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I always welcome your feedback as we are dedicated to improving our range to best suit teachers' and students' needs. My email address is vivienne@pascalpress.com.au. Please don't hesitate to email me with your suggestions and comments.

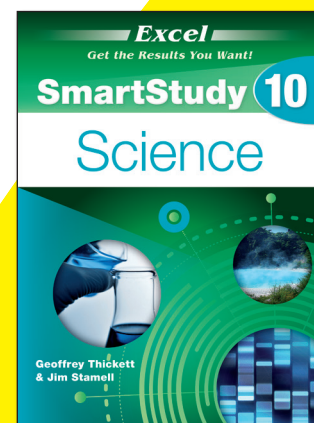
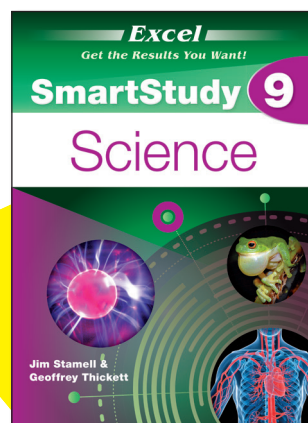
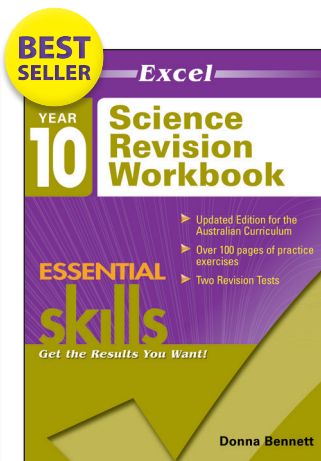
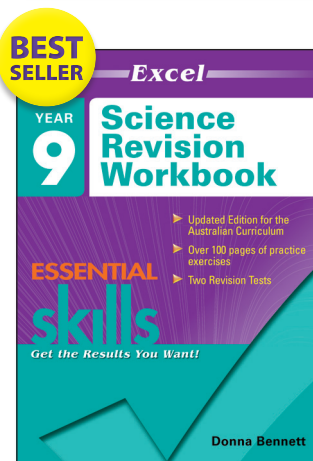
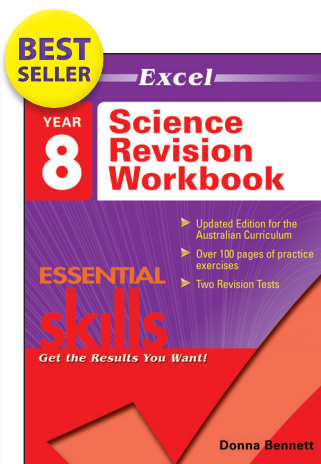
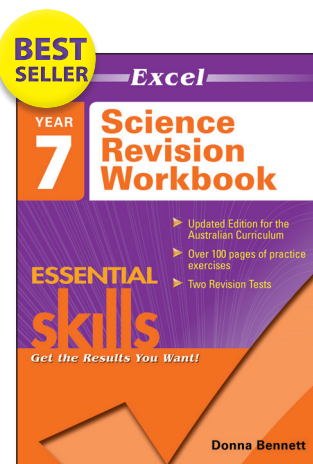
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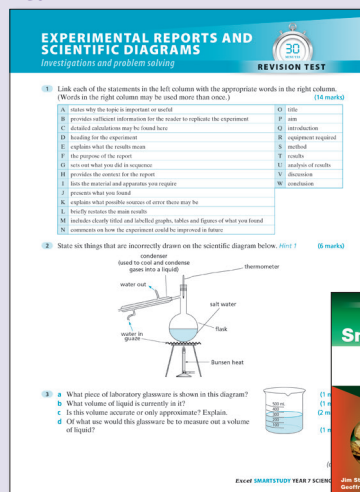
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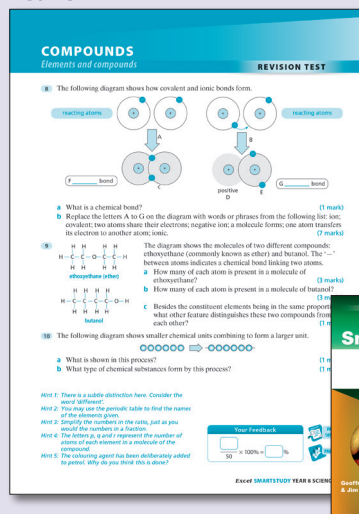
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- A homework resource
- A revision resource for tests and exams

