of Work, Powerpoint slides and answers to the Textbook, this comprehensive teaching support package helps teachers to teach Biology in a lively manner.

---

**Teacher's Resources CD-ROM**  
978-981-01-6814-8

---

# Discover BIOLOGY

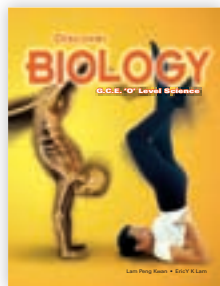
Discover Biology G.C.E. 'O' Level Science covers the Cambridge G.C.E. 'O' Level Science (Biology) Syllabus in an engaging and accessible manner. Fundamentals of Biology are taught through careful scaffolding, and reinforced through hands-on activities and the use of information technology. Examination-type questions are introduced along with problem-solving strategies to develop students' examination-confidence.

## The entire package comprises:

- Textbook
- Workbook
- Practical Book
- Workbook – Teacher's Edition
- Teacher's Resources CD-ROM

## Core Curriculum

### Discover Biology G.C.E. 'O' Level Science Textbook



This Textbook has been revised and updated from the highly acclaimed Comprehensive Biology for G.C.E. 'O' Level Science, making it even more accessible to students and educators. Covering the latest Cambridge G.C.E. 'O' Level Science (Biology) Syllabus set by the Ministry of Education, Singapore, this attractive and comprehensive Textbook is designed to inspire learning.

- Think it Through: These are designed to guide students step-by-step through creative problem-solving.
- Authentic examples: These allow students to emulate the thought processes that led to major scientific discoveries and breakthroughs.
- Exercise: Students are exposed to a variety of exam-type questions at the end of each textbook chapter. A link to the Theory Workbook shows that the exercise should be done along with or just before the corresponding worksheet in the Workbook.

**Think It Through**

You are asked to show that oxygen is given off from green plants during photosynthesis. For the experiment, you are provided with the following materials:

**MATERIALS PROVIDED**

- A solution of potassium permanganate (KMnO<sub>4</sub>)
- A test tube with rubber bung and delivery tube
- A beaker
- A test tube with rubber bung and delivery tube
- A beaker

**Experiment**

Control 1	Control 2

**What results do you expect to see?**

**Give reasons to support your predictions.**

**TRY IT OUT!**

**Application to Disprove**

Suppose you have a population of 42 million on a small island away from the rest of the world. The amount of food available is sufficient to support only 10 million through the use of photosynthesis — growing plants without soil.

**TRY IT OUT!**

1. How photosynthesis is used to grow food in Singapore.

2. How photosynthesis is used to grow crops in Singapore.

3. How photosynthesis is used to grow crops in Singapore.

4. How photosynthesis is used to grow crops in Singapore.

5. How photosynthesis is used to grow crops in Singapore.

6. How photosynthesis is used to grow crops in Singapore.

7. How photosynthesis is used to grow crops in Singapore.

8. How photosynthesis is used to grow crops in Singapore.

9. How photosynthesis is used to grow crops in Singapore.

10. How photosynthesis is used to grow crops in Singapore.

**TEST YOURSELF!**

Read the newspaper article below then try to answer the questions that follow.

**Dr. Thomas Brock, a microbiologist, first discovered the heat-stable Taq polymerase (Taq) enzyme in the hot springs of Yellowstone National Park in 1989. This enzyme is used in the polymerase chain reaction (PCR) process to amplify DNA. Brock's discovery led to the development of PCR, which is now used in many laboratories for the detection of DNA. Brock's discovery also led to the development of PCR, which is now used in many laboratories for the detection of DNA.**

**Many living organisms would die in such extreme conditions. So the question is, how do they survive? Scientists believe that they have adapted to their environment through their DNA. Brock's discovery led to the development of PCR, which is now used in many laboratories for the detection of DNA.**

**Heat-stable Taq polymerase (Taq) enzyme is used in the polymerase chain reaction (PCR) process to amplify DNA. Brock's discovery led to the development of PCR, which is now used in many laboratories for the detection of DNA.**

**Heat-stable Taq polymerase (Taq) enzyme is used in the polymerase chain reaction (PCR) process to amplify DNA. Brock's discovery led to the development of PCR, which is now used in many laboratories for the detection of DNA.**

**Notes**

Give a specific name, value or other brief answers (no supporting argument or calculation is necessary).

**Suggest**

Propose a hypothesis or an alternative answer.

**A Guide to Essay Writing**

Essay questions are designed to test your ability to describe and explain biological processes, principles and concepts. Marks will be awarded according to the points provided.

It is important to read the essay question carefully before attempting to answer it. Do highlight key terms and words in the question. Many students misunderstand the question and as a result, their essays are inappropriate. Sometimes an essay question consists of two or more parts. Ensure that you have answered every part.

Before starting to write, plan the essay. Here is how an essay may be planned:

1. Note the topics involved.
2. Write down all the relevant points and ideas.
3. Organise these points and ideas so that a logical sequence is formed.
4. Develop an introduction, followed by the sequence of points and a conclusion.

While writing, keep returning to the essay plan to stay on track. Avoid using long sentences in your essay.

A few examples are given below to illustrate some key points that should be taken into account while writing your essay.

**Example 1**

Describe clearly the function of human insulin through the recombinant gene technique and its large-scale production. Discuss the advantages and disadvantages of using such a technique.

The topics involved are DNA, genetic engineering, microbiology and biotechnology (fermentation). There are two parts to the question.

The term 'describe' used in the first question means that a detailed, step-by-step account that includes all relevant information is required in the essay. Your answer should provide details of:

- The recombinant gene technique (e.g. the use of enzymes, bacteria, plasmids and the human insulin gene).
- The production of insulin insulin in a fermenter (e.g. starting materials like bacteria and liquid nutrients).

**Checklist**

**Identify the main blood vessels to and from the heart, lungs, liver and kidneys.**

**Describe the structure of the heart in terms of muscular contraction and the working of valves.**

**Describe the cardiac cycle in terms of what happens during systole and diastole.**

**Describe the transfer of substances between capillaries and tissue fluid.**

**Describe the coronary heart disease in terms of the occlusion of coronary arteries.**

**List the possible causes of coronary heart disease such as diet, stress and smoking.**

**State the possible preventive measures for coronary heart disease.**

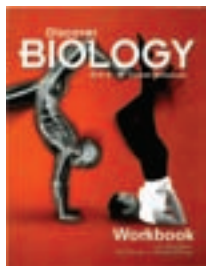
**Exercise**

1. Why does a mammal require a transport system whereas a size called organism such as Amoeba does not?
2. What is meant by double circulation in mammals?
3. State the function of the coronary arteries.
4. State the route through which glucose travels from the small intestine to the arms.
5. Draw labelled diagrams to show the difference between an artery and a capillary.
6. The figure shows a section through the circulation of blood in the human body showing the heart, lungs, body tissue and the main blood vessels. The blood vessel labelled A carries oxygenated blood and the vein in the brain leading into it has two semi-lunar pockets.
7. Label the figure below. In the region of blood vessels A and B, draw arrows to show clearly the direction of blood flow.
8. Name the blood vessels or organs marked by the following numbers: 1, 3, 4, 5 and 6.
9. Give the number of the pressure which represents the right hand side of the heart.
10. Give an example of a gas that is transported in the human body.

Textbook G.C.E. 'O' Level Science  
978-981-01-7725-6

## Core Curriculum

### Discover Biology Workbook G.C.E. 'O' Level Science



This Workbook allows students to develop their understanding of theoretical concepts through active participation in hands-on activities and experiments. Guidance and reinforcement within experiments helps students hone scientific skills.

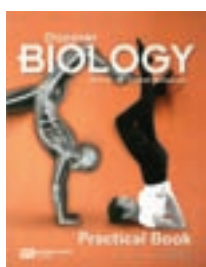
---

#### Workbook G.C.E. 'O' Level Science

978-981-01-1168-7

---

### Discover Biology Practical Workbook G.C.E. 'O' Level Science



This Practical Book provides a complete practical course to complement the Textbook. The investigations in this book have been selected to reinforce fundamental concepts in Biology.

