Welcome to the Assessment and Curriculum Sharing

SCIENCE

We will be starting shortly.

RIVERVALE PRIMARY SCHOOL

SCIENCE WEBINAR 2022

LOWER BLOCK

RIVERVALE PRIMARY SCHOOL

We seek your cooperation on the following

- **No videography**
- **No photography**

All slides will be made available on the school website at a later time.

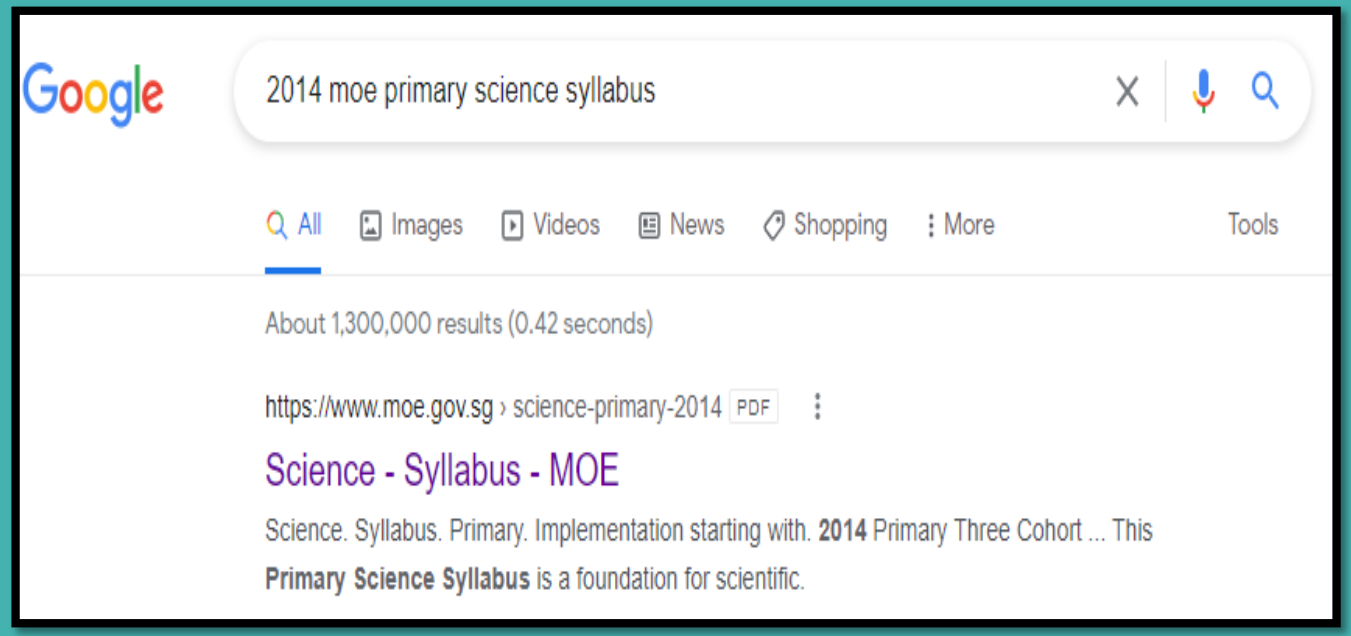
COVERAGE OF WEBINAR

- ✓ Syllabus & Assessment
- ✓ Experiment: Variables, Fair Test, Aim
- ✓ Strategies for answering Science questions
- ✓ Useful Resources

MOE SCIENCE SYLLABUS

Where to get a copy of the 2014 Science (Primary) syllabus?

