



# Tips to Support Children's Science Learning

**A Garden where Scholars Bloom**



# Content

- **T**eaching and Learning of Science @ SLPS
- **S**tudent Learning Experiences
- **S**upporting Children's Science Learning

**A Garden where Scholars Bloom**



# Teaching and Learning of Science

- **Three areas** to master:

## Knowledge (Content)

Students need to know and understand:

- (a) Scientific facts, concepts and principles
- (b) Scientific terminology and conventions
- (c) Scientific instruments and apparatus

## Process Skills

Students need to know how to:

- (a) Interpret information (including pictorial, tabular and graphical)
- (b) Investigate using one or a combination of process skills

## Application of Knowledge and Process Skills

Students need to apply scientific facts, concepts and principles to new situations.



**A Garden where Scholars Bloom**



# Teaching and Learning of Science

## ▪ An example of **Knowledge** (Content)

### **Knowledge (Content)**

Students need to know and understand:

- (a) Scientific **facts, concepts** and principles
- (b) Scientific terminology and conventions
- (c) Scientific instruments and apparatus

### One of the facts/concepts about Heat:

- What is a good conductor of heat?
- What is a poor conductor of heat?

Metals allow heat to flow through them easily.  
They are called **good conductors of heat**.

Materials like air, plastic, rubber and wood do not allow heat to flow through them easily.  
They are called **poor conductors of heat**.

The metal body is a **good conductor of heat**.



The plastic handle is a **poor conductor of heat**.

**# 2.2.4**  
**Conductors of Heat**

**A Garden where Scholars Bloom**



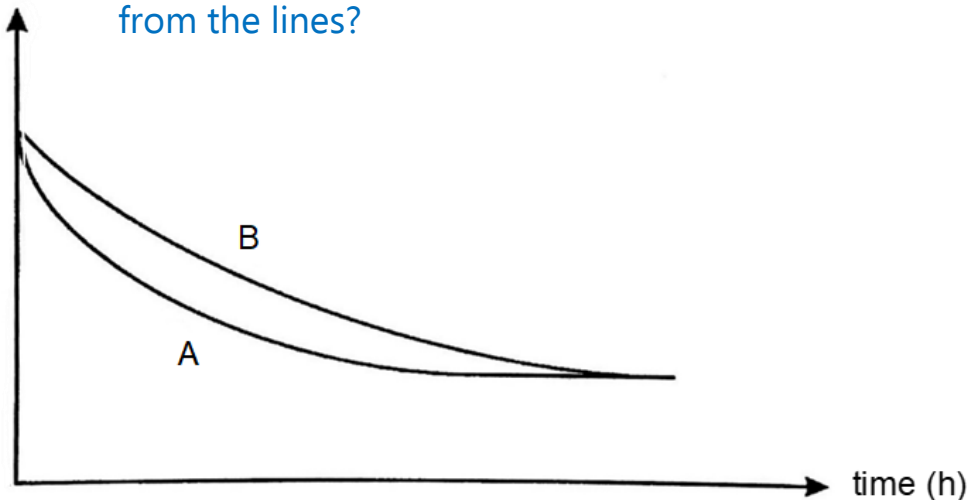
# Teaching and Learning of Science

- An example of using **Process Skills to interpret**

## Interpreting information:

- What trend can you **observe**?
- Compare lines A and B. What can you **infer** from the lines?

temperature of  
liquid X ( $^{\circ}\text{C}$ )



## Process Skills

Students need to know how to:

- (a) **Interpret information** (including pictorial, tabular and graphical)
- (b) Use one or a combination of process skills to investigate.

**A Garden where Scholars Bloom**



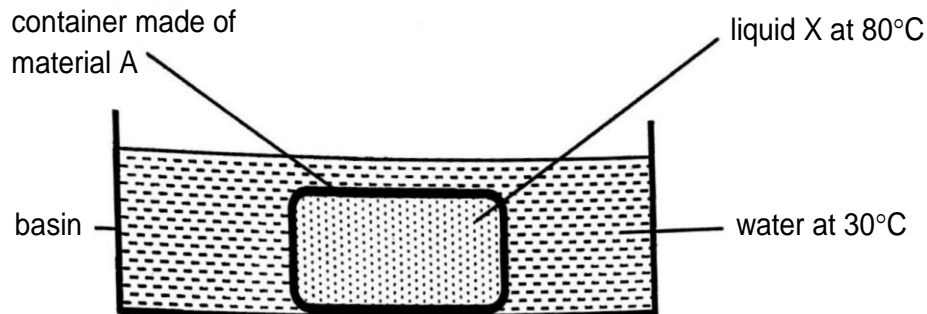


# Teaching and Learning of Science

- An example of **applying Knowledge and Process Skills**

An application question would include an experimental set-up...