---

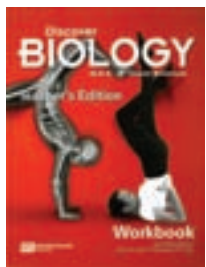
#### Practical Workbook G.C.E. 'O' Level Science

978-981-01-9518-2

---

## Teacher's Resources

### Discover Biology Workbook G.C.E. 'O' Level Science – Teacher's Edition



The Teacher's Edition of the Workbook contains answers to all questions in the Workbook.

---

#### Workbook – Teacher's Edition G.C.E. 'O' Level Science

978-981-01-9560-1

---

### Discover Biology G.C.E. 'O' Level Science Teacher's Resources CD-ROM



Providing teachers with professional development support, including Scheme of Work, Lesson Notes and classroom demonstration ideas, this comprehensive teaching support package helps teachers to teach Biology in a lively and engaging manner.

---

#### Teacher's Resources CD-ROM

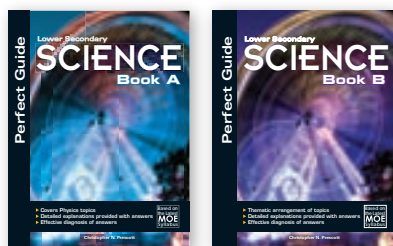
978-981-01-6817-9

---

# Supplementary Materials

## Perfect Guide to Lower Secondary Science

These guides aim to provide pupils with quick and complete preparation for the examination. The contents of these books are based on the latest syllabus set by the Ministry of Education, Singapore.

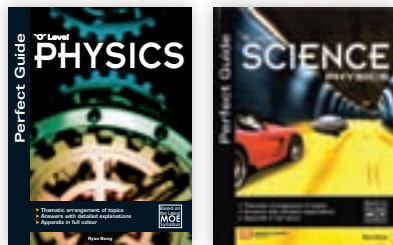


- Thematic arrangement of topics.
- Samples questions with detailed explanation of answers to clear pupils' doubts.
- Tables and illustrations are provided to enhance pupils' understanding of the topic.
- Clear and concise study notes that facilitates revision for the examination.
- Diagnostics evaluation that helps to highlight areas for improvement of each pupils.
- A glossary of scientific terms to help pupils understand difficult scientific words.
- Two thematic assessments in each book to help students gauge their level of understanding.

**Perfect Guide to Lower Secondary Science Book A**  
978-981-01-1261-5

**Perfect Guide to Lower Secondary Science Book B**  
978-981-01-1262-2

## Perfect Guide to Physics



These guides aim to provide students with quick and complete preparation for the Cambridge G.C.E. 'O' Level Science Examination. The contents of these books are based on the latest Cambridge G.C.E. 'O' Level Science (Physics) Syllabus.

- Clear and concise revision notes that includes diagrams and tables to aid in revision of the topics.
- A list of key terms and concepts that open each chapter provide a quick overview of the chapter's contents.
- Notes that point out and correct common misconceptions, and present useful information to enhance knowledge.
- Examples that show applications of the concepts learnt are guided by thought process involved.
- End-of-chapter worked examples and exercises that consist of multiple-choice and structured questions to reinforce learning.
- Four thematic revision papers serve as formative assessment, providing practice as well as allowing students to gauge how well they have understood the concepts learnt, and two trial examination papers help students familiarise themselves with the format of the Cambridge G.C.E. 'O' Level Physics Examination.
- Detailed explanations for all answers so that students will have a better understanding of the topics.
- Coloured appendix with thematic maps provide a visual summary of important data and formulae for revision, as well as interesting facts of how Physics is applied in our daily lives.

**Perfect Guide to 'O' Level Physics**  
978-981-01-1430-5

**Perfect Guide to 'O' Level Science (Physics)**  
978-981-01-1431-2

# Supplementary Materials

## Perfect Guide to Physics Notes



For those seeking a short and quick revision, a note-only version is available in the Perfect Guide to Physics Notes.

*Perfect Guide to Physics Notes will be available soon.*

**Perfect Guide to 'O' Level Physics Notes**  
978-981-01-1586-9

**Perfect Guide to 'O' Level Science (Physics) Notes**  
978-981-01-1620-0

## Perfect Guide to Chemistry



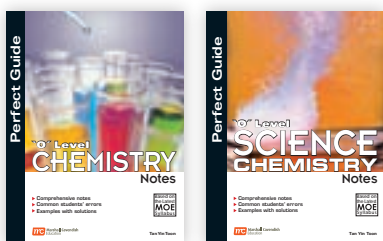
This guide aims to provide students with quick and complete preparation for the Cambridge G.C.E. 'O' Level Chemistry Examination. The content of this book is based on the latest syllabus set by the Ministry of Education, Singapore.

- Clear and concise revision notes, with highlights of key definitions, diagrams and tables to aid in revision of the topics.
- Notes that point out and correct common misconceptions to help mitigate the tendency of repeating these mistakes.
- End-of-chapter worked examples and exercises that consist of multiple-choice and structured questions to reinforce learning.
- Four revision papers and two trial examination papers for practice of concepts learnt and for assessment.
- Detailed explanations for all answers so that students will have a better understanding of the topics.
- Coloured appendix that highlights important data for revision, as well as interesting facts of how Chemistry is applied in our daily lives.

**Perfect Guide to 'O' Level Chemistry**  
978-981-01-1428-2

**Perfect Guide to 'O' Level Science (Chemistry)**  
978-981-01-1429-9

## Perfect Guide to Chemistry Notes



For those seeking a short and quick revision, a note-only version is available in the Perfect Guide to Chemistry Notes.

**Perfect Guide to 'O' Level Chemistry Notes**  
978-981-01-1580-7

**Perfect Guide to 'O' Level Science (Chemistry) Notes**  
978-981-01-1584-5

# Supplementary Materials

## Perfect Guide to Biology



This guide aims to provide students with quick and complete preparation for the Cambridge G.C.E. 'O' Level Biology Examination. The contents of this book are based on the latest G.C.E. 'O' Level Biology Syllabus.

- Comprehensive, yet concise revision notes that include diagrams, tables and flowcharts aid revision. The lists of key definitions that open each chapter provide a quick overview of the chapter's contents.
- End-of-chapter worked examples model the approaches to different questions while the exercises that follow reinforce learning.
- Full answers to all questions include explanations for multiple-choice questions to help students understand the rationale for the answers.
- Notes that highlight and correct common misconceptions help students avoid making these mistakes in the examination.
- Four thematic revision papers serve as formative assessment, providing practice as well as allowing students to gauge how well they have understood the concepts learnt, while two trial examination papers help students familiarise themselves with the format of the Cambridge G.C.E. 'O' Level Examination.

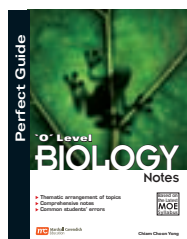
---

### Perfect Guide to 'O' Level Biology

978-981-01-1432-9

---

## Perfect Guide to Biology Notes



For those seeking a short and quick revision, a note-only version is available in the Perfect Guide to Biology Notes.

---

### Perfect Guide to 'O' Level Biology Notes

978-981-01-1578-4

---

## Stay Ahead: New Focus Science Topical Papers for Lower Secondary



These Topical Papers aim to provide students with ample practice to master and apply key scientific concepts, principles and theories in the syllabus as well as basic and higher order thinking skills and processes such as analysing, classifying, comparing, communicating, elaborating, inferring, investigating and creative problem-solving.

---

### New Focus Science Topical Papers for Lower Secondary Volume A

978-981-273-875-2

### New Focus Science Topical Papers for Lower Secondary Volume B

978-981-280-136-4

---

# Supplementary Materials

## Stay Ahead: Lower Secondary Science Topical Assessment



These books consist of topical practice papers that are designed to test students' knowledge, understanding and application of science concepts. Detailed answers provided will reinforce students' learning and guide them in their preparation for the examination.

**Lower Secondary Science Topical Assessment Volume A**  
978-981-273-688-8

**Lower Secondary Science Topical Assessment Volume B**  
978-981-273-860-8

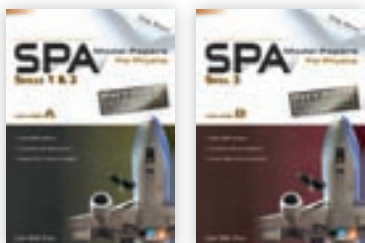
## Stay Ahead: 'O' Level Physics Examination Armoury



This book is written for students preparing for the Cambridge G.C.E. 'O' Level Physics Examination and consists of ten specimen papers. Full worked solutions are provided at the end of the book.

