

**PRIMARY 3
SCIENCE CURRICULUM BRIEFING
4 March 2022**

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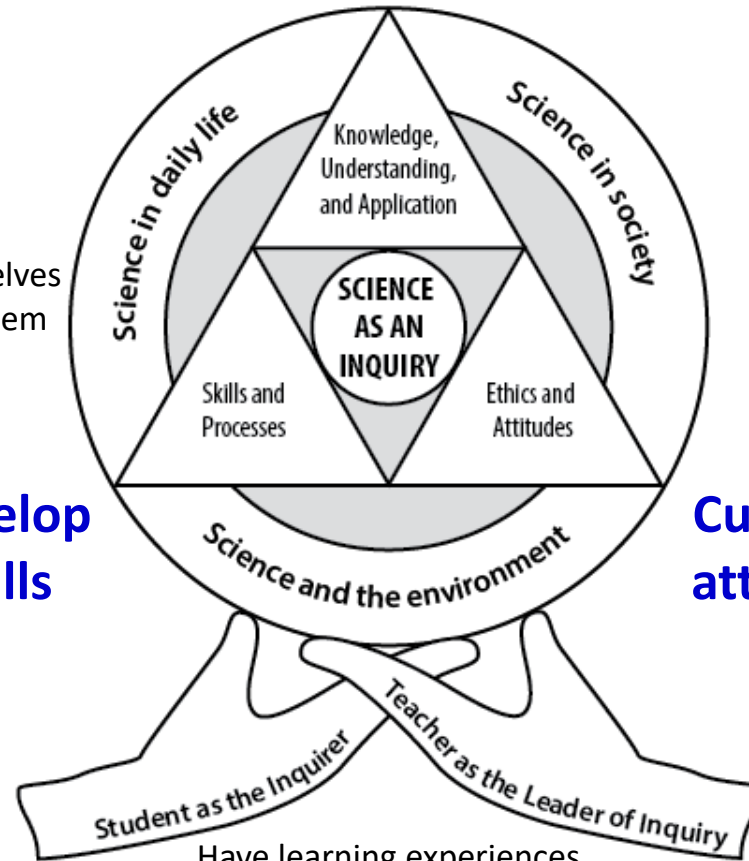
HGS SCIENCE DEPARTMENT VISION

To **nurture** and **develop** every **HGS girl** with an **inquiring mind for Science**



What does my child learn in science?

Learn **basic concepts**
to understand themselves
and things around them



Develop skills

Cultivate attitudes

MOE Science Curriculum Framework

Have learning experiences

which build on **interest** and stimulate **curiosity**



What does my child learn in science?

2014 Science (Primary) Syllabus

For more details, visit the link :

- <https://go.gov.sg/moeprimarysciencesyllabus2014>



Science
Syllabus
Primary

Implementation starting with
2014 Primary Three Cohort



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Learning Outcomes		
Knowledge, Understanding and Application	Skills and Processes	Ethics and Attitudes
Diversity of Living and Non-Living Things (P3 and P4)		
<ul style="list-style-type: none">• Describe the characteristics of living things.<ul style="list-style-type: none">- need water, food and air to survive- grow, respond and reproduce• Recognise some broad groups of living things.<ul style="list-style-type: none">- plants (flowering, non-flowering)- animals (amphibians, birds, fish, insects, mammals, reptiles)- fungi (mould, mushroom, yeast)- bacteria <p><i>Note:</i></p> <ul style="list-style-type: none">- Recall of names of specific living things (e.g. guppy) and their characteristics (e.g. give birth to young alive) is not required.	<ul style="list-style-type: none">• Observe a variety of living and non-living things and infer differences between them.• Classify living things into broad groups (in plants and animals) based on similarities and differences of common observable characteristics.	<ul style="list-style-type: none">• Show curiosity in exploring the surrounding living and non-living things by asking questions.• Value individual effort and team work by respecting different perspectives.



What does my child learn in science?