Janice conducted an experiment using the set-up below.



She measured the temperature of liquid X in the container over a period of time. She repeated the experiment using a container made of material B. Her results are shown in the graph below.

## Application of Knowledge and Process Skills

Students need to apply scientific facts, concepts and principles to new situations.

**A Garden where Scholars Bloom**

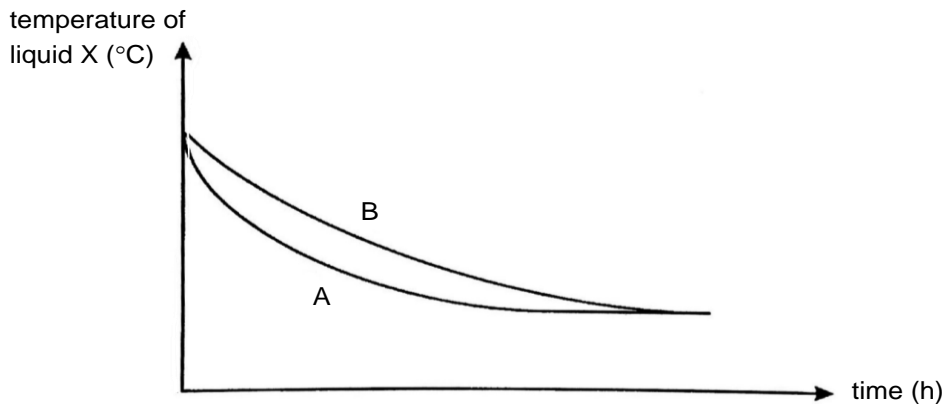


# Teaching and Learning of Science

- An example of **applying Knowledge** and **Process Skills**

...results of the experiment would be given.

She measured the temperature of liquid X in the container over a period of time. She repeated the experiment using a container made of material B. Her results are shown in the graph below.



## Application of Knowledge and Process Skills

Students need to apply scientific facts, concepts and principles to new situations.

**A Garden where Scholars Bloom**



# Teaching and Learning of Science

- An example of **applying Knowledge** and **Process Skills**

**Application of knowledge and process skills:** Students need to use the information from the results to identify the materials that are more suitable for making containers to keep food hot and cold.

Janice wanted to bring hot food and cold drinks for a school trip. She wanted to keep the food hot and the drinks cold. Which material(s) would be more suitable for the containers?

## **Application of Knowledge and Process Skills**

Students need to **apply** scientific facts, concepts and principles to **new situations**.

**A Garden where Scholars Bloom**





# Teaching and Learning of Science

- An example of **applying Knowledge and Process Skills**

To do this, students need to apply the knowledge of heat and infer from the graph as mentioned earlier

**One of the facts/concepts about Heat:**

- What is a good conductor of heat?
- What is a poor conductor of heat?

Metals allow heat to flow through them easily. They are called good conductors of heat.

Materials like air, plastic, rubber and wood do not allow heat to flow through them easily. They are called poor conductors of heat.

**Conductors of Heat # 2.2.4**

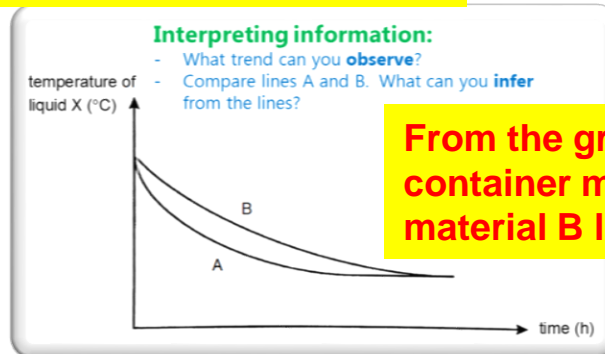
The metal body is a good conductor of heat.

The plastic handle is a poor conductor of heat.

So, material B is a poorer conductor of heat and is a more suitable material.

**Application of Knowledge and Process Skills**

Students need to apply scientific facts, concepts and principles to new situations.



From the graph, liquid in the container made from material B lost heat slower.