**'O' Level Physics Examination Armoury**  
978-981-280-358-0

## Stay Ahead: SPA Model papers For Physics Skills



These books are written according to the latest syllabus in the Cambridge G.C.E. 'O' Level Physics School-based Science Practical Assessment (SPA). The assessment of science practical skills is grouped into three skill sets:

- Skill set 1: Performing and Observing
- Skill set 2: Analysing
- Skill set 3: Planning

**SPA Model Papers for Physics Skills 1 & 2 – Volume A**  
978-981-273-515-7

**SPA Model Papers for Physics Skill 3 – Volume B**  
978-981-273-516-4

## Stay Ahead: Understanding Physics through Problem Solving



This book is specially designed to help students understand physics concepts better and ace the Cambridge G.C.E. 'O' Level Physics Examination.

This book is written based on the principle that students can gain a deep and holistic understanding of physics concepts through continuous exposure to problems with increasing complexity.

**Understanding 'O' Level Physics through Problem Solving (Revised Edition)**  
978-981-280-592-8

**Understanding 'O' Level Science (Physics) through Problem Solving**  
978-981-280-005-3

# Supplementary Materials

## New Pacific Physics 'O' Level Guide



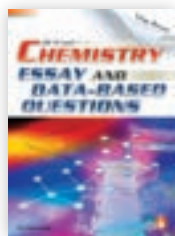
This guide is essential for students preparing for the Cambridge G.C.E. 'O' Level Physics Examination. This guide helps students organise and understand important concepts and key points.

---

**Physics 'O' Level Guide**  
978-981-242-897-4

---

## Stay Ahead: G.C.E. 'O' Level Chemistry – Essay and Data-based Questions



This book contains essay questions as well as data-based questions that test students on using principles and concepts they have learnt and apply them in a 'logical, reasoned or deductive manner to a novel situation'.

---

**G.C.E. 'O' Level Chemistry – Essay and Data-based Questions**  
978-981-280-282-8

---

## Stay Ahead: Biology 'O' Level Guide



This guide is essential for students preparing for the Cambridge G.C.E. 'O' Level Biology Examination. This guide helps students organise and understand important concepts and key points.

- Lesson outcomes at the beginning of each chapter.
- Comprehensive coverage of syllabus.
- Well-labeled diagrams and easy-to-follow charts and tables.
- Review questions to reinforce learning.
- End-of-chapter exercises with answers.
- Comprehensive glossary and index for easy reference.

---

**Biology 'O' Level Guide**  
978-981-273-029-9

---

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

# HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

HUMANITIES

# EARTH

our home

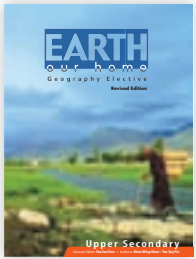
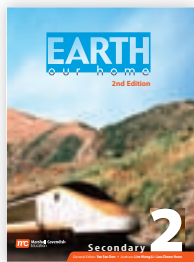
Earth: Our Home has been specially developed to stimulate students' interest in the physical and human environments around them. The lower secondary package cultivates a keen interest in Geography while the upper secondary package is designed to develop in students, a deeper understanding of the complex issues that we face in the world today.

## The package comprises:

- Textbook
- Workbook
- Teacher's Guide
- Workbook – Teacher's Edition

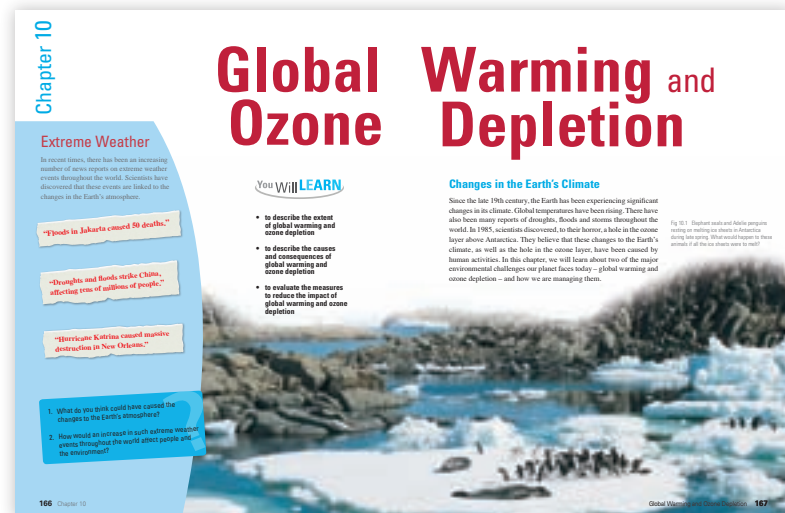
## Core Curriculum

### Earth: Our Home Textbook



Aimed at making Geography come alive, this edition is characterised by text that is engaging, visually captivating photographs, activities to stimulate learning, and diagrams and infographics which aid the understanding of concepts. These elements work towards engaging students' interest in Geography, while facilitating the development of geographical, creative and critical thinking skills.

- Visually captivating photographs, diagrams and infographics present difficult concepts in a manner which is easy to understand.
- Lead-in activities and relevant real life examples help students make connections to the real world.
- Case Study provides in-depth information and examples of specific phenomena.
- Presenting content in a meaningful manner through the use of photographs, news articles, graphs and interesting nuggets of information caters to students with different learning preferences.



**Textbook 1 (2nd Edition)**  
978-981-01-7554-2

**Textbook Full Geography 3**  
978-981-01-7733-1

**Textbook Elective Geography (Revised Edition)**  
978-981-01-1363-6

**Textbook 2 (2nd Edition)**  
978-981-01-7722-5

**Textbook Full Geography 4**  
978-981-01-9542-7

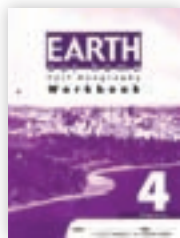
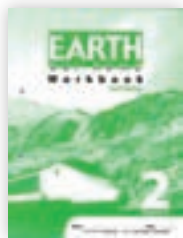
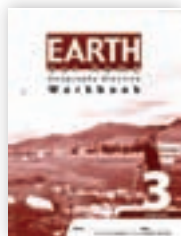
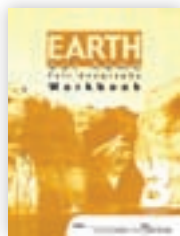
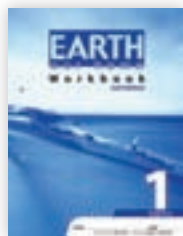
# Core Curriculum

## Earth: Our Home Workbook

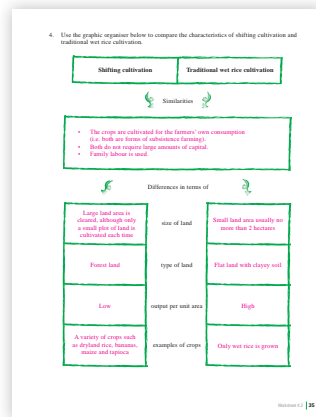
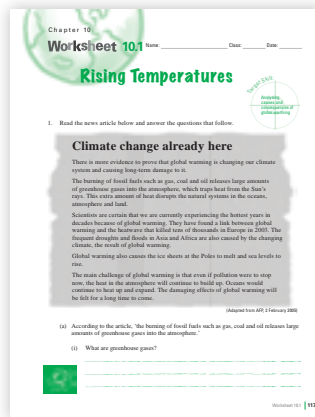
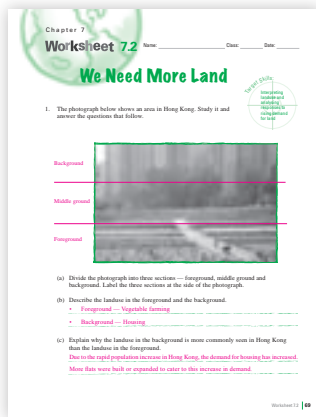
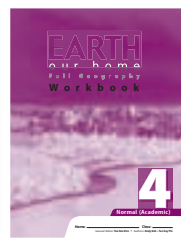
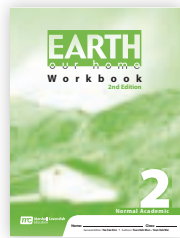
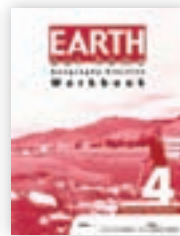
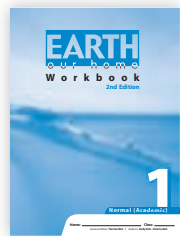
The essential companions to the Textbooks, these books help to assess students' understanding of the concepts learnt with a comprehensive offering of structured exercises. The books aim to extend students' learning by engaging them with meaningful activities and exercises.

