

**THE LEARNING LAB**



# Rise to the Challenge, Explorer

Inside lies a series of challenging Secondary 1 questions  
that will make you rethink everything you know about  
English, Maths and Science.

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# THE SECONDARY 1 CHALLENGE KIT

Greetings, Secondary 1 voyagers!

Are you ready to take on the Secondary 1 cosmic challenge?

In this booklet, you will find sets of questions across  
English, Mathematics and Science.

In each set of questions, you will see Primary 6 questions that  
you should already be familiar with, as well as difficult questions  
that you will encounter in Secondary 1.

For each Secondary question:

- ✦ we will guide you through question analysis
- ✦ we will show you specific techniques you can apply  
when you attempt each question

Are you prepared to complete the mission?

*Once you are done with the challenges, you can scan a QR code to check your  
answers, as well as learn more tips and strategies on how to tackle such topics!*

# IS THIS PRIMARY 6 QUESTION FAMILIAR?



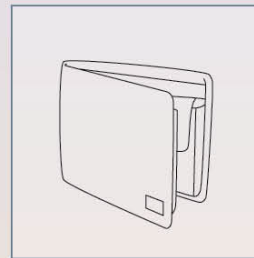
1

A clear **topic**:

Write a composition of at least 150 words about *Friendship*.

2

**Three pictures** to help you come up with a few ideas for your story. At least one picture must be included in your plot.



3

**Two guiding questions** are added to help you generate ideas.

Question 1: Who was involved?

Question 2: How was the friendship formed / challenged?

Both pictures and guiding questions help you develop sufficient content for the composition.

## What are the differences?

Primary 6	Secondary 1
Topic, pictures and questions that guide you as you think of content for your composition	Unguided question requiring independent and critical thinking to start planning your writing
Simple, straightforward topic with one word or a phrase	Multiple words / key terms to analyse

# CHALLENGE YOURSELF TO BREAK DOWN THIS SECONDARY 1 ESSAY QUESTION BEFORE YOU START PLANNING.

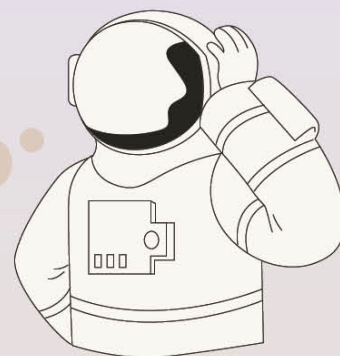


Write between 250 – 400 words on the following:

*Write a story based on the saying “an eye for an eye makes the whole world blind”.*

With no pictures or guiding questions

What do I do when I see the question?  
How do I make sure that I answer the question fully?  
Where will I get guidance or ideas from?



**Here are some steps to help you!**

STEP

1

Highlight the key terms of the question.

STEP

2

Break down the key terms to help you start planning your essay.

**Question analysis:**

What does the idiom “an eye for an eye” mean? What topic or storyline do I need to write about?

**Question analysis:**

What does the metaphor “makes the whole world blind” mean? How does that link to the topic?

HINT: You will need to

- 1) include a back story to explain what the ‘eye’ refers to;
- 2) create a TWO-PART narrative with a convincing climax

Write a story based on the saying “an eye for an eye makes the whole world blind”.

STEP

3

As you plan, make sure your ideas incorporate all your analysis and you explore both parts of the idiom and metaphor equally.

Scan the QR code on Page 16 of the booklet to check the answers for Step 2 and find out more about what you need to do for Step 3.

## ARE THESE PRIMARY 6 GRAMMAR QUESTIONS FAMILIAR?

### Grammar MCQ:

1. “This issue is between Rose and \_\_\_\_\_. Please let us sort it out by ourselves,” Lily said.

- 1 I
- 2 he
- 3 me
- 4 she

As ‘Rose and \_\_\_\_\_’ is the object of the sentence, the answer has to be an object **pronoun**.

2. Students attending college have to get used to \_\_\_\_\_ their own schedules.

- 1 manage
- 2 manages
- 3 managed
- 4 managing

**Gerunds** or noun phrases usually come after prepositions or phrasal verbs, such as ‘get used to’.

3. My grandmother is cooking her famous curry chicken dish. \_\_\_\_\_ you like to stay for dinner?

- 1 Might
- 2 Could
- 3 Would
- 4 Should

Knowing that this is a polite request, you will know to choose the right **modal** to answer the question.