Year 7



Year 8

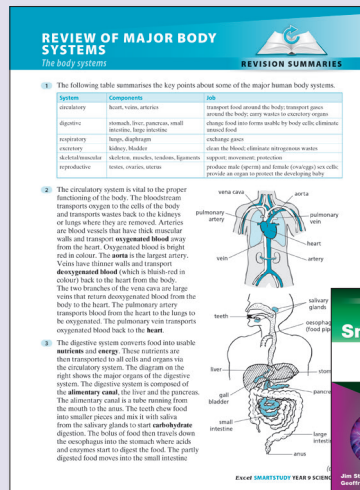


SmartStudy Science

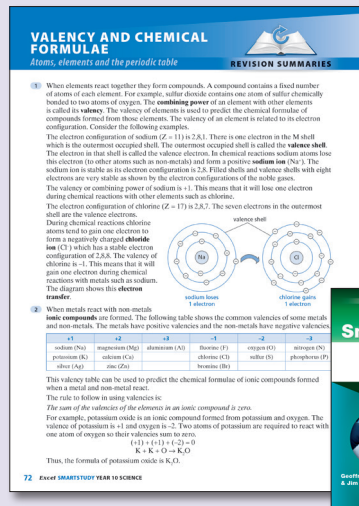
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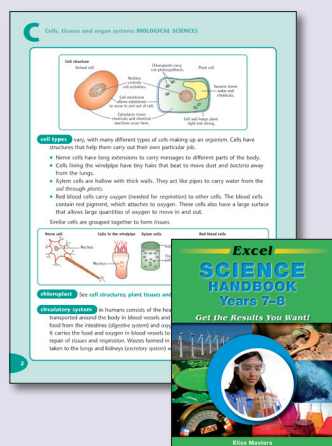
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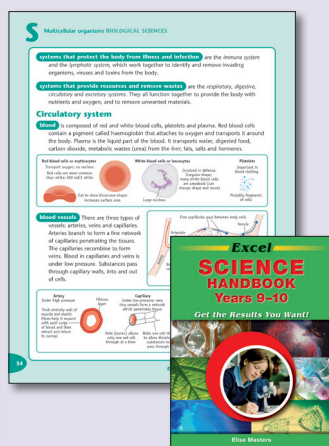


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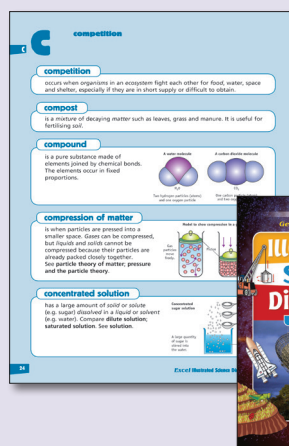
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- A test revision resource
- A photocopiable resource



Years 7–8



Years 9–10



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Handbooks and Dictionaries

- Easy-to-understand explanations of key terms
- Full-colour diagrams of key concepts
- Dictionary-style layout and index for easy navigation



Photocopiable resources

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This series can be used as:

- An extra photocopiable resource
- A homework resource

CHAPTER 3
CELLULAR REPRODUCTION

How do your cells help you grow?

Living things make millions of new cells every day. They do this by cell division. When a cell divides its **chromosomes** separate in a process that makes sure each new cell receives the correct genetic material. Every cell has its own life cycle in which it reproduces itself or rests or divides and dies. Skin cells complete the cycle in 24 hours and others take much longer.

Cell division

As living things develop and mature they grow bigger but their cells stay almost exactly the same size. Growth is the result of cells dividing and increasing in number. There are two different ways that cells divide.

- **Mitosis** is the division of a cell nucleus to produce two identical cells.
- **Meiosis** is a form of cell division that produces the sex cells, which are all genetically different from each other.

The process of mitosis

Mitosis involves one division that produces two new cells with exactly the same genetic material as the original cell. Just before mitosis begins each chromosome copies itself and forms two new **chromatids**. During mitosis two chromatids pull apart to form two separate nuclei. Then the **cytoplasm** divides to form two identical cells.

Mitosis occurs in several stages. These are listed below.

- **Early prophase** — the chromosomes tighten up and condense and a network of tiny tubes called a **spindle**, begin to develop.
- **Late prophase** — the nuclear membrane disintegrates and the spindle begins to move the chromosomes.

spindle begins to form

condensing chromosome

nucleus

nuclear envelope

spindle pole

Early prophase

spindle pole

Late prophase

chromosome

Metaphase

- **Anaphase** — the chromatids (duplicate chromosomes) that make up each chromosome separate and travel to opposite poles.