Themes	Lower Block (P3-P4)	Upper Block (P5-P6)
Diversity	<ul style="list-style-type: none"> • Diversity of living and non-living things • Diversity of materials 	
Cycles	<ul style="list-style-type: none"> • Life cycles of plants and animals • Cycles in matter 	<ul style="list-style-type: none"> • Reproduction of plants and animals • Cycles in water
Systems	<ul style="list-style-type: none"> • Plant System (Plant parts and functions) • Human System (Digestive system) 	<ul style="list-style-type: none"> • Plant Transport System • Human Respiratory and Circulatory Systems • Cell System • Electrical System
Interaction	<ul style="list-style-type: none"> • Magnets 	<ul style="list-style-type: none"> • Interaction of forces • Interaction within the environment
Energy	<ul style="list-style-type: none"> • Energy Forms and Uses (Light and Heat) 	<ul style="list-style-type: none"> • Energy Forms and Uses (Photosynthesis) • Energy Conversion



How does my child learn science?

Inquiry-Based Learning Approach



What does my child learn in science?

	Engaging with an event, phenomenon or problem through:	Collecting and presenting evidence through:	Reasoning, Making meaning of information and evidence through:
Skills	<ul style="list-style-type: none"> • Formulating hypothesis • Generating possibilities • Predicting 	<ul style="list-style-type: none"> • Observing • Using apparatus and equipment 	<ul style="list-style-type: none"> • Comparing • Classifying • Inferring • Analysing • Evaluating
	Communicating		
Processes	Creative problem-solving, Investigation and Decision-making		



How does my child learn science?

✓ Using Textbooks and Workbooks



Introduction to concepts

Unlike poles attract and like poles repel
Two magnets can attract or repel each other. It depends on which of their poles are facing each other.



▲ How can we make two magnets attract or repel each other?

Unlike poles of magnets attract. The North pole of a magnet will attract the South pole of another magnet.



Like poles of magnets repel. The North pole of a magnet will repel the North pole of another magnet. Similarly, the South pole of a magnet will repel the South pole of another magnet.



Exploring through hands-on activities

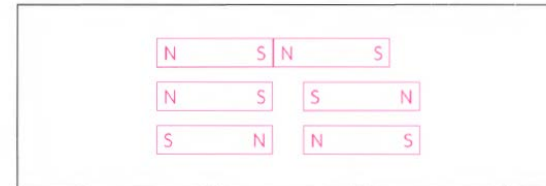
Procedure

A. Poles of a bar magnet

1. Draw a bar magnet and label its North and South poles in the space provided below.

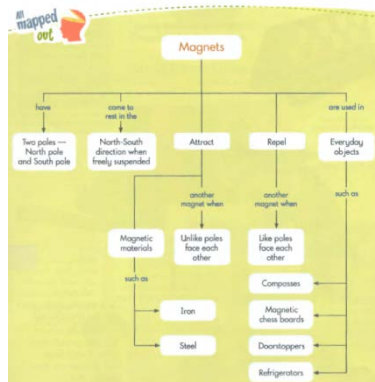


2. Place two bar magnets end to end. What do you notice about the magnets when the ends of the magnets are placed near each other? Draw your observations below.



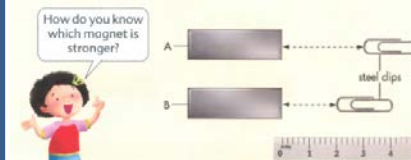
Making links between concepts

- attract
- repel
- magnetic
- non-magnetic
- North pole
- South pole
- North-South direction
- like poles
- unlike poles



Applying concepts in various contexts

2. Sue magnetised two identical steel bars, A and B, using the stroke method. She observed that bar A attracted a steel clip from a distance of 3 cm, while bar B attracted a steel clip from a distance of 2 cm.



How do you know which magnet is stronger?



Which bar was stroked more times? Explain why.

Three ring magnets stayed apart when they were placed on top of one another.



How do the poles of magnets interact with one another?



- Explain why the ring magnets are not touching one another.
- Which one of the ring magnets, A, B or C, should you flip over to make all the three ring magnets come together?

1. The diagram below shows four bar magnets that are attracted to one another.



Which of the following represents the poles at X, Y and Z correctly?