### What are the differences?

Primary 6	Secondary 1
Grammar is tested in the form of MCQs, Cloze or Editing in Paper 2	Grammar is tested in the form of an Editing passage in Paper 1
The errors are identified for you, with blanks provided for the correct answer	The errors are no longer identified for you and you have to figure out if there is an error in each line and write the correct answer in the blank provided  Across ten lines, there will be two lines with no error

# CHALLENGE YOURSELF TO TACKLE THE SECONDARY 1 STYLE OF GRAMMAR WITH NO MCQS!



- ✦ You will be given a short passage
- ✦ You have to identify the errors on your own
- ✦ You will have to write the correct answer next to each error

**Here is an excerpt of the passage with 3 errors and some tips to help you.**

Identify the errors in each line. There are only three lines shown below that contain one grammatical error each. There is one more line with no error.		Correct Answers
<p>Multinational companies have made English her corporate</p> <p><b>TIP 1</b> Analyse the noun and the corresponding <b>pronoun</b> that should be used to refer to it.</p> <p>language. For those whose native language is not English,</p>	1 _____	
<p>working in a foreign language is certainly hard. However,</p> <p><b>TIP 2</b> Put a tick in the right-hand column if the sentence contains <b>no errors</b>.</p> <p>a column written by Michael Skapinker in the Financial Times</p>	2 _____	
<p>says that there are subtle advantages to be a non-native</p> <p><b>TIP 3</b> Check the verb to see if it is in the correct form. Remember the rules for using <b>gerunds</b>.</p> <p>speaker, too. For example, asking for a clarification can</p>	3 _____	
<p>buys valuable time. Additionally, speaking slowly allows...</p> <p><b>TIP 4</b> When checking verbs, keep an eye out for <b>modals</b>. They will give you a clue as to what verb form should be used.</p>	4 _____	

*Scan the QR code on Page 16 of the booklet to check if you have identified the errors in each sentence and derived the correct answer.*

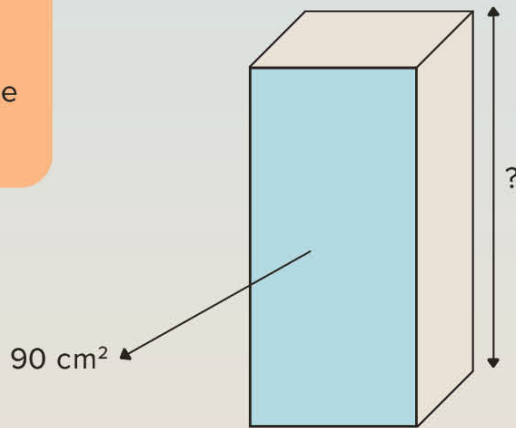
# IS THIS PRIMARY 6 QUESTION FAMILIAR?

## Volume

The figure below shows a square-based cuboid with a base area of  $36 \text{ cm}^2$ . The area of the shaded face is  $90 \text{ cm}^2$ . Find the height of the cuboid.

**Primary:**

Simple application of formula of area of a rectangle to work out the height of the cuboid.



### What are the differences?

Primary 6	Secondary 1
Volume and surface area of cubes and cuboids	Volume and surface area of cubes, cuboids, cylinders and other prisms
Simpler context with 1 topic (Volume and Surface Area) tested  Solve for the answer	Longer context with multiple topics (Volume and Surface Area, Rates and Percentage) tested  Solve and explain the answer



## CHALLENGE YOURSELF TO SOLVE THIS SECONDARY 1 QUESTION!

### Volume and Surface Area

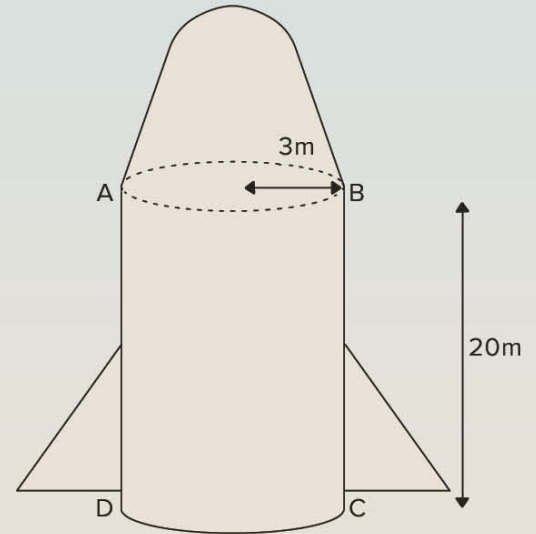
A space agency, named Telska, is planning to cover the **exposed surface areas of the cylindrical part** of their rocket, Telska-123, with a special heat-resistant material. The cylindrical part of the rocket, marked out by ABCD, has a height of 20 metres and a radius of 3 metres.