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Science Skills

Question 1

The following table displays the presence and abundance of different vertebrates during the various time periods.

Millions of years ago	Era	Period	Vertebrates
2	Cenozoic	Quaternary	fish, amphibians, reptiles, birds, mammals
70		Tertiary	fish, amphibians, reptiles, birds, mammals
135		Cretaceous	fish, amphibians, reptiles, birds, dinosaurs, mammals
180	Mesozoic	Jurassic	fish, amphibians, reptiles, birds, dinosaurs, mammals
225		Triassic	fish, amphibians, reptiles, birds, dinosaurs, mammals
270		Permian	fish, amphibians, reptiles, birds, dinosaurs, mammals
300	Palaeozoic	Early Carboniferous	fish, amphibians, reptiles, birds, dinosaurs, mammals
400		Late Carboniferous	fish, amphibians, reptiles, birds, dinosaurs, mammals
440		Devonian	fish, amphibians, reptiles, birds, dinosaurs, mammals
460		Silurian	fish, amphibians, reptiles, birds, dinosaurs, mammals
500		Ordovician	fish, amphibians, reptiles, birds, dinosaurs, mammals
600	Cambrian		fish, amphibians, reptiles, birds, dinosaurs, mammals
660		Pre-Cambrian	fish, amphibians, reptiles, birds, dinosaurs, mammals

Question 2

The following structures are the limbs of several animals. All the limbs have five parts. What part of Darwin's theory does this information support?

human hand, whale flipper, bat wing, pig hoof

Question 3

The information over the page shows the geological time range of certain organisms.

a Which animals are at their maximum number now?

d The populations of which two groups varied considerably over the past 600 million years?

e Which animals emerged in the Ordovician period and lasted in large numbers only until the Early Carboniferous period?

f How many years ago was the Jurassic period?

g In which era was the Jurassic period?

h Which animals dominated the Earth in the Jurassic period?

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- Easy-to-understand revision notes and diagrams
- Exercises to test scientific skills
- Revision questions plus detailed answers
- A glossary in each chapter



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This series can be used as:

- A revision resource
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Each month is named after something related to a season or an event in the sky.

The reason for the seasons

The seasons are due to changes in temperature on Earth and are a direct result of the amount of solar radiation that hits our planet at a particular time of year. The distance between the Earth and the Sun has nothing to do with it. That is a misconception.

The Earth's seasons are caused by the rotation axis of the Earth not being perpendicular to its orbital plane. As Figure 3.8 shows, the Earth's axis is tilted at an angle of about 23.5° from the orbital plane. So for half of the year (i.e. from around 20 March to around 22 September), the southern hemisphere tips away from the Sun, with the maximum distance reached around 21 June. For the other half of the year, the southern hemisphere tips towards the Sun, with the maximum around 21 December.

The two instances when the Sun is directly overhead at the Equator are called the equinoxes. The word *equinox* comes from the Latin *aequus* (equal) and *nox* (night), because around the equinox, the night and day are approximately equal long.

The March (autumnal) equinox will occur around 21 or 22 March. This marks the beginning of autumn in the southern hemisphere. At the same time, it is spring in the northern hemisphere (from an astronomical viewpoint). The September (vernal or spring) equinox happens around 22 or 23 September. This marks the beginning of spring in the southern hemisphere. At the same time, it is autumn in the northern hemisphere (from an astronomical viewpoint).

A solstice is an astronomical event that happens twice each year. This is when the Sun's apparent position in the sky reaches its northernmost or southernmost extremes. The word *solstice* comes from the Latin *sol* (sun) and *stitium* (standstill).

Figure 3.8 The seasons as observed in the southern hemisphere.

Excel Science Study Guide Year 7

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Year 7

Year 8

Figure 1.53 Engineering insect-resistant corn

their health, enhance their wellbeing and lower health care costs for themselves and society as a whole. But two emerging and closely-related issues have arisen:

- genetic privacy (the protection of individual genetic information)
- genetic discrimination (treating individuals differently on the basis of actual or presumed genetic differences).

There are concerns as to how this genetic information may be used by third parties, especially if it is

prejudicial to a person's interests. Questions that need answering include the following:

- 1 Who should have access to personal genetic information, and how will it be used?
- 2 Who owns and controls genetic information?
- 3 How does personal genetic information affect an individual and society's perceptions of that individual?

Governments will be required to enact legislation to deal with such issues. Anti-discrimination laws are needed to ensure, for example, that genetic information cannot be used by employers for hiring and firing purposes or by health insurers to decline coverage.