- A wide variety of activities allow students to demonstrate IT presentation, photography, data interpretation and map reading skills.
- Carefully graded questions within each worksheet to ensure a better understanding and mastery of the topics to build examination confidence.
- Graphic organisers are provided to help students see the inter-relationships between concepts.
- Authentic sources such as photographs, newspaper articles and topographical maps are used in the worksheets to draw relevance to the real world.
- Key Ideas and Test Yourself Visual provide overviews of concepts, key words and how they are related.

### Express



### Normal (Academic)



**Workbook Express 1  
(2nd Edition)**  
978-981-01-7556-6

**Workbook Express 2  
(2nd Edition)**  
978-981-01-7728-7

**Workbook Full Geography  
Express 3**  
978-981-01-7734-8

**Workbook Full Geography  
Express 4**  
978-981-01-9543-4

**Workbook Elective Geography  
Express 3**  
978-981-01-7740-9

**Workbook Elective Geography  
Express 4**  
978-981-01-9548-9

**Workbook Normal (Academic) 1  
(2nd Edition)**  
978-981-01-7555-9

**Workbook Normal (Academic) 2  
(2nd Edition)**  
978-981-01-7729-4

**Workbook Full Geography  
Normal (Academic) 3**  
978-981-01-7735-5

**Workbook Full Geography  
Normal (Academic) 4**  
978-981-01-9544-1

**Workbook Full Geography  
Normal (Academic) 5**  
978-981-01-9570-0

**Workbook Elective Geography  
Normal (Academic) 3**  
978-981-01-7741-6

**Workbook Elective Geography  
Normal (Academic) 4**  
978-981-01-9549-6

**Workbook Elective Geography  
Normal (Academic) 5**  
978-981-01-9566-3

# Teacher's Resources

## Earth: Our Home Teacher's Guide

Arranged in a user-friendly format, these effective guides complement the Textbooks and Workbooks. They provide teachers with suggested teaching notes, additional classroom activities, useful teaching tips and question prompts to enable them to conduct interesting lessons.

- User-friendly format with notes placed around a reduced version of the Textbook.
- The learning outcomes and overview of sub-topics in the chapters are shown at the beginning of the unit.
- Teaching notes are well-organised in the following manner: stimulating interest, facilitating effective teaching, assessing understanding and consolidating learning.



2 The article below describes how Finland's economy developed over time. Read the article and answer the questions that follow.

In the 1950s, the agricultural population formed almost a half of the total population. By the end of the 20th century, only about 8 per cent of the population were employed in agriculture. Industrialisation began in the 19th century, when textile and paper mills started to operate and the traditional sawmilling industry expanded, but really took off only in the 1920s and 1930s. Still, the primary sector was the key source of livelihood for many Finns up to the mid-20th century.

During the 19th and 20th centuries the forest industry as a whole created a manufacturing cluster that included production, machinery, harvesting and transport vehicles, and consultancy. During the latter part of the 20th century, services grew along with the manufacturing sector. An extensive welfare state was developed, with a well-educated population.

By the 20th century, expertise and research and development had taken on greater importance. Technological development, such as in information technology, has also played a role in developing the economy. Mobile technology firms, in particular, have generated innovation and wealth in the Finnish economy in the past few decades. Thus the economy has become innovation-driven during the closing years of the 20th century and the early years of the third millennium.

(Adapted from Change and Continuity in the Finnish Economy Over Time, December 2006)

(a) Using information from the article, explain how the development of the secondary industries has been propelled by the primary industries. (3 marks)

• Secondary industries depend on primary industries for further development. • Industrialisation in Finland began in the 19th century when secondary industries such as paper mills developed from the raw materials provided by the forest industry. • During the 19th and 20th centuries, manufacturing industries of non-timber products such as machinery and transport vehicles also developed to support the forest industry.

(b) The quaternary industry is often regarded as part of the tertiary industry as both industries provide services. Explain what the quaternary industry is involved in, giving examples of services in this industry mentioned in the article. (2 marks)

• The quaternary industry is involved in providing information services, that is, it relies heavily on information and communications technology. • Examples of services in the quaternary industry, as shown in the article, are research and development, consultancy and information technology. (Accept any two examples.)

86 | Geographical Skills Development

(c) What has caused Finland's economy to become innovation-driven at the end of the 20th century? Explain your answers. (4 marks)

• One reason for Finland's economy becoming innovation-driven is the improvement in the educational level of the people. • This is because when the people are well-educated, they acquire the skills and technical expertise which are required to create new ideas and products or services. • Another reason is technological advancement. • The use of advanced technology such as information technology has allowed for greater innovation in the manufacture of products and services.

3 Fig 2 shows the employment structure of Country X in 1965 and 2005.

Fig 2

Using data from Fig 2, briefly describe the changes shown in the employment structure of Country X in 1965 and 2005. (4 marks)

• The total number of jobs increased from 14 million in 1965 to 20 million in 2005. • The proportion and number of jobs in primary and secondary industries decreased. • The proportion and number of jobs in the tertiary and quaternary industries increased, with tertiary industries showing a greater increase. • In 1965, the majority of jobs were in primary industries but in 2005, the majority of jobs were in tertiary industries.

87 | Geographical Skills Development

**Teacher's Guide 1 (2nd Edition)**  
978-981-01-1291-2

**Teacher's Guide Full Geography 3**  
978-981-01-1393-3

**Teacher's Guide Elective Geography**  
978-981-01-1395-7

**Teacher's Guide 2 (2nd Edition)**  
978-981-01-1512-8

**Teacher's Guide Full Geography 4**  
978-981-01-1394-0

# Teacher's Resources

## Earth: Our Home Workbook – Teacher's Edition

These useful books provide teachers with the solutions for questions found in the Workbooks which make marking an easy process for teachers.

### Express

### Normal (Academic)



**Workbook – Teacher's Edition  
Express 1 (2nd Edition)**  
978-981-01-7716-4

**Workbook – Teacher's Edition  
Express 2 (2nd Edition)**  
978-981-01-7731-7

**Workbook – Teacher's Edition  
Full Geography Express 3**  
978-981-01-7737-9

**Workbook – Teacher's Edition Full Geography  
Express 4**  
978-981-01-1097-0

**Workbook – Teacher's Edition Elective Geography  
Express 3**  
978-981-01-7743-0

**Workbook – Teacher's Edition Elective Geography  
Express 4**  
978-981-01-1095-6

**Workbook – Teacher's Edition  
Normal (Academic) 1 (2nd Edition)**  
978-981-01-7717-1

**Workbook – Teacher's Edition  
Normal (Academic) 2 (2nd Edition)**  
978-981-01-7732-4

**Workbook – Teacher's Edition Full Geography  
Normal (Academic) 3**  
978-981-01-7738-6

**Workbook – Teacher's Edition Full Geography  
Normal (Academic) 4**  
978-981-01-1098-7

**Workbook – Teacher's Edition Full Geography  
Normal (Academic) 5**  
978-981-01-1158-8

**Workbook – Teacher's Edition Elective Geography  
Normal (Academic) 3**  
978-981-01-7744-7

**Workbook – Teacher's Edition Elective Geography  
Normal (Academic) 4**  
978-981-01-1096-3

**Workbook – Teacher's Edition Elective Geography  
Normal (Academic) 5**  
978-981-01-1159-5

# Explore Geography

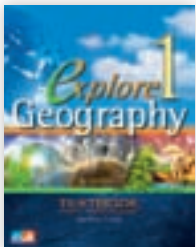
Explore Geography incorporates knowledge, skills and values essential to the holistic understanding of Geography. Through the lessons and activities conducted in this series, students are able to understand the importance of maintaining a sustainable environment, and build a sense of belonging to the society and country.

