

# Parents Learning Fest

Equipping skills to understand and write evidenced-based answers using a variety of Scientific Process Skills



**Punggol Green Primary School**  
**3 February 2018**



# Overview of Sharing

- Learning content
- Aims of Science syllabus
- Use of URL strategy to read and understand Science questions
  - Hands-on Activity
- Feedback

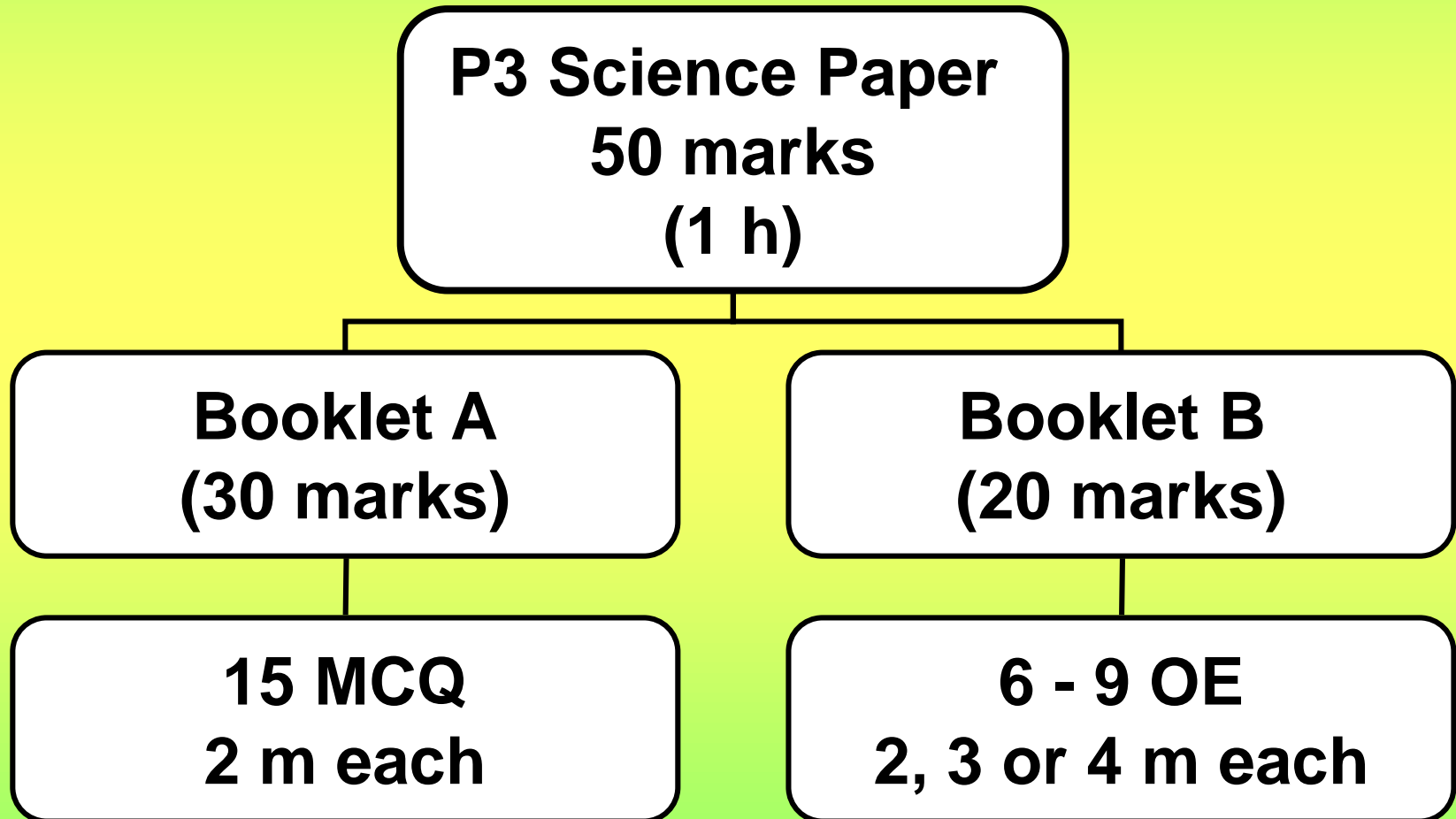
# Learning Content

- Based on 2014 Primary Science Syllabus
- Aims of the Primary Science Syllabus
- 5 themes in Lower Block Science (P3 & 4) – Diversity, Interactions, Cycles, Energy and Systems)
- Focus on 3 areas – (i) Knowledge, Understanding and Application; (ii) Skills and Processes; (iii) Attitudes and Ethics