	X	Y	Z
(1)	North	North	North
(2)	North	South	South
(3)	South	South	North
(4)	South	South	South



How does my child learn science?

- ✓ Use of innovative pedagogies to engage our pupils (Knowledge building, Knowledge Forum, Drama in Science, Assessment for Learning strategies)



Use of ICT

answer to miray's question (Why the balloon expands if air can be compressed)

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answer to miray's question (Why the balloon expands if air can be compressed)

Scaffolds:

Primary - Theory Building ▾

- My idea is
- I wonder
- New information
- Putting our knowledge together
- A better idea is

Keyword(s):

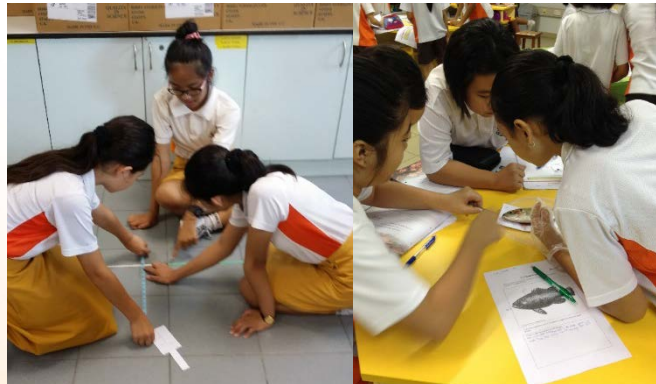
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A ▾ A ▾

My idea is - air only gets compressed when all the space in a container is taken up but the balloon can become bigger so the air tries to fill it all up but instead , it makes the ballon bigger . -

I wonder - why the mass of the deflated balloon (from different groups) is different . -

Knowledge Forum



Co-operative strategies



Drama in Science

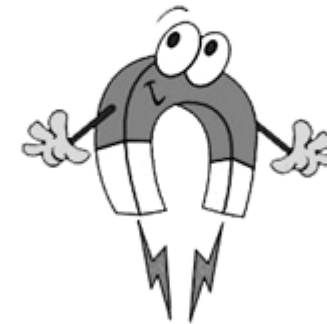


How does my child learn science?

Magnetism Kit



Science Magnetism Kit Activity Booklet



Name: _____ ()

Class: P3 _____



How does my child learn science?

- ✓ Zoo Learning Journey (via Zoom) in Term 1 to support their learning of Diversity (Animals)



How does my child learn science?

ANSWERING STRATEGIES

RHCTC

Read everything, then
Highlight Clues, link to
Topic and
Concept learnt

CER

Claim
Evidence
Reasoning

evidence can be given in question, pictures, table or graph

- ✓ **RHCTC** – understand the question

Encourage annotations to organize their thoughts.

- ✓ **Elimination** – for MCQ

- ✓ **CER** – for Open-Ended Questions

Answers must be supported by evidence.

Note: Students still need to know their science concepts well!



How is my child assessed in science?


- **Conceptual understanding and application of concepts and skills**
- ✓ Students can explain their understanding of concepts in their own words.
- ✓ Concepts which are correct in the context of the questions will be carefully evaluated and awarded marks.



Example 5: Energy in Food

Concept:
Photosynthesis

To help my plants grow well, I should put them in a place with light. Why?



Plants need light to make food. ✓

Plants need light to photosynthesize. ✓

Light provides food for the plant. ✗

Plants use light to photosynthesize (make their own food). It is conceptually incorrect to describe "light as providing food" for the plant.

Example 3: Heat

Concept:
Heat Conduction

This jacket keeps us warm because ...



Air slows down heat flow. ✓

Air prevents coldness from reaching us. ✗

Air is a poor conductor of heat. ✓

The description of coldness being transferred is conceptually incorrect. Heat is transferred from a warmer region to a colder region. The air in jacket slows down heat flow away from the body.

How is my child assessed in science?