**A Garden where Scholars Bloom**



# Teaching and Learning of Science

- **Three areas** to master:

## Knowledge (Content)

Students need to know and understand:

- (a) Scientific facts, concepts and principles
- (b) Scientific terminology and conventions
- (c) Scientific instruments and apparatus

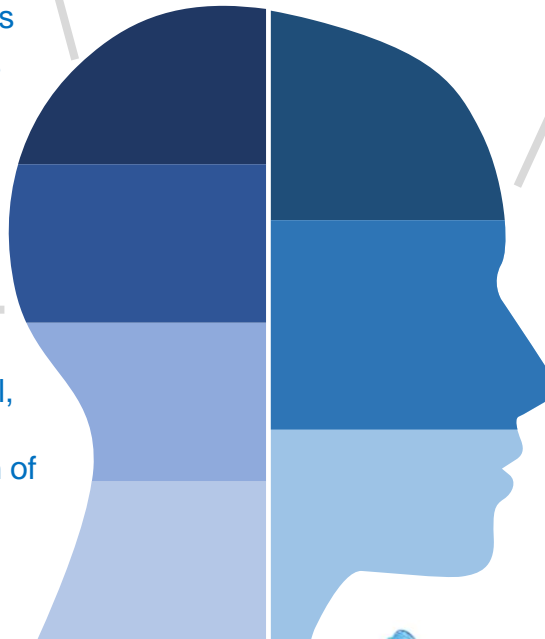
## Process Skills

Students need to know how to:

- (a) Interpret information (including pictorial, tabular and graphical)
- (b) Investigate using one or a combination of process skills

## Application of Knowledge and Process Skills

Students need to apply scientific facts, concepts and principles to new situations.



**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

Engage Students



Develop Student Understanding



Provide opportunities for Practice, Review and Revision



Use strategies to support student learning





# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

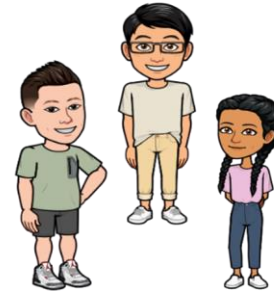
## Engage Students

Use case studies/stories to **promote thinking and discussion**



### Engagement

Alex, Borhan and Chrika met up at Admiralty Nature Park. One of their classmates told them that there were a few types of strange-looking round objects in the park. They could not wait to find out what those objects were!



What do you think those objects are?

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

## Engage Students

Design **tasks** that allow students to **apply knowledge** and **process skills**



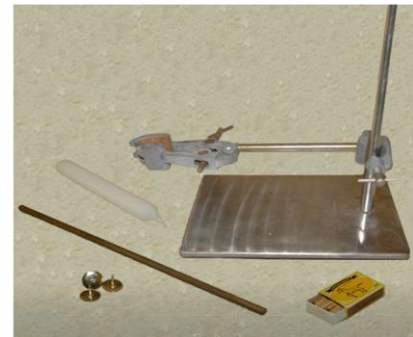
Engagement



### Quiz Time!

Mr Tan wanted to find out how heat flows in an object. He had 3 thumbtacks, a candle, a retort stand and a box of matches.

Can you help him design the experiment? What would be the changed variable?



**A Garden where Scholars Bloom**





# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

## Engage Students

Offer programmes that **stretch students' minds**



- ▶ **Excellence 2000 (E2K)** to cater to selected students – students engaging in scientific investigations to discover and deepen their understanding of advanced science concepts through an inquiry approach
- ▶ Enrichment classes – students (AL4 & AL5) being exposed to **questions that focus on data interpretation**; uncovering and explaining data trend

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?



## Develop Student Understanding

Carry out **hands-on investigations** to explore concepts

Use **questions** to deepen learning

Provide **clear explanation** and address misconceptions

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?



## Quiz Time!

Ahmad stores his cold drinks in a cooler box as shown.



How does the cooler box help keep the cold drinks cold for the longest time?

Extension



## Develop Student Understanding

Provide opportunities for students to **apply knowledge to authentic settings to deepen learning**

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

**Provide opportunities for Practice, Review and Revision**

**Provide wrap-up and sense-making opportunities in addition to workbook**

**Highlight technical vocabulary and phrases.**



## MCQ Companion

SI LING PRIMARY SCHOOL  
MCQ Companion  
Primary 5 Science  
TOPIC: Reproduction in Plants and Humans

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Class: 5 \_\_\_\_\_

For each question from 1 to 15, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4). Write the correct answer in the bracket given.