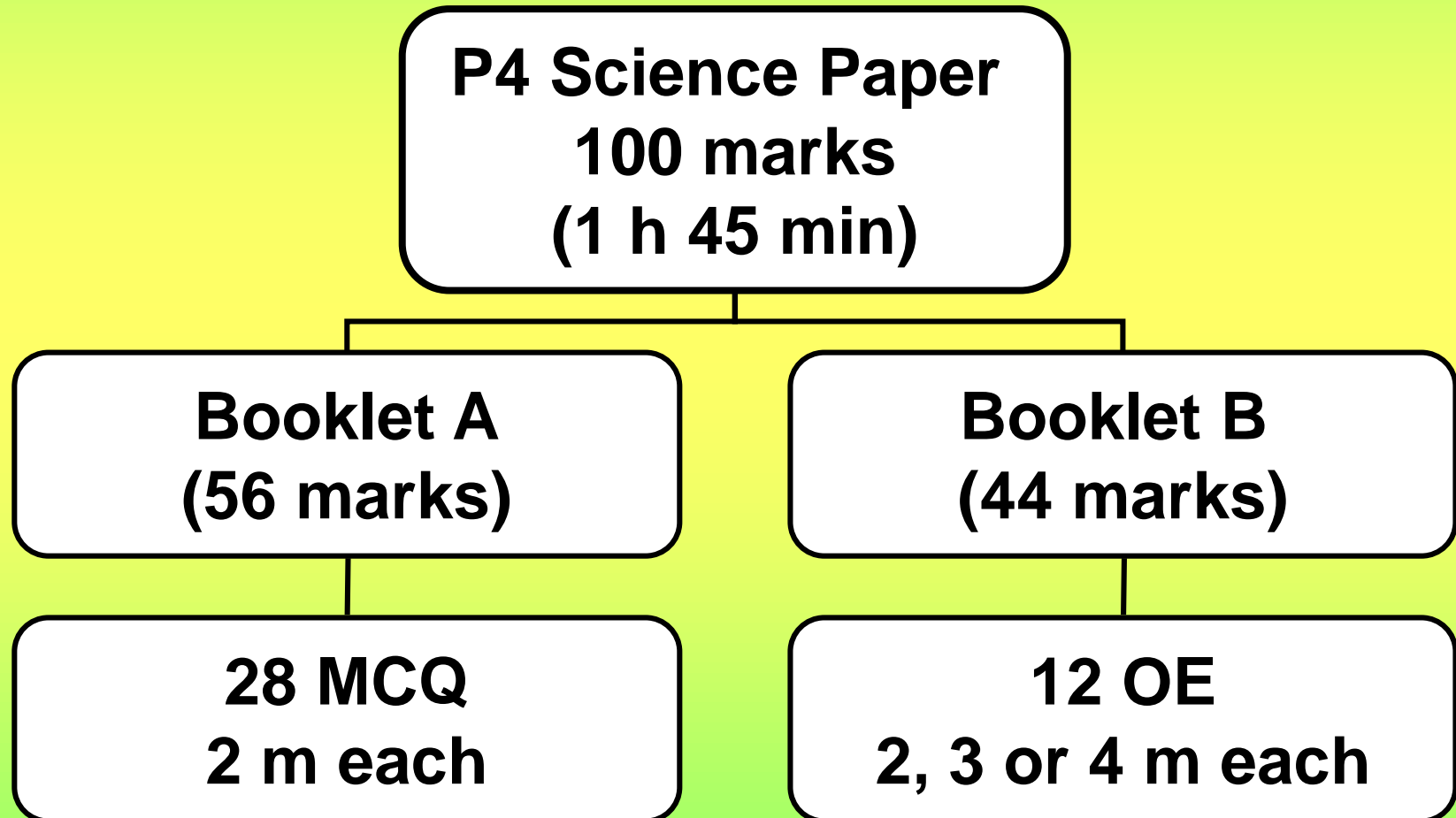
# Aims of Primary Science Syllabus

- Provide primary students with experiences which build on their interest in and **stimulate their curiosity** about their environment
- Provide students with **basic scientific terms and concepts** to help them understand themselves and the world around them
- Provide students with **opportunities to develop skills, habits of mind and attitudes** necessary for scientific inquiry
- Prepare students towards scientific knowledge and methods in making personal decisions
- Help students appreciate how **science influences people** and the environment

# Exam format for Lower Block Science



# Exam format for Lower Block Science



# Breakdown of themes into topics & Sequencing of topics

Theme	Level	Topic
<b>Diversity</b>	<b>P3</b>	1) Living and Non-living things 2) Groups of Living things 3) Materials
<b>Interactions</b>	<b>P3</b>	1) Magnets
<b>Systems</b>	<b>P3</b>	1) Plant System 2) Human Body System
<b>Cycles</b>	<b>P4</b>	1) Life Cycles 2) Matter
<b>Energy</b>	<b>P4</b>	1) Light 2) Heat & temperature