2022 Holistic Assessment Overview

Assessment of Learning			
	Term 2	Term 3	Term 4
	Weighted Assessment 1	Weighted Assessment 2 <i>(Performance Task)</i>	End of year Examination
Total marks	20 marks	15 marks	70 marks
Duration	30 min	-	1h 15 min
Weighting	15%	15%	70%

BOOKLET A

**Multiple-Choice Questions
(MCQ)**

2 marks each

BOOKLET B

**Open-Ended Questions
(OEQ)**

2, 3, 4 marks
each



How is my child assessed in science?

Science Paper Exam Format (WA1 and EOY)

	Booklet A	Booklet B	
	Multiple-Choice Questions (MCQ)	Open-Ended Questions (OEQ)	
	2 marks each	2, 3 or 4 marks each	
Weighted Assessment 1	5 MCQ (10 marks)	5 OEQ (10 marks)	Total: 20 marks
End of Year Examination	20 MCQ (40 marks)	10 OEQ (30 marks)	Total: 70 marks



How is my child assessed in science?

Weighted Assessment 2 (Performance Task)

Provide students with opportunities to apply **critical thinking and problem solving skills, understanding of concepts of materials** and **demonstrate their creativity** in selecting appropriate materials to create a product using materials provided.

- ✓ Activating Prior Knowledge
- ✓ Arousing Interest
- ✓ Encouraging Learner Engagement
- ✓ Exercising Flexibility



How is my child assessed in science?

Assessment for Learning (Ongoing monitoring)

- Science Activity Book
- Mastery worksheets
- Topical self-assessment
- Practice papers
- Hands-on activities with use of scientific skills / process skills
- Science Journal
- Traffic lights
- Mini Whiteboard
- Teacher's classroom observations
- Exit Cards



How can I support my child in learning science?