## The package comprises:

- Textbook
- Activity Book
- Teacher's Guide
- Teacher's Resource CD-ROM
- Activity Book – Teacher's Edition

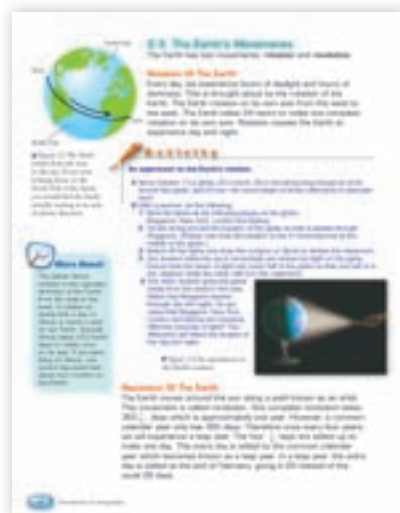
## Core Curriculum

### Explore Geography Textbook



The package adopts an inquiry-based approach which emphasises learning through observations, exploration, investigation, examination and questioning.

- Activities that encourage interactive learning through questioning, sharing, discussion, individual, pair and group work to learn important concepts in a meaningful way.
- Case studies highlight the topics for special mention and analysis to build the needed analytical skills.
- Additional interesting snippets of information to pique students' interest in the topic.
- Thinking questions are available throughout the book to help develop thinking skills.



Textbook Express/Normal (Academic) 1  
978-981-271-191-5

Textbook Express/Normal (Academic) 2  
978-981-271-140-3

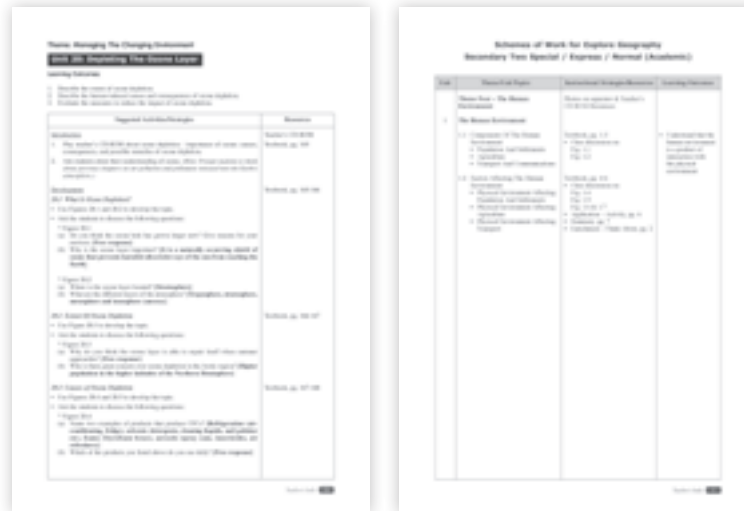


# Teacher's Resources

## Explore Geography Teacher's Guide



These guides serve as a useful tool to aid teachers in preparing their lessons. It contains Lesson Plans and Scheme of Work for every unit of the Textbook so that teachers are able to deliver the lessons confidently in class.



**Teacher's Guide**  
Express/Normal (Academic) 1  
978-981-271-197-7

**Teacher's Guide**  
Express/Normal (Academic) 2  
978-981-271-145-8

## Explore Geography Teacher's Resource CD-ROM



These CD-ROMs contain Lesson Plans and Scheme of Work found in the Teacher's Guide to provide convenience for teachers in lesson planning. Powerpoint slides are also available for teacher's usage during the class to facilitate learning.



**Teacher's Resource CD-ROM 1**  
978-981-271-196-0

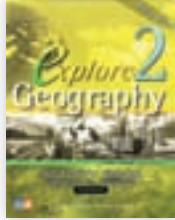
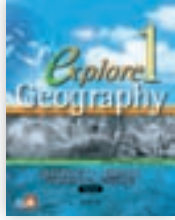
**Teacher's Resource CD-ROM 2**  
978-981-273-457-0

# Teacher's Resources

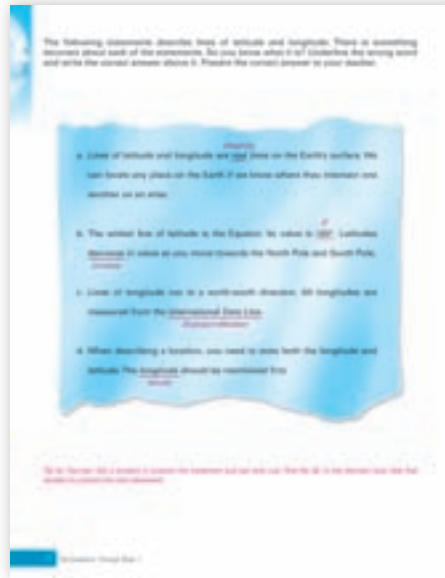
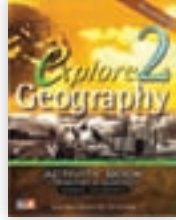
## Explore Geography Activity Book – Teacher's Edition

These books contain the suggested answers for questions found in the student's edition of the Activity Books. The books also contain tips that highlight how some activities can be extended to project work to make learning even more interesting for students.

### Express



### Normal (Academic)



**Activity Book – Teacher's Edition Express 1**  
978-981-271-194-6

**Activity Book – Teacher's Edition Normal (Academic) 1**  
978-981-271-195-3

**Activity Book – Teacher's Edition Express 2 (Revised Edition)**  
978-981-273-845-5

**Activity Book – Teacher's Edition Normal (Academic) 2 (Revised Edition)**  
978-981-273-846-2

# The Living Past

## *History of Ancient India, China and Southeast Asia*

The Living Past is a holistic and comprehensive programme comprising a continuum of strategies and tools for the teaching and learning of History. It supports the achievement of the learning outcomes identified in the latest lower secondary History syllabus.

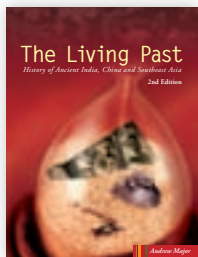
Designed to meet the varying needs of teachers and students, The Living Past focuses on promoting active and higher-order learning for students, as well as dynamic teaching for teachers.

### The package comprises:

- Textbook
- Workbook
- Teacher's Guide
- Workbook – Teacher's Edition
- Teacher-assist Pack

## Core Curriculum

### The Living Past Textbook



The Textbook adopts a multi-focal approach towards the cultivation of an appreciation for all things historical in students. The various modes of presenting information help develop a deeper understanding of History. Overarching ideas that cut across the various themes provide a comprehensive understanding of the interconnectedness of the three ancient civilisations.

- Learning outcomes set clear and focused objectives for each topic to prepare students for the concepts to be covered in each unit.
- Arresting photographs can be used as a stimulus for classroom discussion to make learning fun and engaging.
- Useful recap questions at the end of every section serve as an excellent revision tool to ensure that students understand the concepts learnt.

**CHAPTER 3 Birth of Civilisations**

**Learning Outcomes**

You will be able to:

- define 'civilisation', 'kingdom' and 'empire'
- identify the factors that led to the rise of civilisations.
- identify the features of civilisations.

The picture below shows how people lived thousands of years ago. How are their lives different from ours?

**What is a Civilisation?**

Long ago, people did not live in just one place. Instead, they roamed around hunting for animals and gathering food. Later, they learned how to grow crops and rear animals. These hunters and gatherers also lived in small groups.

When groups of people come to live together and develop their own way of life, we say that they have the same **culture**. This usually means that they speak the same language, eat the same kinds of food, obey the same rules and laws and follow the same customs and traditions. When the culture has developed over a long time and becomes very advanced, we call it a **civilisation**.

The earliest civilisations were developed by people living in fixed places or villages, which gradually grew into towns and cities. In fact, the term 'civilisation' comes from the Latin word *civis*, which refers to the act of living in a city.

**Growth of ancient civilisations**

The earliest civilisations began c. 3800 BCE. The place where a civilisation begins is known as the **cradle of civilisation**. Generally, this is a place that has plenty of sunshine and rainfall. These conditions make the place suitable for farming. The place is also usually close to water sources such as rivers and seas. Fig 3.2 explains the importance of being close to rivers and seas.