SCAN ME

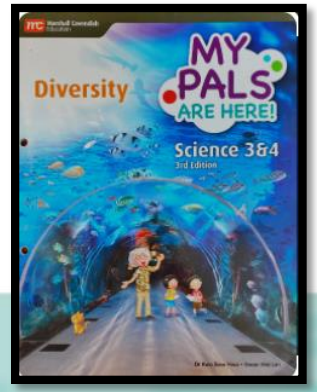


Coverage of the Syllabus

Primary 3

Diversity

- Living and Non-Living Things
- Materials



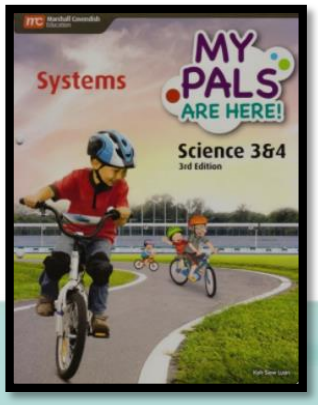
Cycles

- Cycles in plants and animals
- Matter

Primary 4

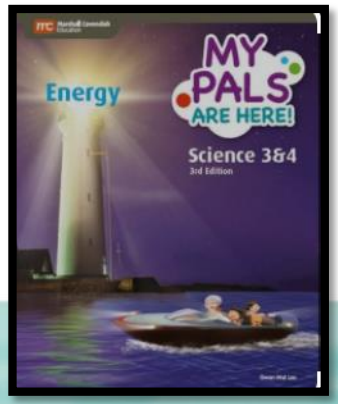
Systems

- Plant system
- Human Body Systems – Digestive system



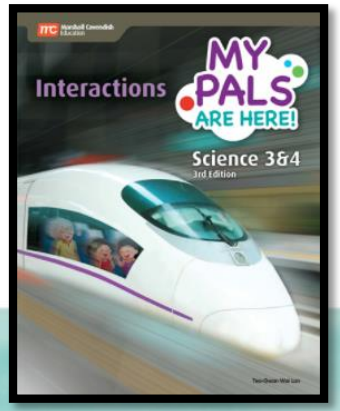
Energy

- Light energy
- Heat energy



Interactions

- Magnets



Summative Assessment – P3

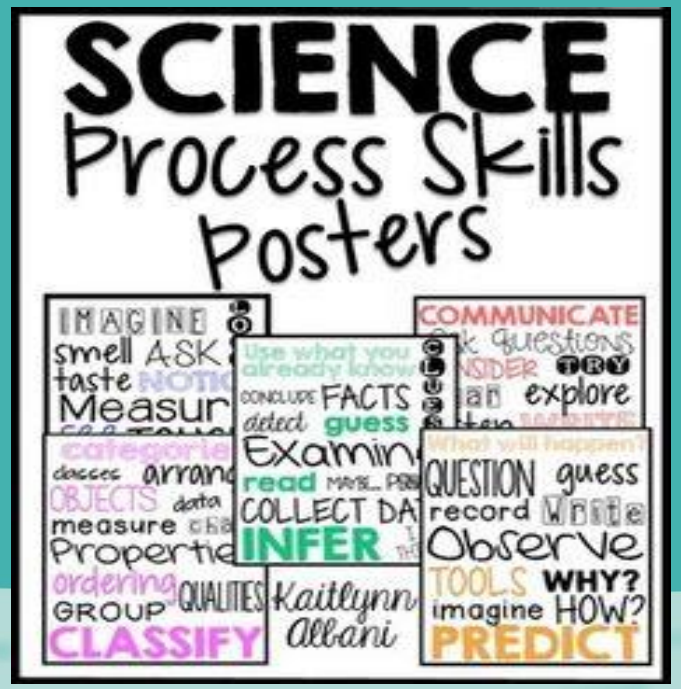
	Weighted Assessment Multiple Choice Questions (MCQ) <Term 2>	Weighted Assessment Open-ended Questions (OEQ) <Term 3>	End of Year Exam MCQ + OEQ <Term 4>
Diversity	- Living and Non-living things - Plants - Animals - Fungi & Bacteria - Exploring Materials	- Living and Non-living things - Plants - Animals - Fungi & Bacteria - Exploring Materials	- Living and Non-living things - Plants - Animals - Fungi & Bacteria - Exploring Materials
Cycles		- Life cycles of animals - Life cycles of plants	- Life cycles of animals - Life cycles of plants - Matter
Total	30 marks	30 marks	80 marks
Weighting	15%	15%	70%

Summative Assessment – P4

	Mid Year Exam <Term 2>	End of Year Exam <Term 4> *SBB
Systems	- Body Systems - Plant Systems	- Body Systems - Plant Systems
Energy	- Light Energy	- Light Energy - Heat Energy
Interactions		- Magnets & their Properties - Making Magnets - Using Magnets
P3 topics	P3 – Diversity & Cycles	P3 – Diversity & Cycles
Total	100 marks	100 marks
Weighting	30%	70%

SCIENCE PROCESS SKILLS

- Observing
- Comparing
- Classifying
- Inferring
- Predicting
- Analysing
- Evaluating
- Communicating
- Generating possibilities
- Formulating hypothesis
- Creative Problem Solving
- Decision-making
- Investigation



PROCESS SKILLS IN PRIMARY SCIENCE

Comparing	Identifying similarities and differences between two or more objects, concepts or processes.
Classifying	Grouping objects or events based on common characteristics.
Inferring	Interpreting or explaining observations or pieces of data or information.
Analysing	Identifying the parts of objects, information or processes, and the patterns and relationships between these parts.
Evaluating	Assessing the reasonableness, accuracy and quality of information, processes or ideas and also the quality and feasibility of objects.
Communicating	Transmitting and receiving information presented in various forms – written, verbal, pictorial, tabular or graphical.