# Process Skills in Science

Observing	Formulating hypothesis
Classifying	Generate possibilities
Comparing	Predicting
Communicating	Evaluating
Inferring	Analyzing
Measuring & using apparatus	



# Helping children to remember Science

- Use of mindmaps & diagrams as a revision tool
- Remember science facts using catchy phrases and acronyms
- Learn to spell and use the important content words
- Encourage children to ask questions actively
- Write short notes next to the questions, underline key words such as 'explain', 'suggest'

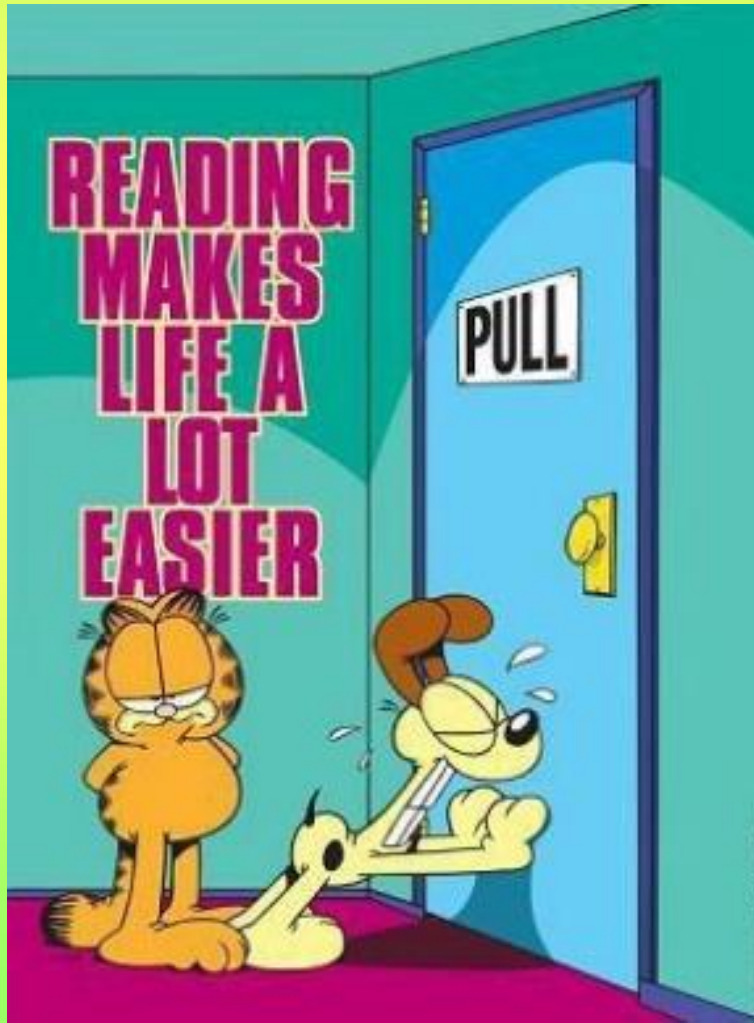


# Tips

## Open-Ended Science questions

- Identify the topic the question is addressing
- Run through the key concepts learnt quickly
- Read the question and identify the purpose of the question (which process skill?)
- Plan your answer and write your answer clearly, using specific words
- Read again to check if you have answered the questions adequately.

# Introduction: Science literacy.

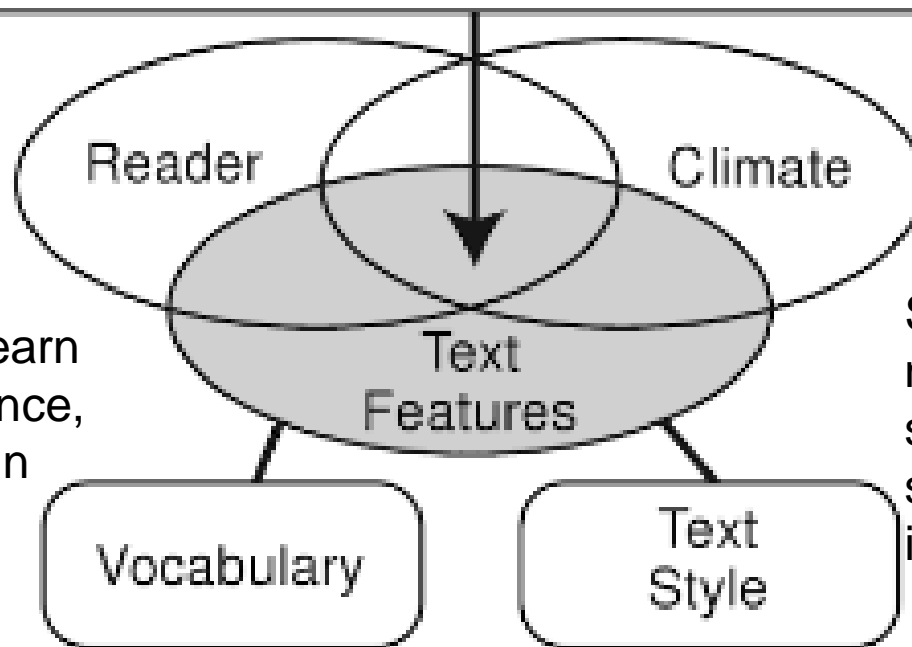


Although everyone can read and many can read very well...