#### Question analysis:

While the surface area of a cylinder will include the curved surface area and twice the area of the circular base, here, the circular base is accounted for only once. This is shown in the given diagram, as well as the phrase 'exposed' in the problem.

#### Formula:

Curved surface area of cylinder =  $2\pi rh$   
(where  $r$  = radius and  $h$  = height)



Company A and Company B are competing to provide this service to Telska. The details are as follows:

Company A	Coverage at a rate of \$50 per square metre, <b>nett price.</b> <b>No additional discount</b>
Company B	Coverage at a rate of \$60 per square metre, with an additional 18% discount if total amount (before discount) is above \$26 000.

**Question analysis:**  
Company A might seem cheaper (based on price per square metre) but more calculations for Company B is needed to check the actual amount of discount, if any at all.

Assuming that the material and quality is the same between the two companies, **explain** which company Telska should choose, given that **cost savings** is an important factor in this decision.

**Decision made based on the lowest price.**

#### Secondary:

You are required to provide an explanation for the final answer. You have to work out the difference in the costs of both companies to determine which is the cheapest option.

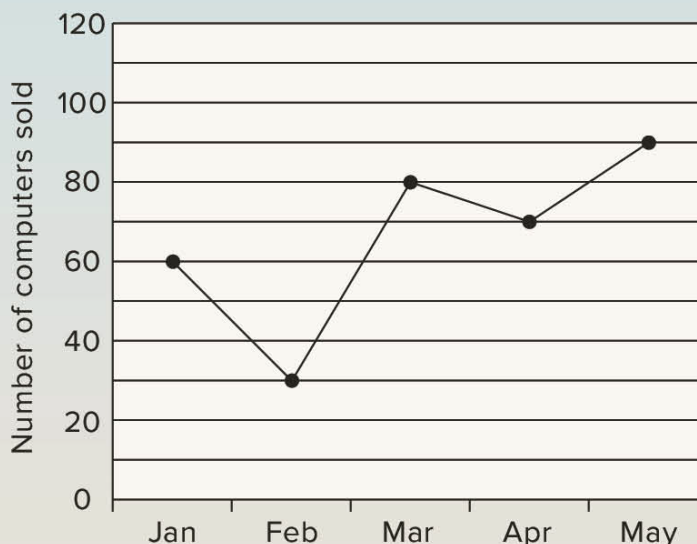
Scan the QR code on Page 16 of the booklet to find out if you got the correct worked solution and explanation.

# IS THIS PRIMARY 6 QUESTION FAMILIAR?

## Line Graph

The line graph below shows the sale of computers in an electronic store from January to May.

**Primary:**  
Read the values of selected points to answer the questions.



- Between which **2 months** was there a **greatest increase** in the sale of computers?
- In which **month** was the sale of computers  $\frac{1}{3}$  that of May?