COVERAGE OF WEBINAR

- ✓ Syllabus & Assessment
- ✓ Experiment: Variables, Fair Test, Aim
- ✓ Strategies for answering Science questions
- ✓ Useful Resources

KEY EXPERIMENTS

P3:

- **Materials**
- **States of matter**

P4:

- **Plant systems**
- **Light energy**
- **Heat energy**
- **Magnets**

VARIABLES OF AN EXPERIMENT

- A variable refers to any condition that can exists in differing amounts or types
- **Constant/fixed** variable: All other conditions that are kept the same as they affect the results.
- **Changed/independent** variable: Condition that is varied/changed
- **Measured/dependent** variable: Measurements and observations taken

VARIABLES OF AN EXPERIMENT

- Examples of **changed or constant** variable:
  - Amount of water
  - Amount of sunlight
  - Type of material used
  - Size of each bread slice

- Examples of **measured** variable:
  - Light intensity
  - Temperature of water
  - Number of paper clips attracted

FAIR TEST CONCEPT

- In a fair experiment, only **ONE** variable is **CHANGED** in the set-up and only **ONE** variable is **MEASURED** as a direct consequence of the changed variable.

- If we change more than one variable, we do not know which of the changed variable affected the measured variable.

- Changed variable and measured variable can sometimes be represented in a table of data or graphs.

AIM OF AN EXPERIMENT

- It is what an experiment is testing.
- Starts with statements like "to find out…." / "to investigate…"

- Combines **variable changed (altered)** with the **observation/ results/ measurements**

- E.g. To find out how the surrounding temperature (variable changed) affects the rate of evaporation of water (measured).

AIM OF AN EXPERIMENT

- A tip to answer <u>Aim</u> questions is to use this structure:

A (altered: changed)
i
M (measured)

Example:
He / she wanted to find out how (variable changed) affects (variable measured).

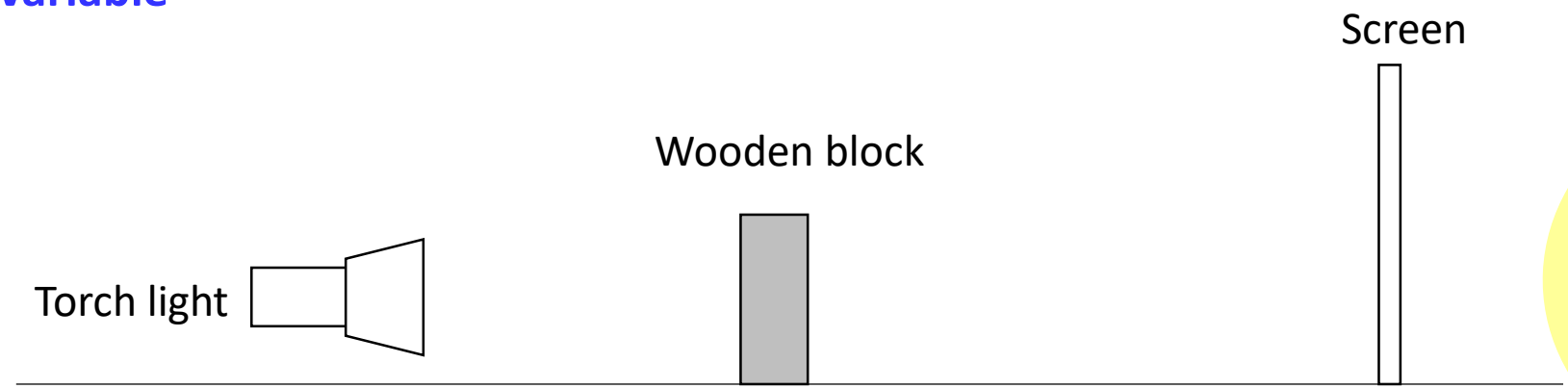
TEST YOURSELF

Aim

Changed variable

Ali wanted to find out if the distance of the object from the light source affects the size of the shadow. The diagram below shows his experimental set-up.