Experiment 1

Investigating human traits

Aim:

To survey the class and determine the proportion of the class possessing these dominant or recessive characteristics.

Method

Part A: Surveying the class

1. Use Table 1.5 to determine the proportion of the class possessing these dominant or recessive characteristics.

2. Count the number of students with the dominant characteristic and the number with the recessive characteristic for each trait (see also Figure 1.54 on the next page). Record your class results in a copy of the table.

Table 1.5 Proportion of dominant and recessive characteristics

Dominant trait	Number	Percentage	Recessive trait	Number	Percentage
brown eyes			blue eyes		
right-handed			left-handed		
able to bend thumb joint			cannot bend thumb joint		
free-hanging earlobe			attached earlobe		
able to roll tongue into U-shape			cannot roll tongue into U-shape		
second toe shorter than big toe					
moist hair					
straight hairline					

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Science Study Guides

- In-depth case studies of specific topics
- Diagrams and illustrations of key concepts
- Revision tests
- Answers to all revision and test questions



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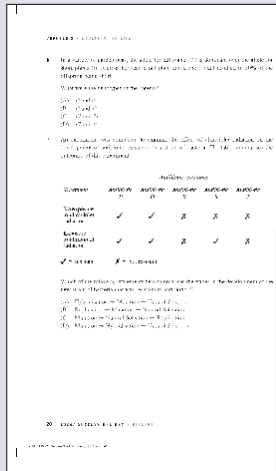
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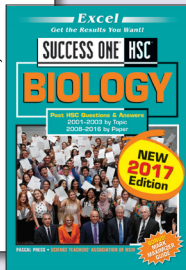
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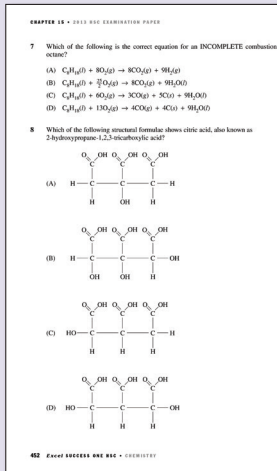
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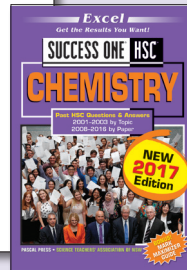
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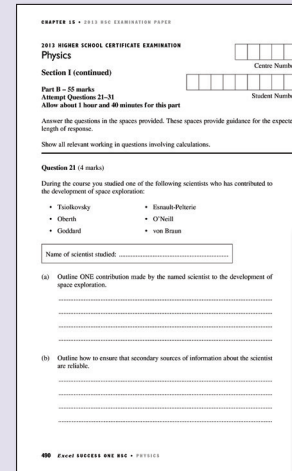
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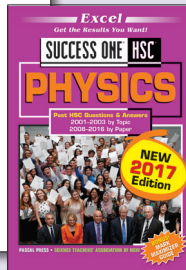
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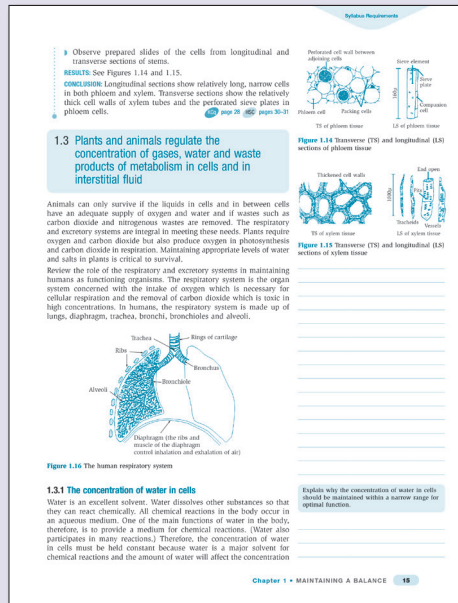


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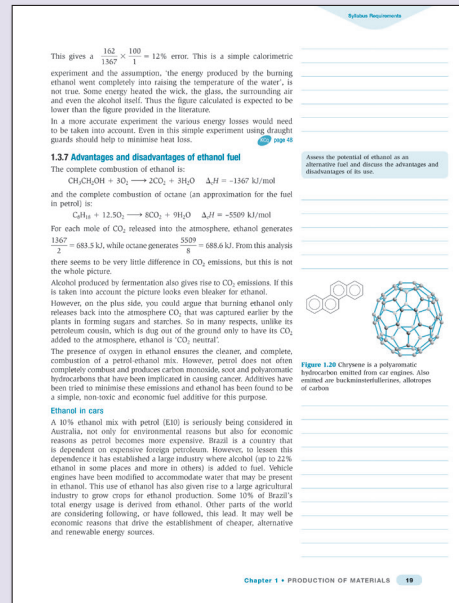
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- An HSC revision resource