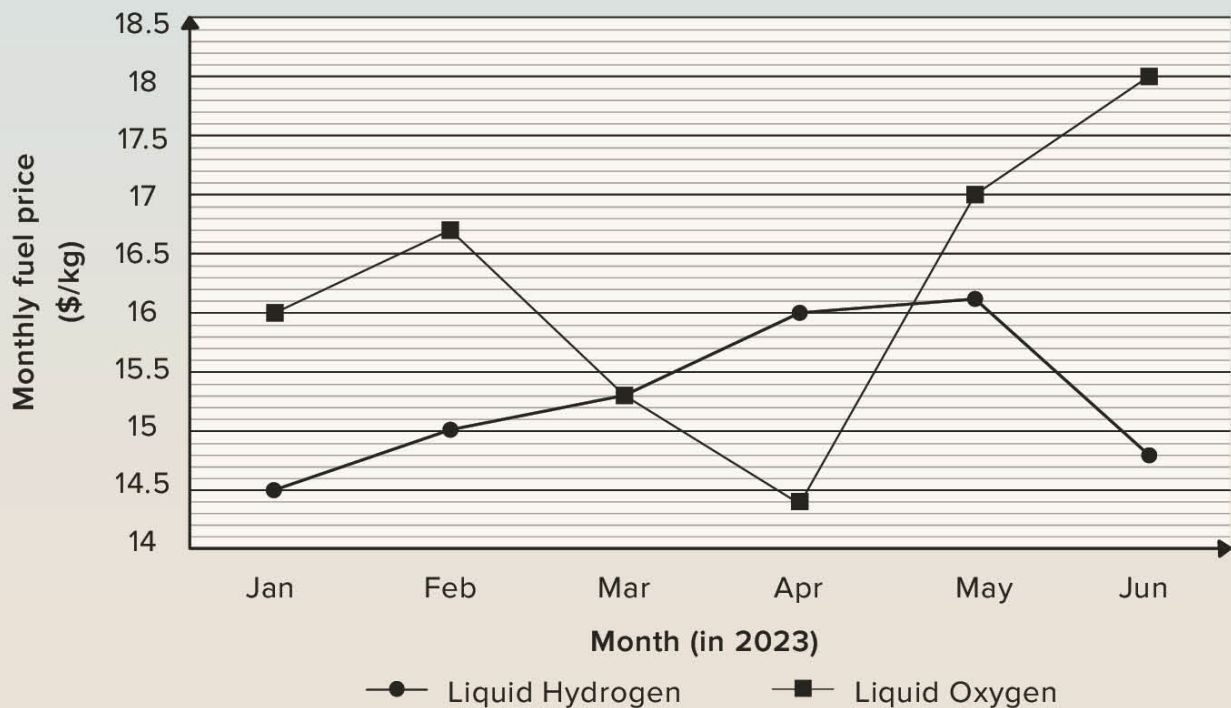
### What are the differences?

Primary 6	Secondary 1
Reading and interpreting bar graphs, line graphs and pie charts	Reading and interpreting new statistical diagrams such as dot diagram, stem-and-leaf diagram and histogram
Reading values off the graph to calculate required answers	Using given data to explain the answer to the question  Question involves new terminology and deeper understanding of averages and statistical data (mean, mode and median)

# CHALLENGE YOURSELF TO SOLVE THIS SECONDARY 1 QUESTION!

## Statistics

The following graph represents the monthly fuel prices, taken at the start of the month, of two different types of fuel for rockets, liquid oxygen, and liquid hydrogen from January to June 2023.



**Question analysis:**  
Definition of mean: average

**a. Secondary:**  
Read the values of all points. The question also requires you to use the values to calculate the mean.

- Calculate the mean monthly pricing of each type of fuel.
- By using your answer in part a, determine which fuel is more value for money to power Telska-123, assuming that you can only select one type of fuel in these six months.

**Question analysis:**  
More value for money indicates getting more fuel for less cost. With a changing monthly price, we can use the lower mean pricing to determine the cheaper fuel.

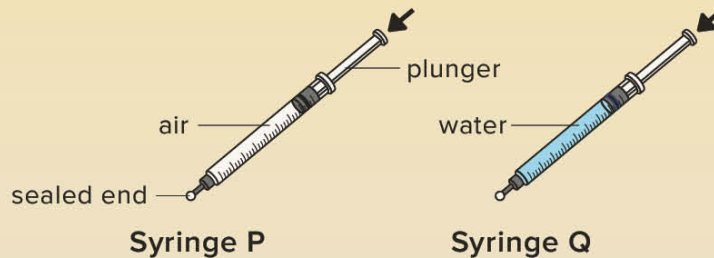
Scan the QR code on Page 16 of the booklet to find out if you got the correct worked solution and explanation.

# IS THIS PRIMARY 6 QUESTION FAMILIAR?

## Matter

**Primary:**  
Identify and explain which states of matter can be compressed.

Xenon had two identical syringes, P and Q. He filled Syringe P with air and Syringe Q with water. One end of each syringe was sealed. He then tried to push in the plunger of each syringe.



- Was he able to push the plunger of Syringe P in? Explain why.
- Was he able to push the plunger of Syringe Q in? Explain why.