1. Ann wanted to find out if a fruit would develop when a certain part of a flower was removed. Three similar flowers P, Q and R with different parts removed are shown in the diagrams below.

Flower P

Flower Q

Flower R

Ann put pollen grains from the same species of flowers on the three flowers.  
Which flowers would most likely develop into a fruit?

(1) P and Q only  
(2) Q and R only  
(3) P and R only  
(4) P, Q and R

## Science Process Skills

SI Ling Primary School  
Science Process Skills  
Primary Five  
TOPIC: Reproduction in Plants and Humans

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Class: \_\_\_\_\_

1. John went on a field trip to collect some fruits and seeds samples of three different plants, A, B and C. He made a record of the locations where he found the samples in the map below.

Observe the seed shown in the diagram below.

**A Garden where Scholars Bloom**





# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

Provide opportunities for  
Practice, Review and  
Revision

Monitor student  
understanding



## Concept Mastery

Si Ling Primary School  
Concept Mastery 2  
Primary Five Science  
TOPIC: Reproduction in Plants and Humans

Name : \_\_\_\_\_ ( )

Class : 5 ( )

Date : \_\_\_\_\_

Parent's Signature: \_\_\_\_\_

12

For each question from 1 to 3, four options are given. One of them is the correct answer. Make your choice (1, 2, 3 or 4). Write the correct answer in the bracket given. (6 marks)

1. The diagram shows two flowers.

Pollination takes place when pollen grains are transferred from \_\_\_\_\_.

(1) A to B  
(2) C to D  
(3) C to E  
(4) none of the above

( )

**A Garden where Scholars Bloom**





# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

**Provide opportunities for Practice, Review and Revision**



Provide **extra support** for identified students.

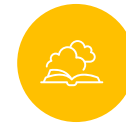
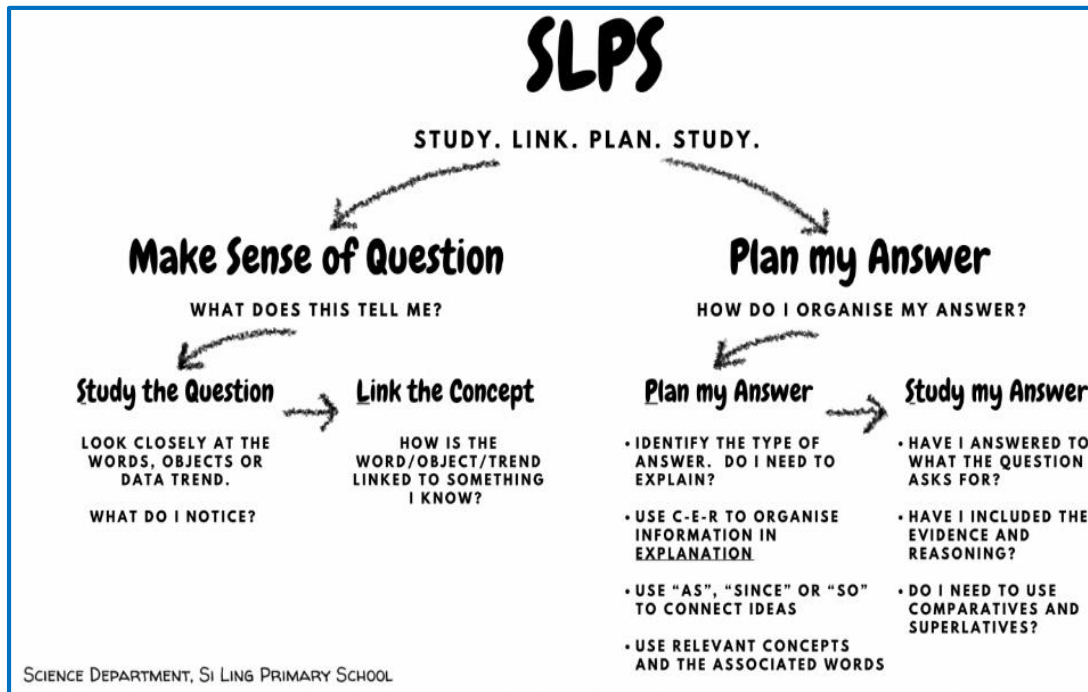
- ▶ Remediation classes – to bridge identified learning gaps

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?