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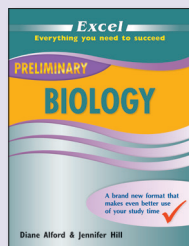
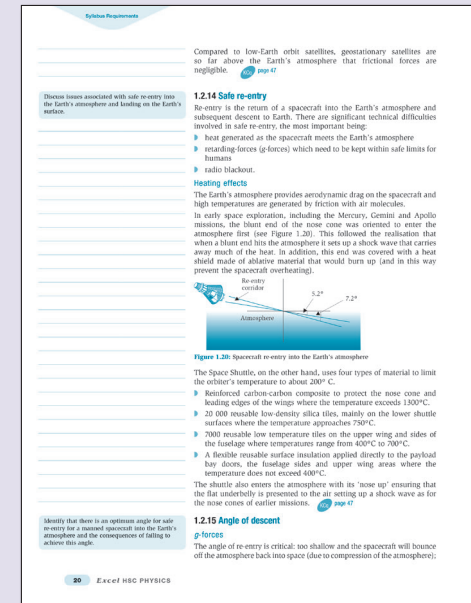
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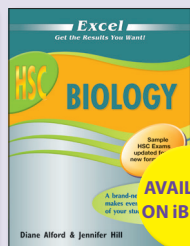
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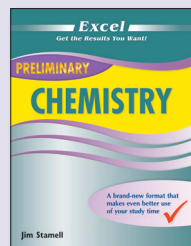
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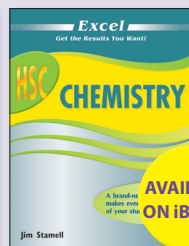
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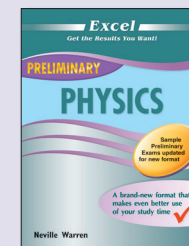
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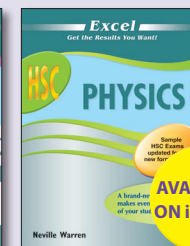
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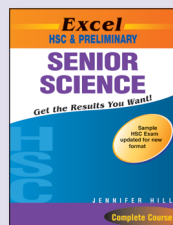
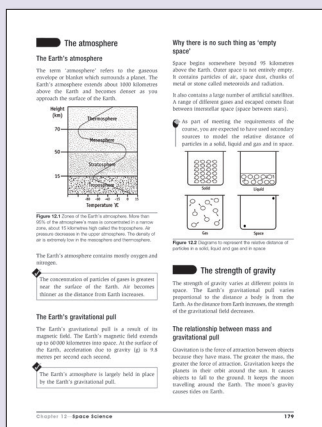
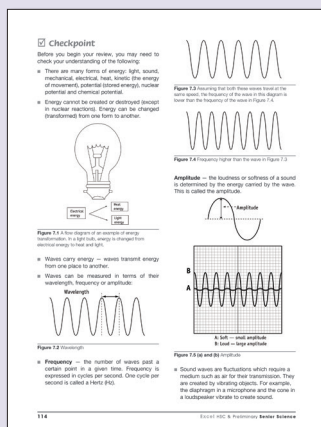
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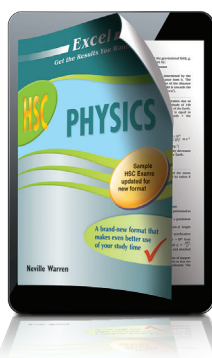
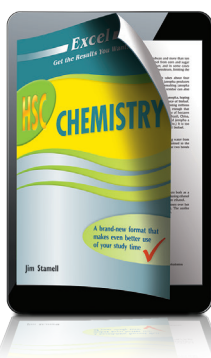
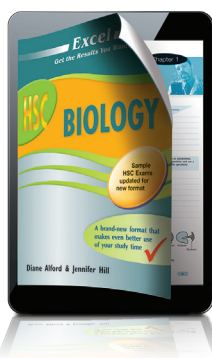


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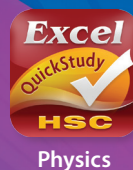
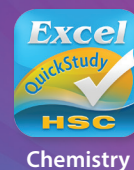
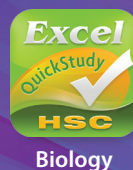
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