## Water and Changes of State

**Primary:**  
Identify the state of matter at a given temperature.

The table below shows the melting and boiling points of three substances.

Substance	Melting point (°C)	Boiling point (°C)
X	10	80
Y	240	381
Z	-55	0

- Identify the state of each substance at 29 °C.

### What are the differences?

Primary 6	Secondary 1
<p>Observable properties of matter (e.g. whether solids, liquids and gases can be compressed)</p> <p>Determine state of substance at a given temperature</p>	<p>Abstract concepts (e.g. arrangement of particles in matter) to explain the properties of matter</p> <p>Draw the arrangement of particles in a substance based on its state at a given temperature</p>
<p>Each topic covers fewer concepts</p> <p>Only a simple explanation is required in the answer</p>	<p>Each topic covers more concepts (e.g. concepts in Matter and Water and Changes of State are condensed into one topic)</p> <p>The explanation in the answer must be based on a specific theory (e.g. particulate nature of matter)</p>

# CHALLENGE YOURSELF TO SOLVE THIS SECONDARY 1 QUESTION!

## Kinetic Particle Theory

During spacewalks, astronauts need to carry their portable life support systems, which are equipped with oxygen tanks to ensure that they can breathe in space.



portable life support system

**a. Secondary:**  
Explain in greater detail, using particulate nature of matter, why there is a difference in compressibility of different states of matter.

**a. Question analysis:**  
Compressed means that the particles are pushed closer together.

Compare the arrangement of particles at different states.

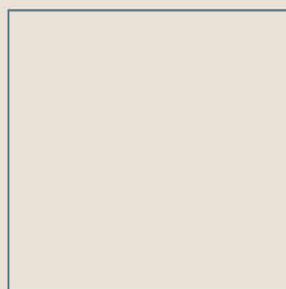
a. Oxygen, which is a gas at room temperature and pressure, is usually compressed when stored in oxygen tanks. Using the **particulate nature of matter**, explain why gases can be easily compressed but liquids and solids cannot.

The table below shows the melting and boiling points of oxygen.

Substance	Melting point (°C)	Boiling point (°C)
Oxygen	-218	-183

**b. Secondary:**  
Requires a **multi-step question analysis process** to derive the answer of the arrangement of particles in a substance at given temperatures.

b. The average temperatures on Mars and Neptune are  $-65\text{ }^{\circ}\text{C}$  and  $-200\text{ }^{\circ}\text{C}$  respectively. Draw the arrangement of oxygen particles at the respective temperatures.



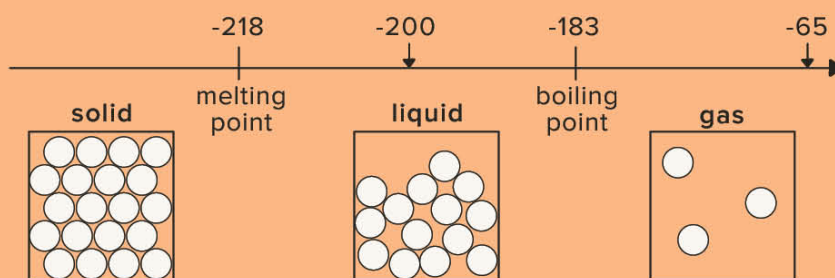
oxygen at  $-65\text{ }^{\circ}\text{C}$



oxygen at  $-200\text{ }^{\circ}\text{C}$

**b. Question analysis:**

Use a number line to determine the physical state of oxygen at the respective temperatures before drawing the arrangement of particles.



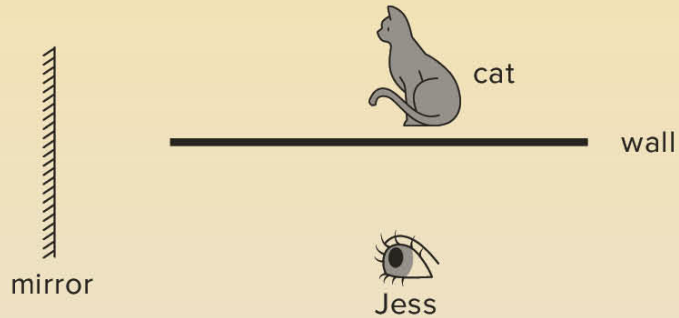
Scan the QR code on Page 16 of the booklet for the correct answers and some notes of the concepts covered!