... few can use reading for science!

# Why do even strong English readers flounder (initially) in science?

## Three Interactive Elements of Reading



How to help students learn new vocabulary in science, vocab that is not used in daily conversation?

Science text is clearly not narrative in style, so how should students understand it?

# Text features to take note of when reading science questions

Vocabulary unique to science

Vocabulary with different meanings when used in science

Interpret scientific diagrams and symbols

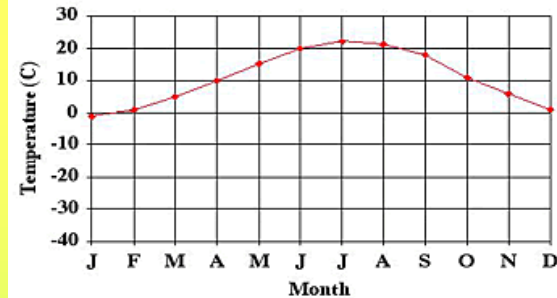
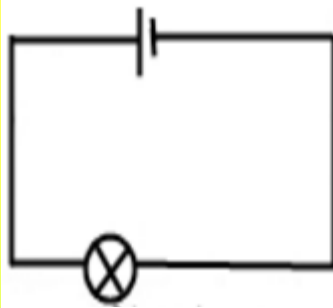
Infer and recognise cause-and-effect relationships

Infer main ideas and draw conclusions

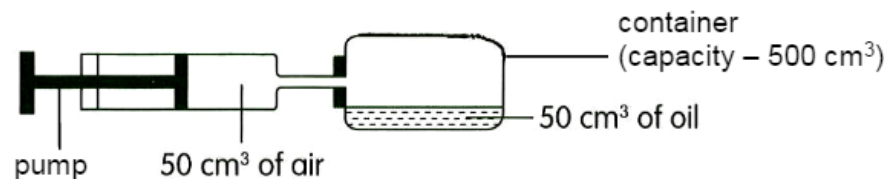
Use deductive and reasoning skills

Hypothesis. Pollination. Fertilisation.

Light. Population. Cycle.



Tina has a container with a capacity of  $500 \text{ cm}^3$  and it contains  $50 \text{ cm}^3$  of oil. She pumps  $50 \text{ cm}^3$  of air into the same container with one stroke of the pump.

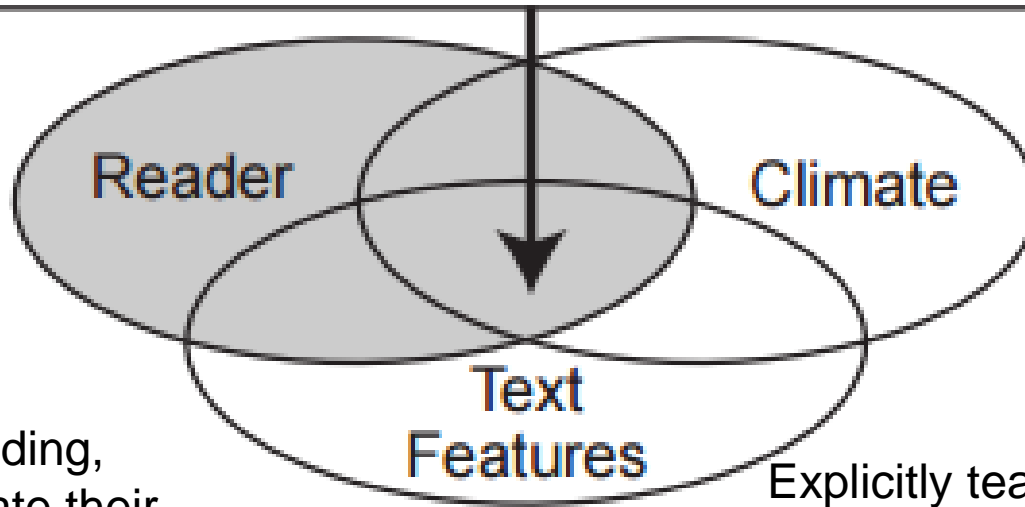


What will be the volume of air in the container?