😊 Help your child track her learning

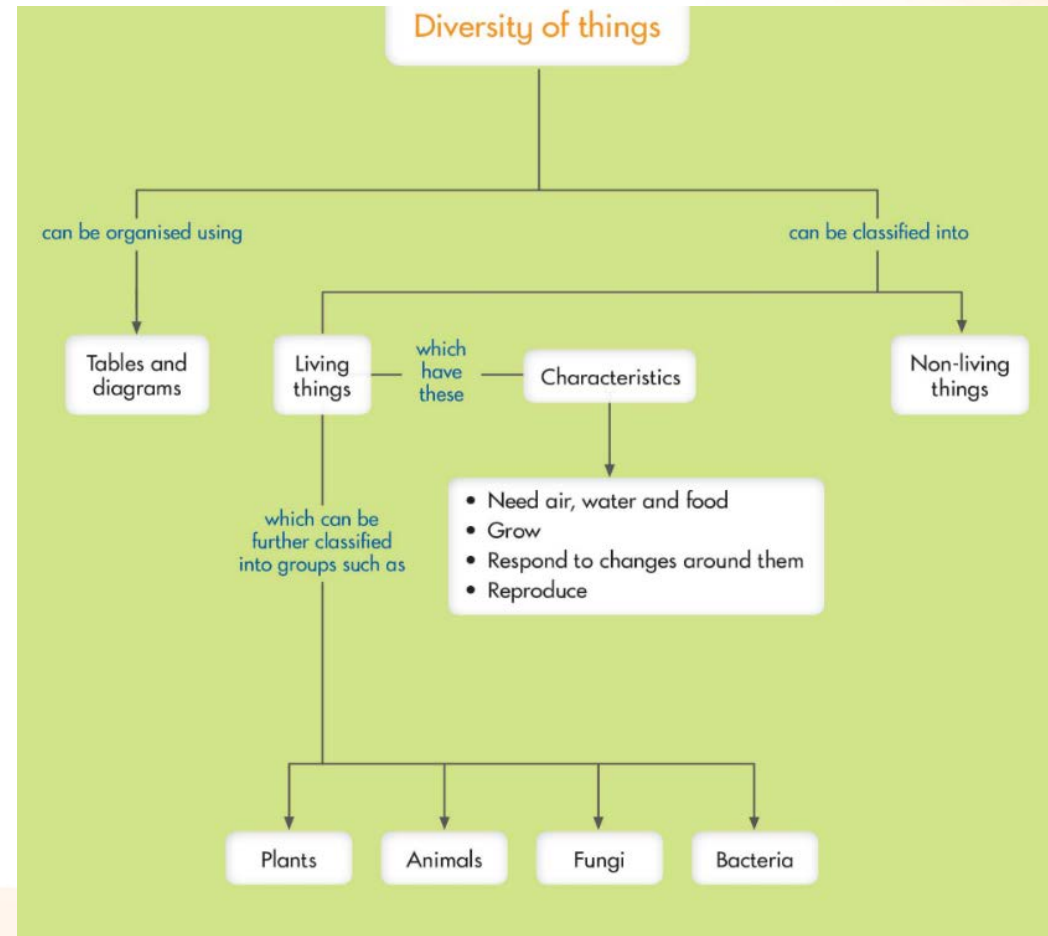
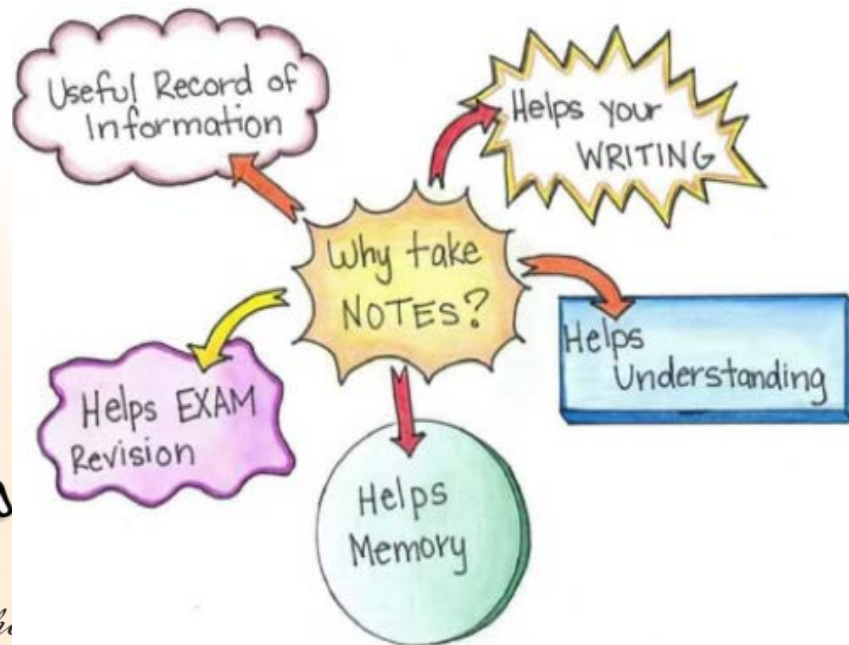
- Work with and guide your child in planning her revision schedule.
- Check her handbook to monitor her homework and corrections
- Support your child's online learning, e.g. SLS assignments, online research



How can I support my child in learning science?

2. Help your child revise and retain her science concepts.

- ✓ Note-taking
- ✓ Concept Maps
- ✓ Labelled diagrams



How can I support my child in learning science?

😊 Other forms of support you can provide

- Promote Science learning by:
 - going outdoors (e.g. Zoo, Gardens by the Bay, Singapore Science Centre, Gardens by the Bay etc)
 - exploring relevant YouTube videos
 - reading Science related magazines
 - watching Science related TV programmes etc
- Reinforce scientific concepts by providing real-life examples (incidental learning)
- Try out experiments at home (“kitchen science”)



How can I support my child in learning science?

Resource for parents

- **Useful link for parents** <https://www.schoolbag.sg>



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Use the search function and search science:

<https://www.schoolbag.edu.sg/search-result?q=science>

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How can I support my child in learning science?