# IS THIS PRIMARY 6 QUESTION FAMILIAR?

## Light

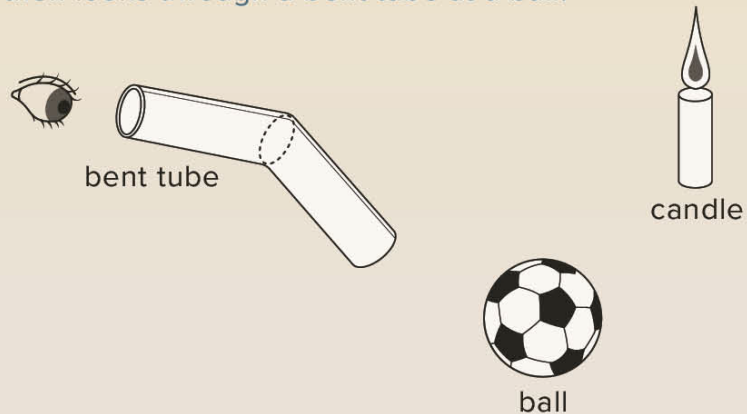
Study the diagram below.

**a. Primary:**  
Draw one light ray from the light source.



- a. Show how Jess is able to see the cat behind the wall by drawing lines to represent the light rays and arrowheads to show the direction in which the light is travelling.

Jess then looks through a bent tube at a ball.



**b. Primary:**  
Describe that light travels in straight lines.

- b. Can Jess see the ball through the bent tube? Explain your answer.

### What are the differences?

Primary 6	Secondary 1
Light travels in straight lines, can be reflected and can be blocked	The laws of reflection The refraction of light The dispersion of light
Draw simple ray diagrams for reflection	Draw detailed ray diagrams for reflection and refraction

# CHALLENGE YOURSELF TO SOLVE THIS SECONDARY 1 QUESTION!

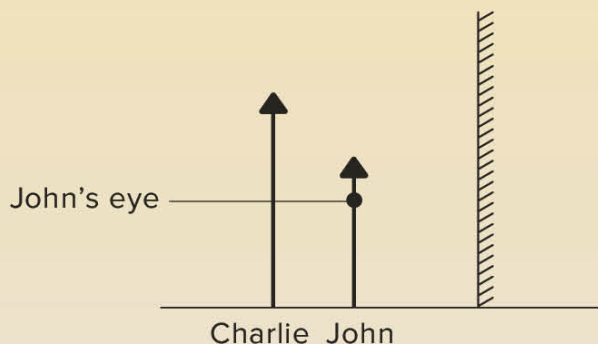
## Light

The diagram below represents John standing in front of a plane mirror with Charlie standing behind him.

**a. Secondary:**  
Draw ray diagrams for plane mirror reflection. Use ray diagrams to describe image properties.

**a. Question analysis:**  
Recall the key steps to draw ray diagrams using the "IRIN" mnemonic – draw:

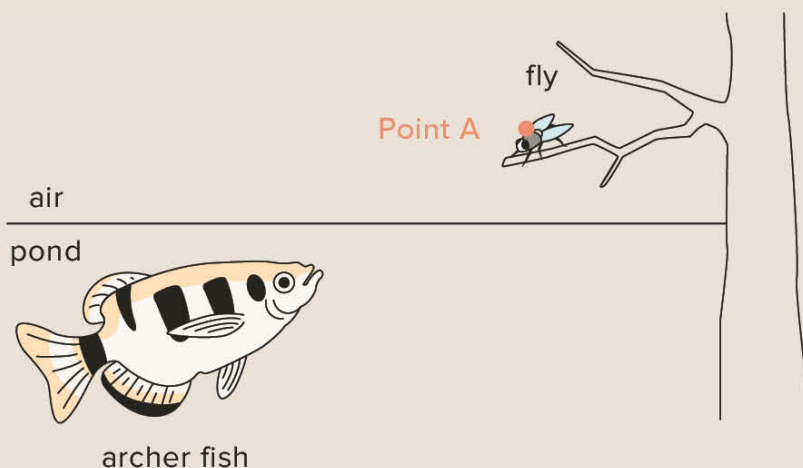
- 1 Image
- 2 Reflected rays
- 3 Incident rays
- 4 Normal lines



- a. Draw Charlie's image and draw a light ray to show how John sees the top of Charlie's head in the mirror.
- b. John sees an archer fish in a pond. The diagram below shows the archer fish and a fly on a tree branch near the water surface.