Use strategies to support student learning

Use **SLPS strategy** to guide students ace in **answering open-ended questions**

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?

**CER**  
CLAIM. EVIDENCE. REASONING.



**Explanation**  
EXPLAIN WHY, GIVE A REASON WHY

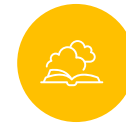
**Claim** + **Evidence** + **Reasoning**

**Claim**  
WHAT IS MY ANSWER?  
WHAT OBSERVATION WAS MADE?

**Evidence**  
WHAT DO I SEE OR KNOW  
THAT MAKES ME STATE  
THE CLAIM?

**Reasoning**  
WHICH CONCEPT TELLS  
ME THAT THE EVIDENCE  
MAKES THE CLAIM  
CORRECT?

SCIENCE DEPARTMENT, SI LING PRIMARY SCHOOL



Use strategies to support student learning

Use **CER strategy** to guide students **construct science explanations**

Your teacher will show you two leaves, A and B. The leaves were taken from a plant exposed to sunlight for two days. The tip of leaf B has been cut off for identification.

**C: Leaf B**  
B: Leaf B is exposed to sunlight as it is not covered with black paper.  
A: Leaf B is able to photosynthesize and produce sugar which is stored as starch.

leaf B - is exposed to sunlight -> can photosynthesize  
leaf A (covered with black paper) -> blocks light -> cannot photosynthesize

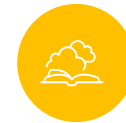
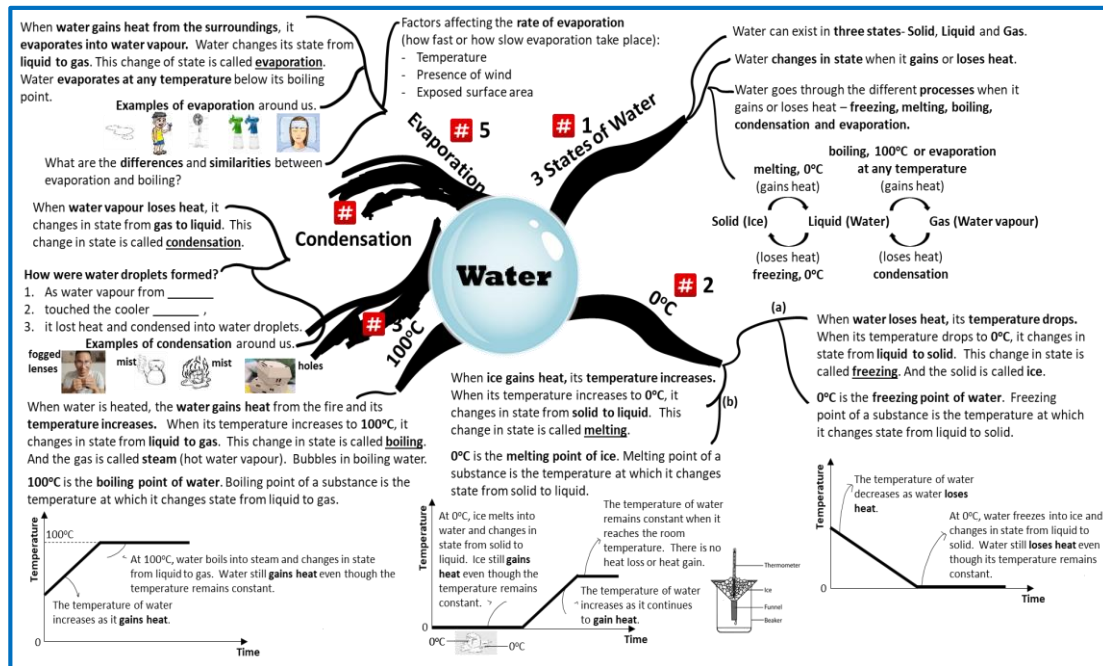
**Claim** **Evidence**  
Predict which leaf contains starch. Explain your answer.  
[Leaf B] is leaf B is exposed to sunlight and is not covered with a black paper, unlike A which is covered with a black paper which blocks light.  
[so] Leaf B is able to photosynthesize and produce sugar which is stored as starch. Thus, leaf B contains starch.

**A Garden where Scholars Bloom**



# Student Learning Experiences

How do we provide the best learning experience for our students to master the **three areas**?