How do you *make* kids love science? You don't

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1. Get them intrigued
2. Make it about them
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5. Get them thinking

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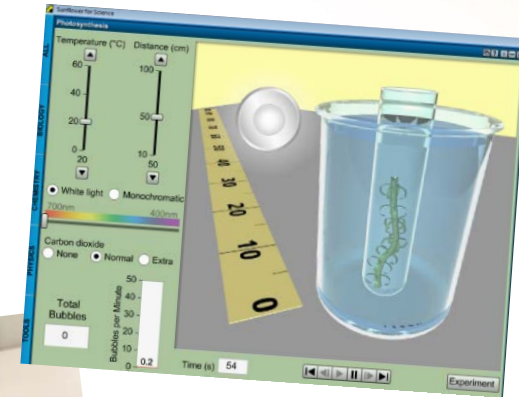
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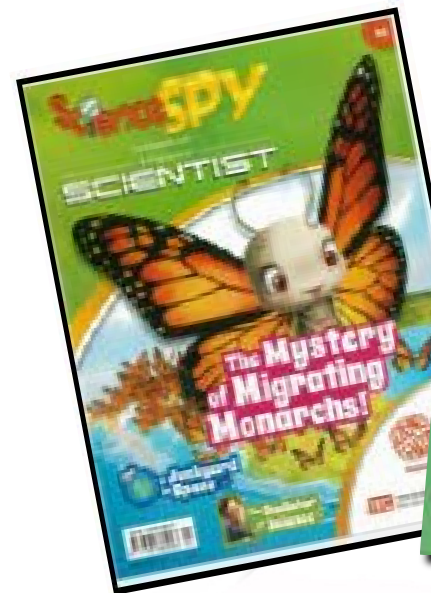
School's Support in our Pupils' Learning

- ✓ School laboratories 1 & 2
- ✓ Resources for hands-on activities (dataloggers, science kits)
- ✓ Environment as the 3rd teacher: Solar-powered Hydroponics, Science garden, EcoPond
- ✓ Use of ICT (SLS, virtual experiments, Padlet)



School's Support in our Pupils' Learning

- ✓ **Remedial** for selected students
 - *P3 Science remedial to start in Term 2
- ✓ **Science magazines and books** (available in the school and class libraries)
- ✓ **Young Scientist Badge Scheme** (digital) : Self-directed learning



Thank you for your attention!

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Conceptual Understanding in Primary Science: Examples and Applications

2022



Conceptual Understanding in Primary Science

- Students learn Science through understanding and applying concepts and skills in different contexts in an age-appropriate manner.
- The focus of learning Science is not on giving "standard answers" or keywords. Students can show their understanding by using their own words to explain clearly in the context of the question.
- Science is alive and its applications are all around us.



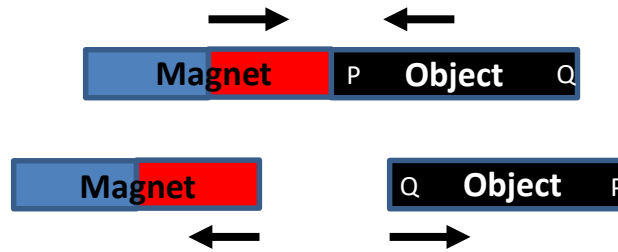
Examples and Applications in Different Contexts



Example 1: Magnets

Concept:
Magnetic Repulsion

The object is definitely a magnet. Do you agree?



Yes, they attract each other.



Yes, the magnet and object move away from each other.



Yes, they repel each other.



If the object is only attracted by a magnet, it may just be a magnetic material. There is insufficient evidence to conclude that the object is a magnet. The object is definitely a magnet only if it repels a magnet.

Example 1: Magnets

Applications in daily life

Magnets help us in our everyday life!



There are magnets in my toy!



Magnets help us to separate the magnetic materials in our rubbish too.



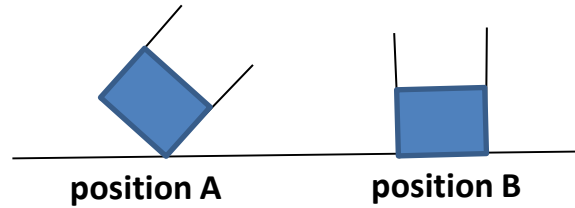
Yes, they are even used in Maglev trains!



Example 2: Matter

Concept:
Properties of Matter

A substance is put in a container.
The container is placed in positions A and B below.
The object is definitely a solid. Do you agree?