When historians study an ancient civilisation, they are interested in knowing how it came about and what kinds of government, occupations, writing system and beliefs the people had. They also want to study the achievements of the people and see which of these have lasted till today.

**Fig 3.1** The three earliest civilisations — the Mesopotamian Civilisation, the New Valley Civilisation and the Indus Valley Civilisation — were located near major rivers.

**Fig 3.2** Benefits of being close to rivers and seas.

1. Rivers provided water for drinking and watering crops such as rice and wheat. People did not need to depend too much on rain water if they lived near a permanent source of water.

2. Rivers and seas provided fish, which was an important source of food.

3. The soil around rivers was usually fertile and easy to plough. Therefore, large amounts of crops could be grown.

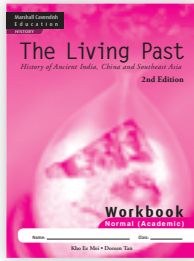
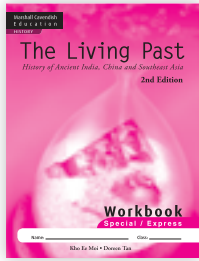
4. Rivers and seas provided a means of transport. People could travel long distances from one village to another. They could trade (buy, sell and exchange goods) with one another much more easily than before.

Textbook (Second Edition)

978-981-01-9390-4

# Core Curriculum

## The Living Past Workbook



A companion to the Textbooks, these books contain exercises that are carefully structured to reinforce fundamental skills and prepare students for the examinations.

- Clear and concise guides are provided to enhance students' understanding of key historical skills.
- Activities are differentiated between the two books to suit the various learning needs of students.

**Activity 3: Differentiating between primary and secondary sources**

**Quick Start**

1. Primary sources are information provided by people who were involved in the events or who witnessed them as they took place. Some examples of primary sources are artefacts, photographs, official records and diary entries of events as they happened.
2. Secondary sources are works of people who were not involved or never witnessed the events. They have only second-hand experience about them. Examples of secondary sources include books, journal articles and essays.
3. Whether a source is primary or secondary depends on how a historian is using it.

In the table below, descriptions of sources and their uses are given. Read and decide whether the source is a primary or secondary source. Tick in the appropriate column.

Source	Use	Primary	Secondary
Pieces of pottery found at Fort Canning	To investigate the history of early Singapore	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A diary entry of a student who lived in Singapore in the 19th century	To find out about the school life of children in 19th century Singapore	<input checked="" type="checkbox"/>	<input type="checkbox"/>
An article in <i>Berita Harian</i> (Malay language newspaper) about Singapore-Malaysia relations	To learn about how Singapore's relations with Malaysia has progressed over the years	<input type="checkbox"/>	<input checked="" type="checkbox"/>
An article in <i>Berita Harian</i> (Malay language newspaper) about Singapore-Malaysia relations	To examine the attitudes of Singapore journalists towards Malaysia	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<i>The Living Past</i> , a history textbook used by secondary one students in the 21st century	To learn about the lives of people in ancient India, China and Southeast Asia	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<i>The Living Past</i> , a history textbook used by secondary one students in the 21st century	To find out what history topics are taught in the 21st century	<input checked="" type="checkbox"/>	<input type="checkbox"/>

12

**Review**

**Activity 1: Questions with short answers**

Answer the following questions in complete sentences.

1. Give two examples of natural disasters faced by the people of ancient India. Why were they considered threats?
 

*Two examples are floods and famines. They were considered threats because floods destroyed homes and killed many people. Famines caused many people to starve to death.*
2. What were ancient Indian kings expected to do during a famine?
 

*During a famine, the people expected their kings to distribute food from the government's grain stores and take the wealth from the rich to help feed the starving.*
3. How did people in ancient China deal with the threat of flooding?
 

*Farmers built their own dikes to stop the rivers from flooding. Chinese emperors also employed many engineers and labourers to build and maintain dikes.*
4. What is a civil war? Give an example of a civil war that occurred in ancient China.
 

*A civil war is a war fought between different groups of people who are in the same country. An example of a civil war in China happened during the period of the Warring States (403–221 BCE), when China was divided into seven feudal states that fought with one another.*

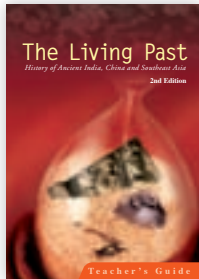
110

**Workbook Express (Second Edition)**  
978-981-01-9391-1

**Workbook Normal (Academic) (Second Edition)**  
978-981-01-9392-8

## Teacher's Resources

### The Living Past Teacher's Guide



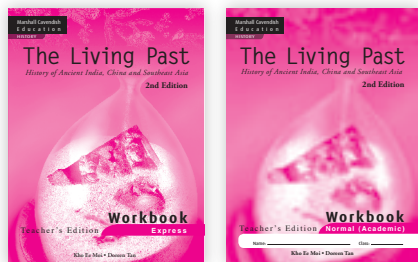
This effective guide contains at-a-glance content to facilitate lesson planning. It also contains extra information and question-prompts to save time and reduce tedious research for lessons.



**Teacher's Guide**  
978-981-01-6320-4

# Teacher's Resources

## The Living Past Workbook – Teacher's Edition

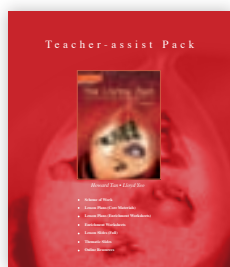


This edition of the Workbooks provide suggested answers and marking strategies to students' attempts of the Workbook questions. Level of Response Marking Schemes (LORMS) are also provided to help make the marking process easier.

**Workbook – Teacher's Edition Express (2nd Edition)**  
978-981-01-9553-3

**Workbook – Teacher's Edition Normal (Academic) (2nd Edition)**  
978-981-01-9554-0

## The Living Past Teacher-assist Pack



This handy resource pack offers detailed Lesson Plans and Scheme of Work to facilitate lesson planning. Multi-focal approaches to teaching are incorporated to cater to students of varied learning abilities and styles.

The Living Past – Chapter 2: Reconstructing the Past

### Chapter 2: Reconstructing the Past Lesson 2

**Learning Outcomes**  
By the end of the lesson, students should be able to:  
 • explain how historians examine evidence;  
 • distinguish between fact and opinion;  
 • examine and interpret source materials.

**Key:**  
 HA, HA, LA refer to activities directed at  
 (HA) Higher ability students  
 (MA) Middle ability students  
 (LA) Lower ability students  
 (SE) Special Express  
 (NA) Normal (Academic)

**TIME ALLOCATED: 1 HOUR**

Key Concepts	Instructional Procedures	Target Ability Level	Materials & Resources	Time (min)
	<b>PRE-ACTIVITY: PHOTO ACTIVITY</b> • Teacher to show students Fort Tanyang-Katong video, and discuss Questions for discussion: (i) What are some of the processes used to recover the artefacts? (ii) What are some questions they will ask to find out if something is authentic? (iii) What do their findings tell us about the past? Teacher then notes responses on whiteboard.	HA-MA-LA	Video 2/6 – Fort Tanyang-Katong	7
SCs, fact and opinion	<b>LESSON: EXPLAINING THE 3-Cs</b> • Teacher to explain following terms from textbook: (i) reliability (ii) credibility, consistency, corroboration (iii) fact and opinion • Responses from students on part (ii) in pre-activity to be classified according to the SCs. • (HA), activity (in consolidate learning)	HA-MA-LA	TB pages 15–17 Teacher's Guide pages 15–17 (SE, NA) WB page 11 (SE, NA) PowerPoint slides 2.8–2.10	13

© 2004 Marshall Cavendish International (Singapore) Private Limited

**Teacher-assist Pack**  
1099014816

# Crisis and Conflict

*An Enquiry Approach to Modern World History*

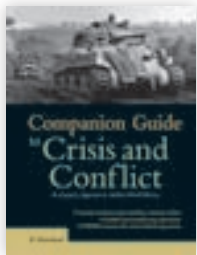
Crisis and Conflict debunks the myth that History is boring and far removed from the lives and present-day concerns of students.