Use strategies to support student learning

Develop **#Concepts** to help students **retrieve concepts**

**A Garden where Scholars Bloom**





# Supporting Children's Learning

Why do you get yourself involved in your child's learning in Science?

- Help child **strengthen science concepts**
- **Reinforce** and **extend** what child is learning in school
- **Motivate child to feel confident** about himself or herself as learners

**How do you support your child in learning Science?**

A decorative border at the bottom of the slide features a lush green field with various white daisies and small blue flowers. Several colorful butterflies, including orange and black ones, are scattered across the scene, some appearing to fly.

**A Garden where Scholars Bloom**

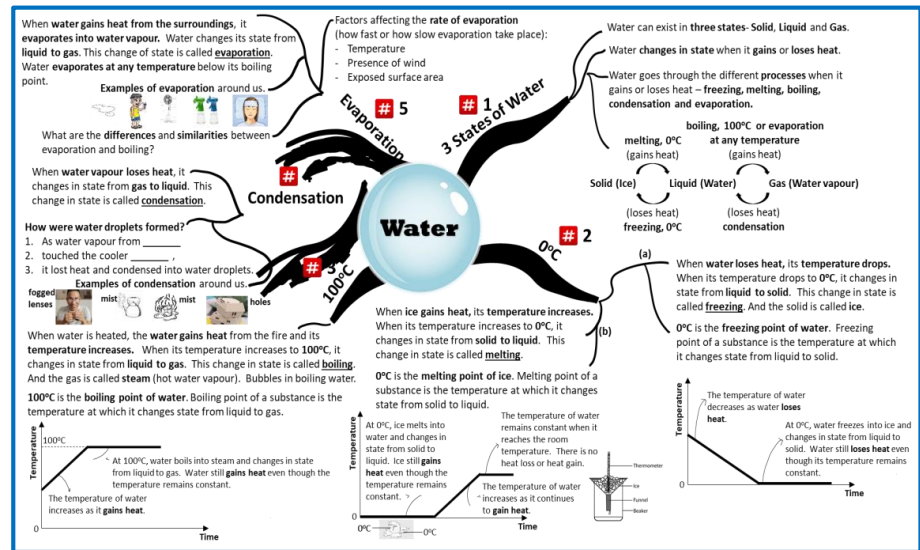
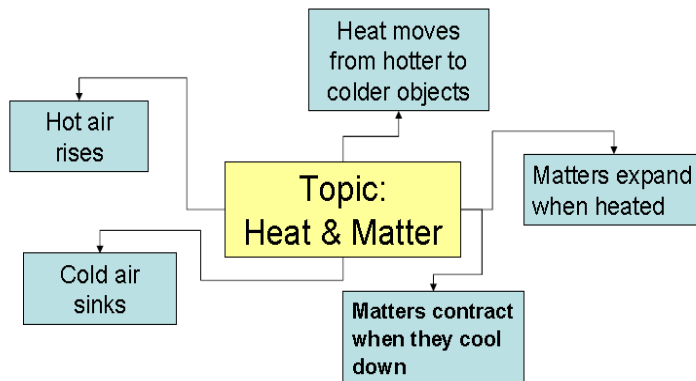




# Supporting Children's Learning

- Guide your child to **master the science concept**
  - Encourage child to **read frequently**, know the facts
  - Ensure child is very familiar with the **concepts in**

## #Concepts



**A Garden where Scholars Bloom**



# Supporting Children's Learning

- Guide your child to **master the science concept**
  - Use **graphic organisers** to arrange their thoughts
  - Revise concepts learnt from P3 to P5; make use of the **#Concepts**

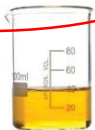
**A Garden where Scholars Bloom**

# Supporting Children's Learning

- Guide your child to **master the science concept**
  - Use **questions** or **words in textbooks** to ask your child

## Liquid Questions to ask:

What are the properties of a liquid?



► What do you observe about the shape and volume of the liquid in both containers?

The liquid takes the shape of the container it is in. The volume of the liquid remains the same even if it is poured into another container.

Both containers have 40 ml of liquid. The liquids have the same volume.



A liquid has a **definite volume** but **no definite shape**.

## Expected response from child

What happens when the liquid in a syringe is pressed by pushing in the plunger?

The plunger cannot be pushed in at all. The volume of the liquid does not change. A liquid cannot be compressed.

Why does a liquid spread all over the floor when you spill it?