[1m]

# Can students identify features in Science qns? The Role of the reader (student)

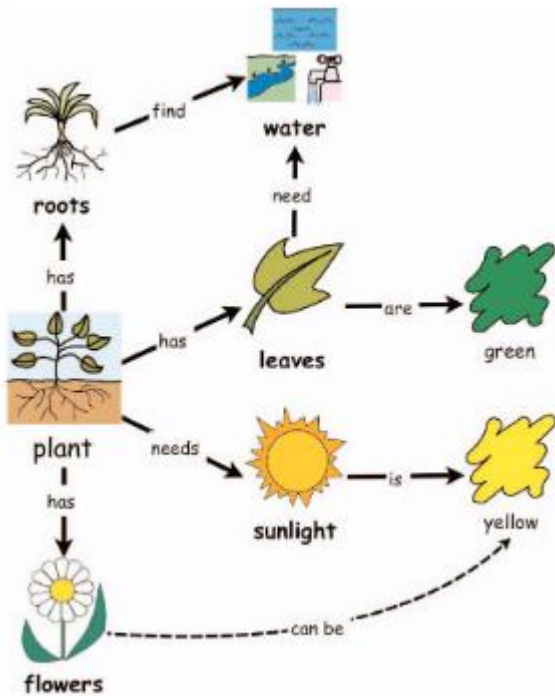
## Three Interactive Elements of Reading



Through active reading, students can activate their prior knowledge.

Explicitly teach students to spot clues in the text, such as **bold words**, words on skills like “observe” and “compare” etc.

# Teachers use many ways to deepen Science literacy such as...



Semantic Mapping is effective in teaching vocab (Olson & Gee, 1991; Pearson & Johnson, 1976)

Peacock Flower  
how is the peacock flower?

stigma  
anther  
petals

It is pollinated by (1)  
The anther and stigma are long and they extends outside the petals. This allow (3) to carry the (2) to the (4)

answer: (1) wind  
(2) & pollen grains  
(3) the wind  
(4) stigma

Learning Log to enhance science literacy, which includes matching diagrams to vocab (J Deaf Stud

leaves  
soil  
roots

taller  
more  
Fruits (Flowering) plant

Annotation helps to promote model-based reasoning (Quilin & Thomas, 2015)

# when students know **how** to read...

- ...they attempt science questions with confidence.
- There are different types of science questions.
- Some questions test science knowledge.
- Some test concepts.
- Others test skills and processes.