## The package comprises:

- Textbook
- Workbook
- Workbook – Teacher's Edition

## Core Curriculum

### Crisis and Conflict Textbook



This accessible and colourful book challenges the idea that History consists of a fixed set of facts and allow students to discover History in an open and exploratory way. Students are encouraged to question and to become aware that many historians continue to discuss the meaning and significance of historical events and offer many different interpretations of the 20<sup>th</sup> century.

- Attractive design with carefully chosen illustrations help to capture and sustain students' interest in the topics.
- Information is structured in easy-to-digest segments of information with navigation aids, tables, charts, infographics, concept maps and timelines to facilitate the acquisition of knowledge.
- Students are able to develop their source-handling and thinking skills, interpreting and evaluating the rich variety of sources available.
- Different viewpoints are provided so that students can discover and assess the different interpretations of history.



**Textbook**

978-981-01-6408-9

# Core Curriculum

## Crisis and Conflict Workbook

Complementing the Textbooks, these books provide activities that boost students' confidence and skills. Through these activities, pupils are able to carry out activities that consolidate and extend skills required for the examination.

### Express

### Normal (Academic)



**Workbook Express 3**  
978-981-01-6409-6

**Workbook Normal (Academic) 3/4**  
978-981-01-6410-2

**Workbook Express 4**  
978-981-01-1034-5

**Workbook Normal (Academic) 5**  
978-981-01-1035-2

## Crisis and Conflict Workbook – Teacher's Edition

This edition of the Workbooks provides suggested solutions to the questions found in the student's edition, thus facilitating the marking process.

### Express

### Normal (Academic)



**Workbook – Teacher's Edition Express 3**  
978-981-01-6503-1

**Workbook – Teacher's Edition Normal (Academic) 3/4**  
978-981-01-6504-8

**Workbook – Teacher's Edition Express 4**  
978-981-01-1036-9

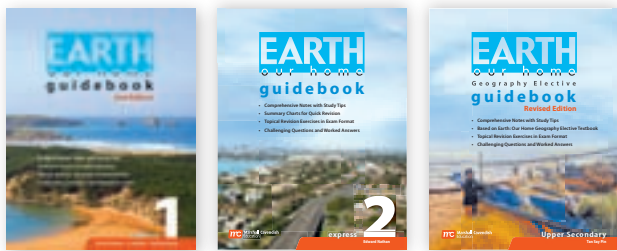
**Workbook – Teacher's Edition Normal (Academic) 5**  
978-981-01-1037-6

# Supplementary Materials

## Earth: Our Home Guidebook

These effective guides aim to facilitate students' understanding of Geography.

- Flow charts, illustrations and statistical diagrams are used to illustrate concepts which serve as quick reference guides and make learning fast, easy and effective.
- Real-life examples, photographs and diagrams are provided to help students relate what they have learnt to the world around them.
- Useful study tips help students remember and understand what has been taught and guide them in the application of geographical skills.
- Topical revision exercises in examination format enable students to apply what they have learnt and further reinforce their understanding of the concepts.
- Problem-based questions that come with rubrics for self-assessment further challenge students' understanding of the topics and develop higher-level thinking skills.
- Specimen examination papers serve as a gauge of students' level of understanding and build their examination confidence.



**Guidebook Secondary 1**  
978-981-01-9525-0

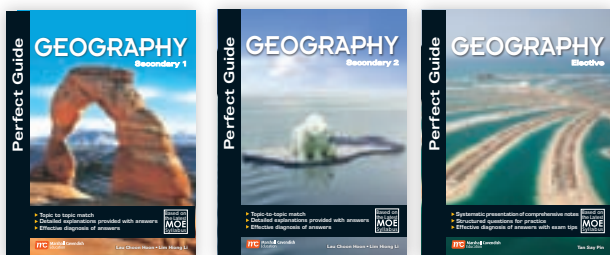
**Guidebook Secondary 2**  
978-981-01-1330-8

**Guidebook Geography Elective  
(Revised Edition)**  
978-981-01-1318-6

## Perfect Guide to Geography

These useful guides aim to provide students with quick and complete preparation for the examination.

- Clear and concise revision notes help students to recall key concepts learnt from classroom lessons.
- Tables and illustrations facilitate students' understanding of the topic by presenting the concepts taught in a visual manner.
- Sample questions with detailed explanation of answers so that students are able to understand what examiners are looking out for from the various question types.
- Summary mind maps provide a big-picture view of key learning points and provide a quick recap of what have been covered.
- Assessment tools such as topical tests and assessment papers help students apply what they have learnt to examination-type questions and help them to gauge their level of understanding of the topics.



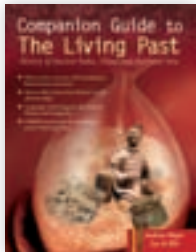
**Perfect Guide to Geography Secondary 1**  
978-981-01-1316-2

**Perfect Guide to Geography Secondary 2**  
978-981-01-1317-9

**Perfect Guide to Geography Elective**  
978-981-01-1477-0

# Supplementary Materials

## Companion Guide to The Living Past



This effective guide is written with the aim of stimulating students' interest in History.

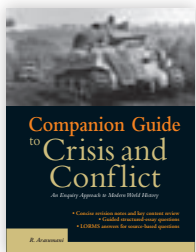
- Used on its own or as a supplement to an existing textbook, vital content is presented in an easy-to-read format, with condensed notes, graphic organisers and tables to help students consolidate learning. This is a good tool for teachers to enhance their teaching.
- Across the Three Civilisations enables students to spot the key similarities and differences across three civilisations at one glance, making learning easier for them.
- History Alive! demonstrates to students how concepts learnt affect everyday lives in modern Singapore.
- Level of Response Marking Scheme (LORMS) answers are provided for source-based questions and structured-essay questions that provide tips for teachers and guide students in their independent learning.
- Two test papers are included at the end of the book to ensure that students are well-prepared for the examinations.

---

**Companion Guide to The Living Past**  
978-981-01-1315-5

---

## Companion Guide to Crisis and Conflict



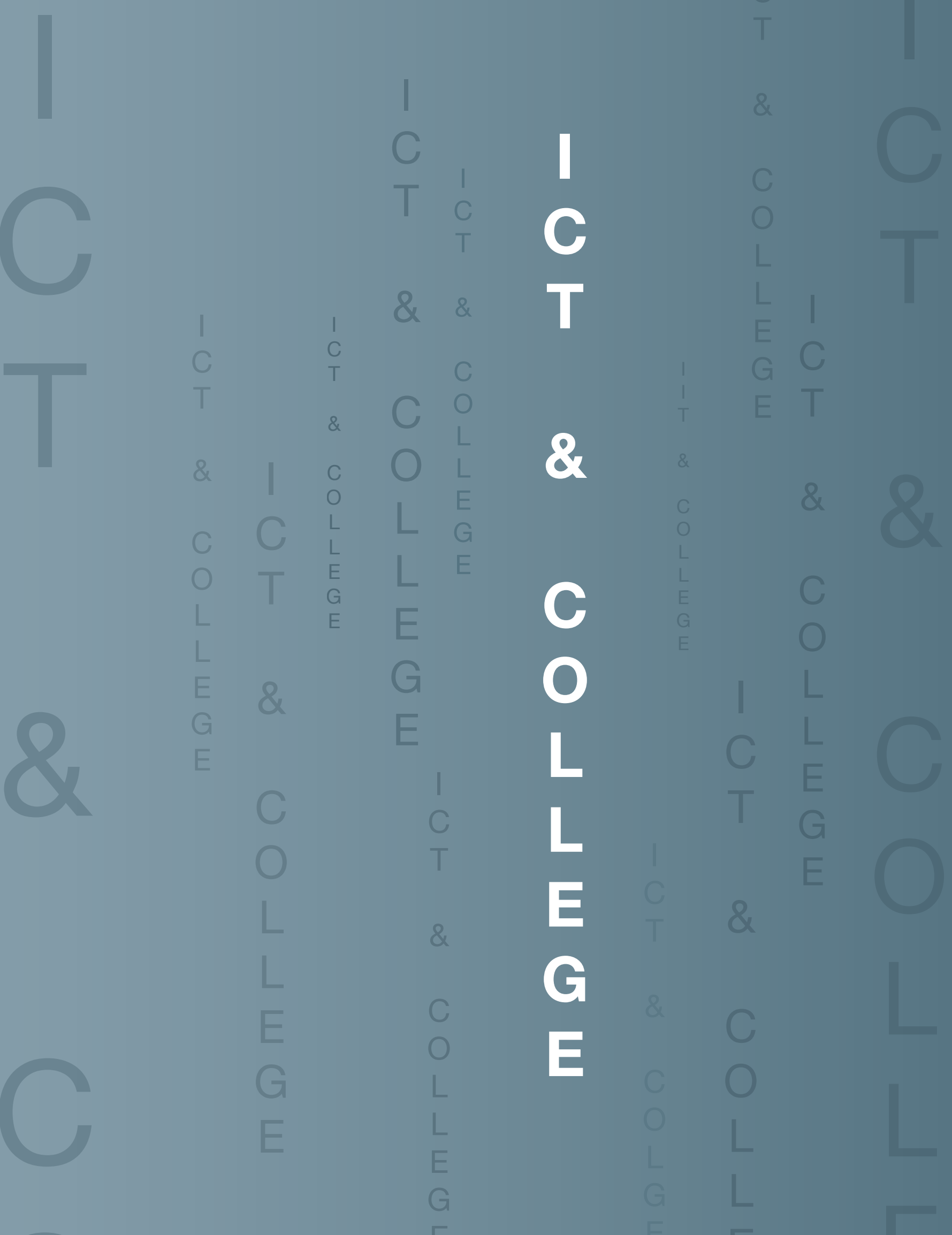
A revision aid and concise guide, this book presents students with vital content that fosters a firm grasp of Modern World History.