Measured variable



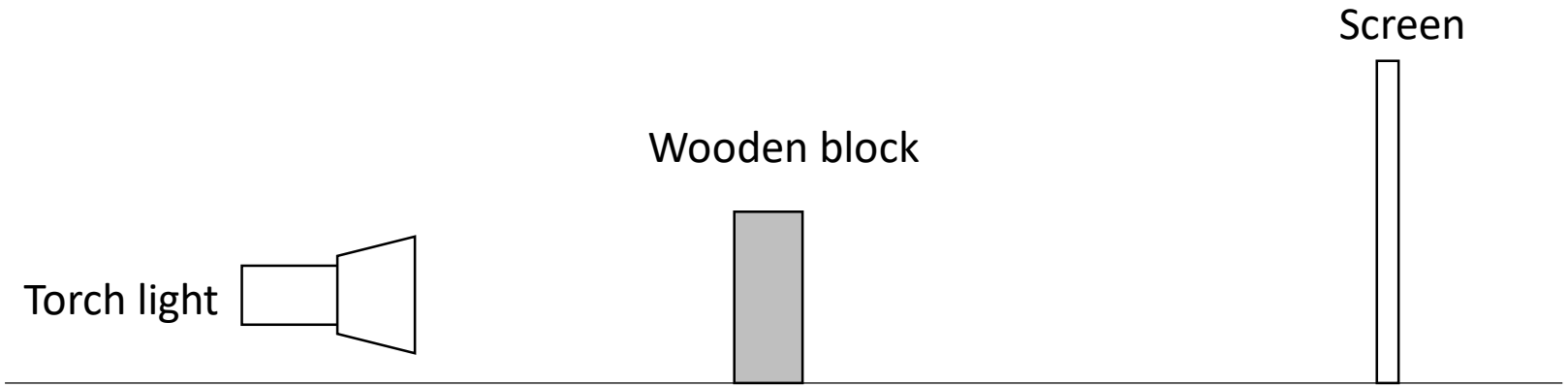
What is the changed variable and measured variable?

Changed variable: **Distance between wooden block and torch light**

Measured variable: **Length/Height of shadow formed on screen**

TEST YOURSELF

Ali wanted to find out if the distance of the object from the light source affects the size of the shadow. The diagram below shows his experimental set-up.



Constant variable: **Same type of torch light**
Same type of wooden block
Same position of screen

COVERAGE OF WEBINAR

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SOME QUESTION WORDS

Question words	What is required?
State / identify	To write down a fact
Relationship	How the variable tested affects the observation
Explain	To link and apply science concept(s) in a given context
Compare	To group things based on common characteristics
Classify	To identify similarities and differences between objects, concepts or processes

SOME QUESTION WORDS

Question words	What is required?
What / Which	State the accurate observation, variable, object
Where	Provide a suitable location for set-up
When	Time / duration
How	Describe a difference or similarity / describe method / way of doing something
Why	Give reason to explain a phenomenon

STRATEGY TO ANSWER QUESTIONS

- Relationship questions
- Explain questions (OIC Model)

RELATIONSHIP QUESTION

Relationship : To state how **changes / patterns** in the variable changed **affect** the observations/ measurements (from graph / results table)

Suggested sentence structure:

As … increases, … increases/decreases

Variable Changed (cause)

Measured variable (effect)

Eg. As the temperature increases, the rate of evaporation increases.

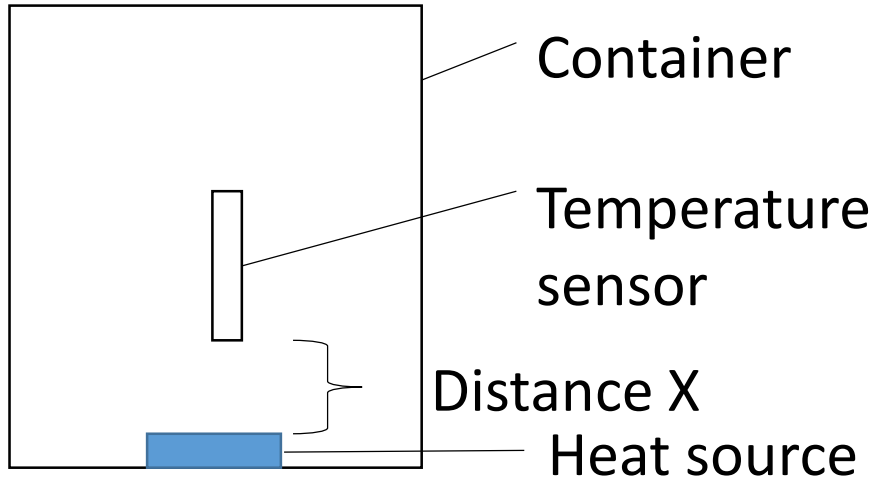
RELATIONSHIP QUESTION 1

Tom measured the temperature in a container as shown at various distances from the heat source. He recorded his results in the table below.