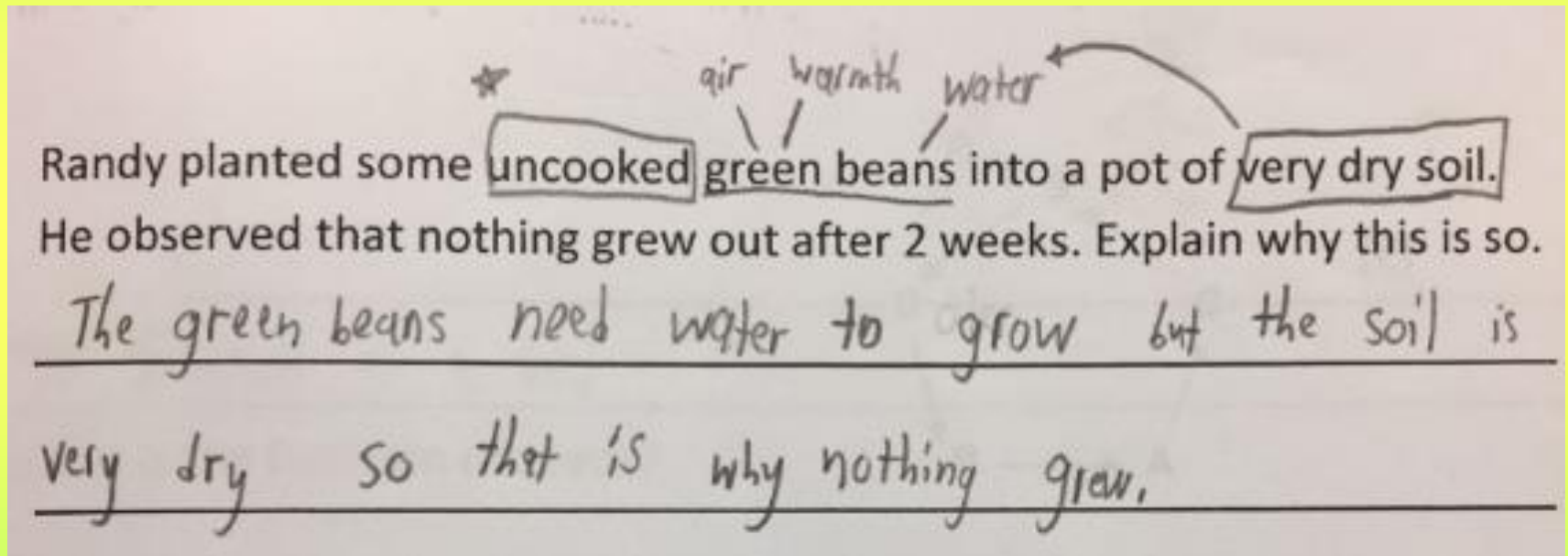


# Varied Presentation of Questions

Knowledge, Understanding and Application	Skills and Processes
<ul style="list-style-type: none"> <li>• Scientific phenomena, facts, concepts and principles</li> <li>• Scientific vocabulary, terminology and conventions</li> <li>• Scientific instruments and apparatus including techniques and aspects of safety</li> <li>• Scientific and technological applications</li> </ul>	<p><i>Skills</i></p> <ul style="list-style-type: none"> <li>• Observing</li> <li>• Comparing</li> <li>• Classifying</li> <li>• Using apparatus and equipment</li> <li>• Communicating</li> <li>• Inferring</li> <li>• Formulating hypothesis</li> <li>• Predicting</li> <li>• Analysing</li> <li>• Generating possibilities</li> <li>• Evaluating</li> </ul> <p><i>Processes</i></p> <ul style="list-style-type: none"> <li>• Creative problem solving</li> <li>• Decision-making</li> <li>• Investigation</li> </ul>

- Questions have to be presented in many forms in order to assess different kinds of skills and processes.
- Today, we will focus on 3 types of questions.

# Today's session is on the use of the strategy known as url



Randy planted some uncooked green beans into a pot of very dry soil.  
He observed that nothing grew out after 2 weeks. Explain why this is so.

The green beans need water to grow but the soil is  
very dry so that is why nothing grew.

Annotations: A star is above 'uncooked'. 'air', 'warmth', and 'water' are written above 'green beans' with lines pointing to it. An arrow points from 'very dry soil' to 'water'.

What is URL?

# “U.R.L.” as an active reading strategy

**U**nderline → Trigger words

**R**ead → Text, Tables, Graphs, Pictures

**L**ist → related concepts/facts



Recall **concepts/facts**



Apply **concepts**

# How do we proceed from here?

- We will share the outline of 3 types of questions.
- After that, you get to practice solving these 3 types of questions so you can apply what you have heard.
- The Teachers Facilitators at your table will guide you through. Feel free to ask them anything!

# 1. COMPARING SKILLS

This is the skill of identifying the **similarities** and **differences** between two or more objects, concepts or processes.

**U**nderline

**R**ead

**L**ist

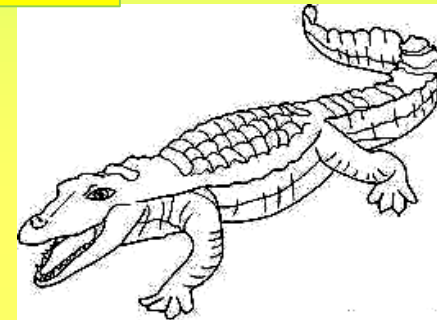
List observable characteristics from diagrams

Do not compare their  
Shape,  
Colour and Size.

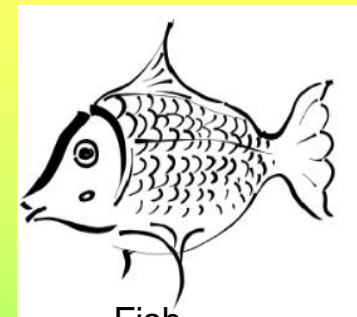
Based on diagrams only,

(a) State one similarity  
between the 2 animals.

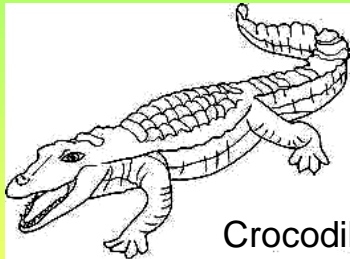
(b) State one difference  
between the 2 animals.



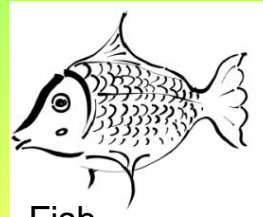
Crocodile



Fish



Crocodile

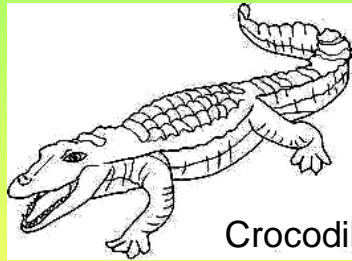


Fish

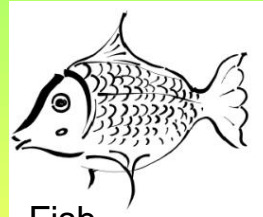
For similarities and differences, **DO NOT** accept characteristics that cannot be **observed** here, for e.g.:

- Both can swim.
- Both can be found in water.
- Crocodile lay eggs on land while fish lay eggs in water

Although all these characteristics may be true about the animals, they are not observable from the diagrams.