- Information is presented in a concise, easy-to-read format, with learning aids like mind maps to help students organise and absorb information.
- Structured-essay questions with guided structure to aid students in planning and crafting their essays.
- Source-based questions that consist of political cartoons and textual sources are provided for students to practise their inferring and reasoning skills, equipping them for the 'O' Level Examination.
- Level of Response Marking Scheme (LORMS) for source-based questions provides tips for teachers on dealing with these questions and guides students in their independent learning.
- A Cambridge G.C.E. 'O' Level mock examination paper at the end of the book helps students familiarise themselves with the examination format.

---

**Companion Guide to Crisis & Conflict**  
978-981-01-1329-2

---



ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

# ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

ICT & COLLEGE

Introduction to

# Information and Communications Technology

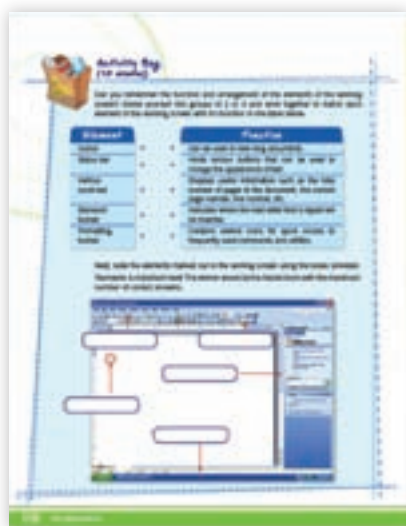
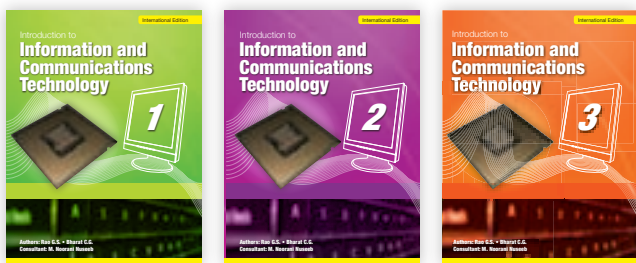
Introduction to Information and Communications Technology is a series of three textbooks specially written for Information and Communications Technology (ICT) learning at secondary school level. Aimed at giving students a basic knowledge of ICT, this series gears them towards exploring ICT for pleasure, self-study or ICT-related vocations.

## Core Curriculum

### Introduction to Information and Communications Technology Textbook (International Edition)

The topics in these books are presented in an easy-to-understand format with ample illustrations and examples. Concepts and tasks are carefully sequenced and introduced to ensure a gradual progression in learner training and skills development.

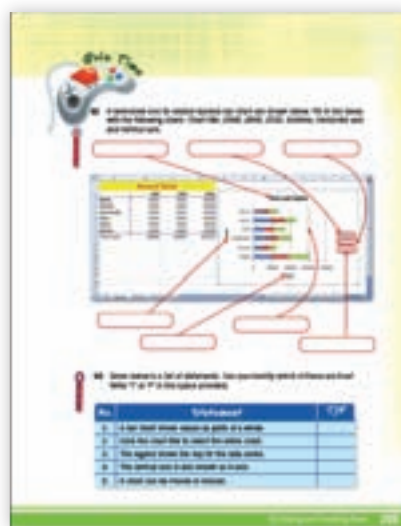
- The Lesson Opener contains activities that engage students' interest and stimulates them to ask or answer questions.
- Step-by-step instructions with visual screenshots help students to master the functions of applications software easily and quickly.
- Lesson summaries are available to help students recall and revise core concepts learnt.
- A variety of individual students' activities, explorative activities and group activities are provided to promote both independent and collaborative learning.
- Graded exercises at the end of each lesson help assess students' understanding of the topics.
- Students are able to engage in project work which provides an added platform for them to apply ICT to cross-curricular activities and real life situations.



**Textbook 1 (International Edition)**  
978-981-01-6630-4



**Textbook 2 (International Edition)**  
978-981-01-6631-1



**Textbook 3 (International Edition)**  
978-981-01-6867-4

## College Titles

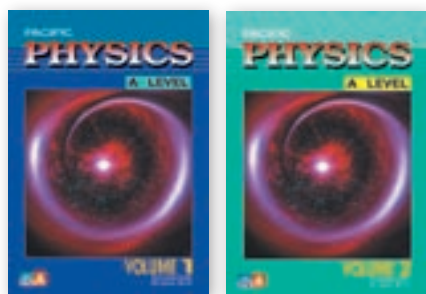
### College Economics



This book is designed to deliver complex economic concepts and theories in clear and concise language. Its comprehensive coverage of the key elements of economic theory provides students new to the subject a firm foundation for further study at the university level.

**College Economics**  
978-981-273-286-6

### Pacific 'A' Level Physics



This series of two books is specifically written for students preparing for the Cambridge G.C.E. 'A' level Examination. Presentation of various concepts in these books is comprehensive, accurate and easy to understand with important terms and definitions being highlighted. There is also a good selection of worked examples and exercises provide students with the necessary practice and reinforcement.

**Volume 1**  
978-981-271-254-7

**Volume 2**  
978-981-271-833-4

### H2 Mathematics: A Comprehensive Guide For 'A' Level (2nd Edition)



This series of two guidebooks is specially written for students taking H2 Mathematics in the latest Cambridge G.C.E. 'A' Level Mathematics Examination.

The series adopts a flexible modular approach with extensive coverage of all the topics in the new syllabus. Fully worked solutions are provided in a CD-ROM attached to each book.

**Volume 1 (2nd Edition)**  
978-981-28-0319-1

**Volume 2 (2nd Edition)**  
978-981-28-0356-6

### College Mathematics Syllabus C (2nd Edition)



College Mathematics Syllabus C is a series of two textbooks that cover all the topics, compulsory and optional, in Syllabus C of Cambridge G.C.E. 'A' Level Mathematics.

In Volume 1, emphasis is placed on illustrative examples, especially in topics related to geometrical properties, where diagrams are often used to provide an instinctive point of view. In Volume 2, theorems and definitions are emphasised and there are numerous examples to illustrate each new concept and to show different computational techniques involved.

**Volume 1 (2nd Edition)**  
978-981-271-942-3

**Volume 2 (2nd Edition)**  
978-997-163-863-4

# Marshall Cavendish Education offers a range of high quality K–12 materials to match the needs of your schools.



## How to order?

Contact your local Marshall Cavendish representatives.

Customer Service Marshall Cavendish Education

Tel: +65 6411 0820

Fax: +65 6288 9254

Email: [tmesales@sg.marshallcavendish.com](mailto:tmesales@sg.marshallcavendish.com)

Website: [www.marshallcavendish.com/education](http://www.marshallcavendish.com/education)