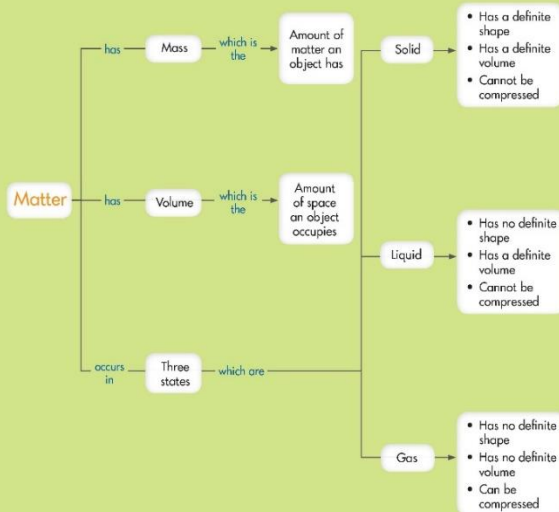
## Words that child can use to create graphic organiser

matter  
mass  
volume  
occupies space

states  
solid  
liquid  
gas

definite shape  
definite volume  
compressed

all mapped out





# Supporting Children's Learning

- Guide your child to **master the science concept**
  - Use role-play or watch animations to understand abstract topics (e.g. Youtube, SLS).

**A Garden where Scholars Bloom**



# Supporting Children's Learning

- Guide your child to **apply** what he/she has learnt to **different situations**
  - Encourage child to explain scientific phenomenon or daily life situations using science concepts
  - Watch with child science documentaries from Discovery Channel, Animal Planets etc.
  - Encourage child to borrow and read science-related magazines
  - Discuss science-related articles in newspaper reports

A decorative border at the bottom of the slide features a lush green field with various white daisies and small blue flowers. Several colorful butterflies, including orange, yellow, and blue ones, are scattered across the scene, appearing to fly over the garden.

**A Garden where Scholars Bloom**





# Supporting Children's Learning

- Guide your child to **apply** what he/she has learnt to **different situations**



## For example:

You can ask how the hand-dryer removes water from his hands.

Your child needs to recall the concept of rate of evaporation to tell you how.

**A Garden where Scholars Bloom**



# Supporting Children's Learning

- Guide your child during **revision**
  - Go through the **corrected responses** in assignments with child
  - Remind them to use **relevant science concepts** in their responses and to **study key information** i.e. diagrams
  - Ask child to **interpret information** in graphs, tables
  - Remind child to use the **strategies (SLPS and CER)** they have learnt in answering Multiple-Choice Questions and Open-ended Questions

A decorative border at the bottom of the slide features a lush green field with various white daisies and small blue flowers. Several colorful butterflies, including orange and black monarchs and blue ones, are scattered across the scene.

**A Garden where Scholars Bloom**



# Supporting Children's Learning

- Guide your child during **revision**
  - Use Practice Papers to **conduct timed practice** with child to practise time management

Format of Paper (Standard)					
Booklet	Duration	Item Type	No. of questions	Marks per question	Marks
A	1h 45mins	Multiple-choice	28	2	56
B		Open-ended	12 – 13	2 – 5	44

**A Garden where Scholars Bloom**



# Supporting Children's Learning

- Guide your child during **revision**
  - Use Practice Papers to **conduct timed practice** with child to practise time management

Format of Paper (Foundation)					
Booklet	Duration	Item Type	No. of questions	Marks per question	Marks
A	1h 15mins	Multiple-choice	18	2	36
B		Structured	6 – 7	2 – 3	14
		Open-ended	5 – 6	2 – 4	20

**A Garden where Scholars Bloom**



# Supporting Children's Learning

- **Explore** with your child
  - Carry out experiments to **hone their process skills**

<https://www.scientificamerican.com/education/bring-science-home/>

<http://www.sciencekids.co.nz/experiments.html>



**A Garden where Scholars Bloom**





# Supporting Children's Learning

- Join **TIPS** (**T**eachers-**I**nvolving-**P**arents@**S**LPS) Learning Series
  - **Workshop** to pick up strategies to support your child
  - Details will be sent via Parents Gateway

**A Garden where Scholars Bloom**



# Supporting Children's Learning

## Summary:

- Guide your child to **master the science concept**
- Guide your child to **apply** what he/she has learnt to **different situations**
- Guide your child during **revision**
- **Explore** with your child
- Join **TIPS Workshops**

**A Garden where Scholars Bloom**



**Thank You**

**A Garden where Scholars Bloom**