**b. Secondary:**  
Light can bend (refract) due to the change in the speed of light in different media.

**b. Question analysis:**  
Rays bend towards the normal in an optically denser medium. Recall the concept using the "FAST" mnemonic: "faster – away from normal, slower – towards normal".



- i. Draw two light rays to show how the archer fish sees Point A on the fly. Label the image as A'.
- ii. Hence, explain if the archer fish should aim a stream of water higher or lower than A' in order to hit the fly.

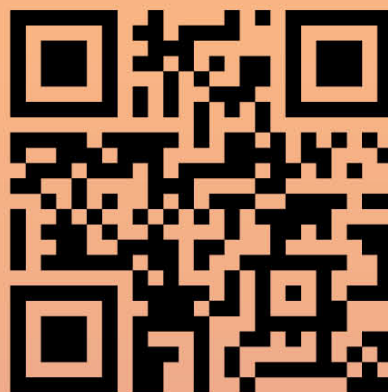


## MISSION ACCOMPLISHED!

Congratulations, voyagers, on your successful completion of the Secondary 1 cosmic challenge!

Did you get everything right?

Check your answers by scanning the QR code below and find out more tips and techniques from our TLL experts on how to ace the topics and components you saw in the booklet.





# EMBARK ON YOUR SECONDARY SCHOOL LEARNING JOURNEY WITH TLL



Empowering learning for the past two decades, TLL has been guiding students at every stage of their learning journey to foster knowledge, skills and the resilience needed to face challenges in both school and life.

With the passion and dedication of our curriculum experts and teachers, we deliver lessons that engage and inspire, while meeting your evolving educational needs.



## NURTURING THE LOVE OF LEARNING

- ◆ We make abstract topics relevant by embedding them in real-world contexts
- ◆ We go beyond rote learning, sparking interest in the subject by approaching issues from different perspectives, nurturing curiosity and equipping you with a wealth of general knowledge



## ATTAINING ACADEMIC EXCELLENCE

- ◆ We nurture a deep understanding of topics by breaking down concepts and teaching you to think critically
- ◆ We help you hone your analytical and problem-solving skills, while equipping you with exam techniques and strategies so you can tackle academic tasks and exams with ease



## ACHIEVING STUDENT PROGRESS AND GROWTH

- ◆ Our teachers provide a safe environment to build your confidence, tracking your progress closely through in-class activities and practice tests at crucial milestones
- ◆ Our teachers provide personalised feedback so you can identify areas of strength and improvement

# WHAT YOU CAN EXPECT IN OUR TLL SECONDARY PROGRAMMES



## EXPOSURE: GROW WHAT YOU KNOW

### Specially curated materials

- ◆ Passages adapted from renowned publications that help you gain global insights
- ◆ Comprehensive notes, concept maps, tutorials and practice tests cover a wide range of question types so that you build a strong foundation

### Active learning

- ◆ In-class discussions that help you build critical thinking and communication skills
- ◆ Hands-on activities (e.g. science experiments) and interactive games and videos that help you to achieve deeper understanding and consolidate your learning



## ANALYSIS AND STRATEGY: SHOW WHAT YOU KNOW

### Question analysis and answer precision

- ◆ Systematic approaches to help you break down questions, analyse them and structure answers in a logical and targeted manner

### Applied learning and problem-solving strategies

- ◆ Exposure to a wide range of application questions in real-world contexts so that you can tackle higher-order thinking questions in exams



## ANSWERING TECHNIQUES: PRESENT WHAT YOU KNOW

### Metacognition (improving thinking processes)

- ◆ Handouts focused on analysing errors that help you identify, understand and avoid common misconceptions and mistakes

### Exam excellence

- ◆ Topical quizzes, revision and practice tests that are given out just in time before the exams to refine your exam skills (e.g. time management) and provide valuable feedback that guides your exam preparation

# OUR SECONDARY PROGRAMMES

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Secondary 1 to 4 English\*

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Secondary 3 and 4 Biology\*

Secondary 3 and 4 Chemistry\*

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*\*courses available for both mainstream and IP students*

*^courses available for specific school clusters:*

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# **THE LEARNING LAB**