Yes, it is a solid because it takes up the same amount of space in positions A and B.



Yes, the substance has a fixed shape and volume in both positions A and B.



Yes, the substance did not change its shape in position A.



If the substance only takes up the same amount of space in the container, it may be a liquid. There is insufficient evidence to conclude that the substance is a solid. The substance is definitely a solid if it has a definite shape and volume.



Example 2: Matter

Applications in daily life

Properties of solids, liquids and gases are applied in our everyday life.



We can fill balloons of different shapes and sizes as gases have no definite shape and volume!



Water takes the shape of the containers as it has no definite shape.



We can also have ice sculptures in cold environment as ice has a definite shape and volume.



Example 3: Heat

Concept:
Heat Conduction



Air slows down
heat flow.

This jacket keeps us warm because ...



air
in
jacket



Air prevents coldness
from reaching us.



Air is a poor conductor of heat.



The description of coldness being transferred is conceptually incorrect. Heat is transferred from a warmer region to a colder region. The air in jacket slows down heat flow away from the body rather than prevents coldness from reaching us.

Example 3: Heat

Applications in daily life

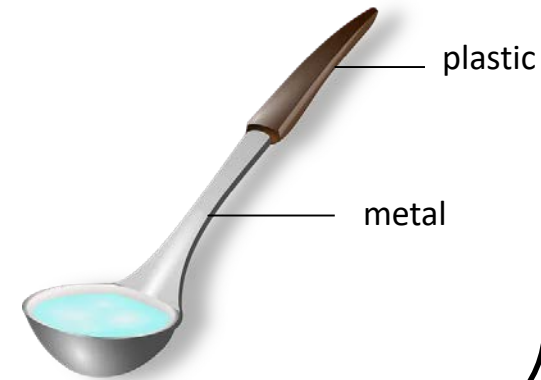
Some objects are better conductors of heat so they allow heat to flow through faster than others. What are some examples of heat flow in our everyday life?



Heat flows through the metal pot quickly to cook our food.

Some objects are made of both good and poor conductors of heat, such as the soup ladle.

I can hold the plastic handle safely when getting my hot soup.



Heat flows through the cardboard slowly so that I can hold my hot drink.



Example 4(a): Water Cycle

Concept:
Evaporation

There are water droplets on the leaves in the morning.
They are not there after a while. Why?



Water has disappeared!



Water has evaporated.



Water didn't disappear. It evaporated.

**Conceptually, it continues to exist, except in a different state.
'Water has disappeared' does not explain what happened to the water.
Evaporation happens when water changes from liquid to gas.**



Example 4(b): Water Cycle

Concept:
Evaporation

There are water droplets on the leaves in the morning.
They are not there after a while. Why?



Water has changed
from liquid to air.



Water has become
water vapour.



Air is made up of different gases including water vapour.
So it is a misconception that water vapour is air.

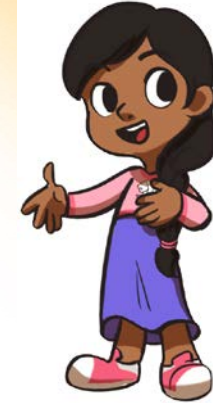
Example 4: Water Cycle

Applications in daily life

Evaporation is happening around us ...



Just like water from my clothes evaporated!



Putting little balls in reservoirs can help to slow down evaporation of water.



And water by the road evaporating!



Example 5: Energy in Food

Concept:
Photosynthesis

To help my plants grow well,
I should put them in a place with light. Why?



Plants need light
to make food.



Plants need light to photosynthesise.



Light provides food
for the plant.

Plants use light to photosynthesise (make their own food). It is conceptually incorrect to describe “light as providing food” for the plant.



Example 5: Energy in Food

Applications in daily life

Photosynthesis is important ...



During photosynthesis, plants provide us with oxygen!



Plants photosynthesise to make food for themselves.



When there are more plants, more carbon dioxide in the air will be taken in by the plants during photosynthesis. With less carbon dioxide in the air, this in turn helps to reduce global warming!



Thank you