Crocodile



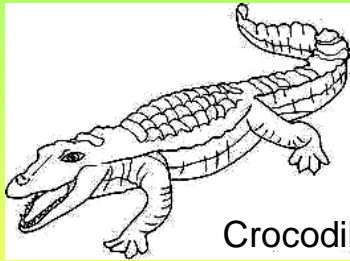
Fish

(a) State one **similarity** between the 2 animals.

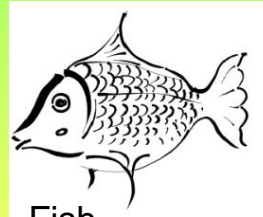
Possible Answers:

- Both have scales as their body covering.
- Both have tails
- Both have mouth





Crocodile



Fish

(b) State one **difference** between the 2 animals.

Possible Answer:

- Crocodile has legs but fish has fins

Do not accept:

Crocodile has legs while fish does not have.

-- In this question, the answer will be clearer to state what each of the animal has to ensure that the answer is more specific.

## 2. ANALYSING AND INFERRING : FLOW CHART

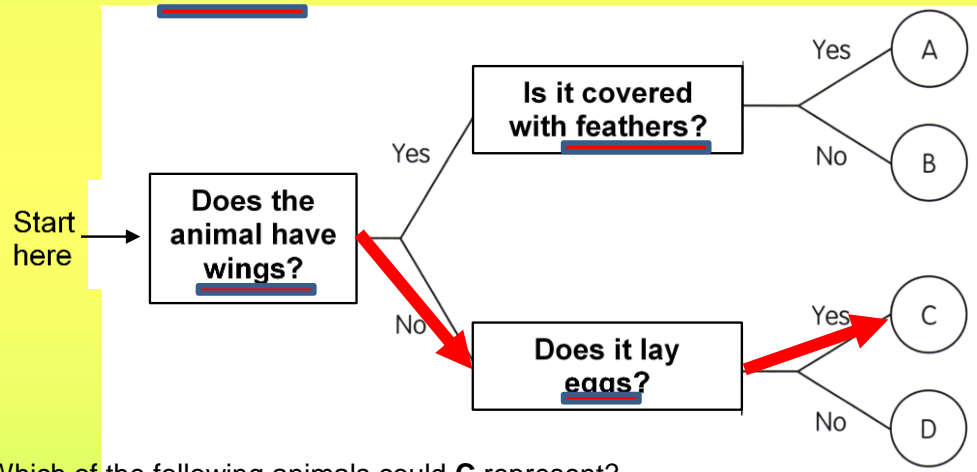


**Analysing** is the skill of identifying the parts of objects, information or processes, and the **patterns** and **relationships** between these parts.

**Inferring** is the skill of interpreting or **explaining** observations or pieces of data or information.

# Concept: Diversity of Animals – Characteristics of Animals

Refer to the flowchart below.



**U**nderline  
**R**ead  
**L**ist

Which of the following animals could C represent?

( 1 ) Clownfish



( 2 ) Whale



( 3 ) Bat

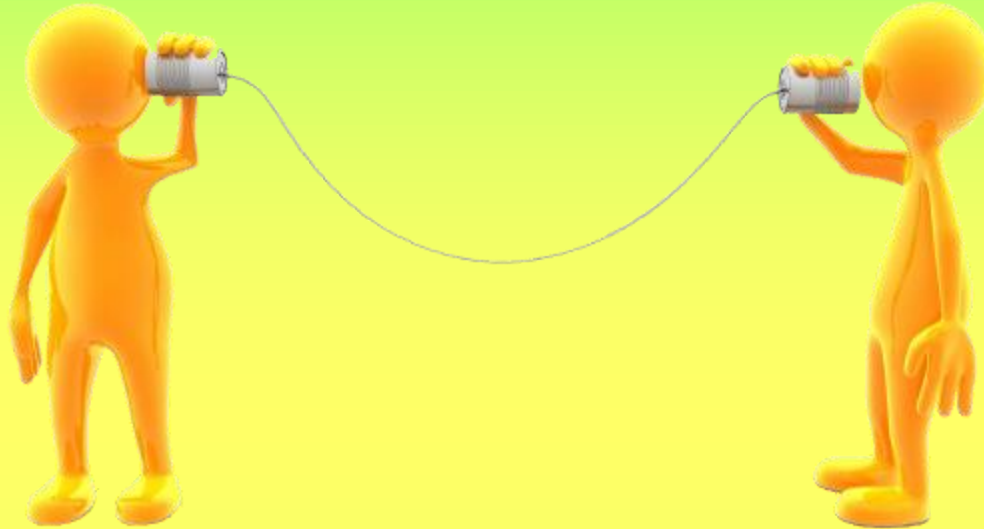


( 4 ) Penguin



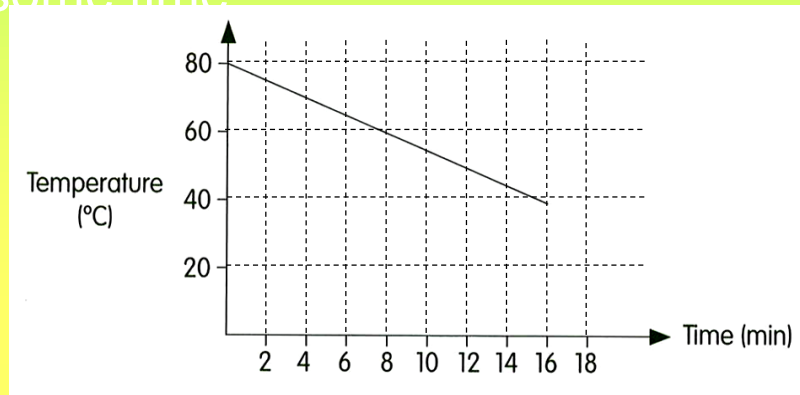
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# 3. COMMUNICATION SKILLS - GRAPH



This is the skill of **transmitting and receiving information** presented in various forms – written, verbal, pictorial, tabular or graphical.

Nabil places a cup of hot tea on the table in a room. The temperature of the room is at 28°C. The graph below shows the changes in temperature of the tea over some time



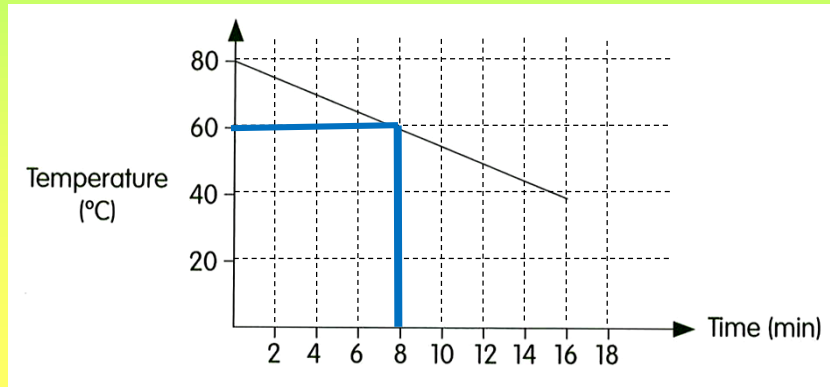
**U**nderline

**R**ead

**L**ist

Concept: Heat flows from higher temperature to lower temperature

Nabil places a cup of hot tea on the table in a room. The temperature of the room is at  $28^{\circ}\text{C}$ . The graph below shows the changes in temperature of the tea over some time.



- ( a ) The temperature of the tea at 8 minutes is 60  $^{\circ}\text{C}$ .  
( b ) Predict the temperature of the tea after 5 hours.  
28  $^{\circ}\text{C}$ .  
( c ) Explain your prediction in (b).

The question stated that the room temperature was  $28^{\circ}\text{C}$ .

Heat flows from a place of **higher temperature** to a place of **lower temperature** until both places are at the same temperature.

The cup of hot tea **loses heat to its surroundings** until it is at the same temperature as its surroundings or **room temperature**.

**HANDS ON ACTIVITY**

**YOU WILL TRY 3 QUESTIONS.**

# 3 Types of Science Questions

Comparing Skill	Analysing and Inferring	Communication Skills
This is the skill of identifying the <b>similarities</b> and <b>differences</b> between two or more objects, concepts or processes.	<b>Analysing</b> is the skill of identifying the parts of objects, information or processes, and the <b>patterns</b> and <b>relationships</b> between these parts.  <b>Inferring</b> is the skill of interpreting or <b>explaining</b> observations or pieces of data or information.	This is the skill of <b>transmitting and receiving information</b> presented in various forms – written, verbal, pictorial, tabular or graphical.



# Resources to help your child

- Online resources to deepen and broaden pupils' knowledge
  - (i) Sciberdiver (<http://www.sciberdiver.edu.sg>)
  - (ii) LMS platform – AsknLearn  
(<http://lms.asknlearn.com/PGPS/Logon>)
  - (iii) National Geographic  
(<http://www.nationalgeographic.com>)
- Other materials to consider
  - you-tube videos (must screen through)