Distance X (cm)	Temperature (^{0}C)
15	90
30	85
45	74
60	57
75	45

Distance X increases

Temperature decreases



What is the **relationship** between the **distance X** and the **temperature measured**?

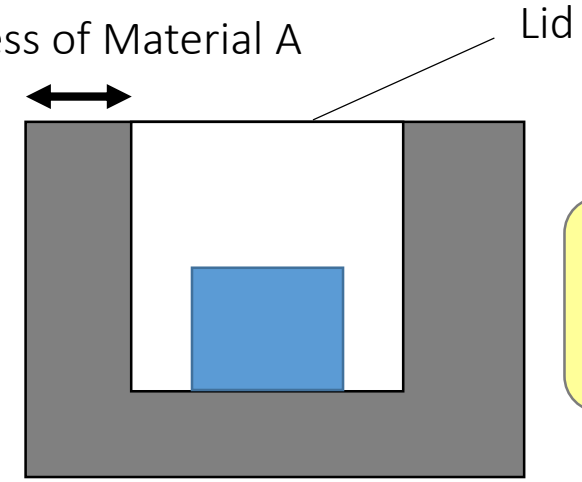
As **distance X** increases, the **temperature** decreases.

Variable Changed (cause)

Measured variable (effect)

RELATIONSHIP QUESTION 2

In the experiment below, Mary wanted to test how the thickness of Material A affects the time taken for an ice cube to melt. The results of her experiment is shown in the table.



Thickness of Material A(cm)	Time taken for ice cube to melt (min)
5	3
10	7
15	10
20	15

Thickness of Material A increases

Time taken for ice to melt increases

What is the relationship between the **thickness of Material A** and the **time taken for the ice cube to melt**?

As the **thickness of Material A** _____, the **time taken for the ice cube to melt** _____.

EXPLAIN QUESTIONS

Explain questions are among the most difficult questions to get correct. This is because the student needs to provide appropriate scientific reasoning and concepts to explain a phenomenon.

Using the OIC model, we can explain a given phenomenon, provided we have sound scientific reasoning.

EXPLAIN – OIC MODEL

O – Observation

(what is seen or predicted to happen / what needs to be done to a particular experimental set-up to achieve its objective.)

I – Interpretation

(Tying in of concepts and how it relates to phenomenon)

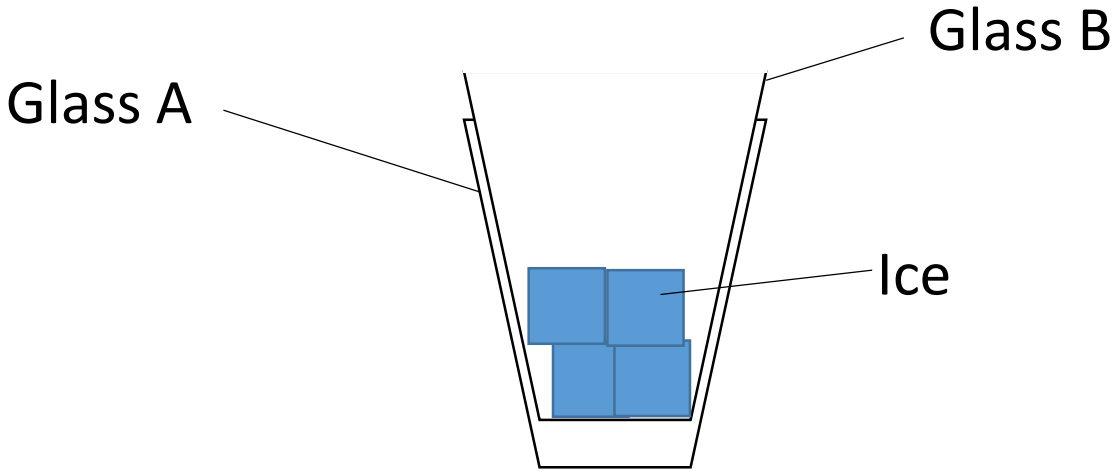
C – Conclusion

(Explaining or predicting what will happen)

EXPLAIN QUESTION 1

Step 1: Identify and interpret the **key information** given in the question (highlight/annotate)

Glass A and Glass B are stuck together as shown below.
Sandra added ice into Glass B to help separate the 2 glasses.



Topic: Heat

Concept: Heat transfers from hotter to colder region. When objects loses heat, they contract.

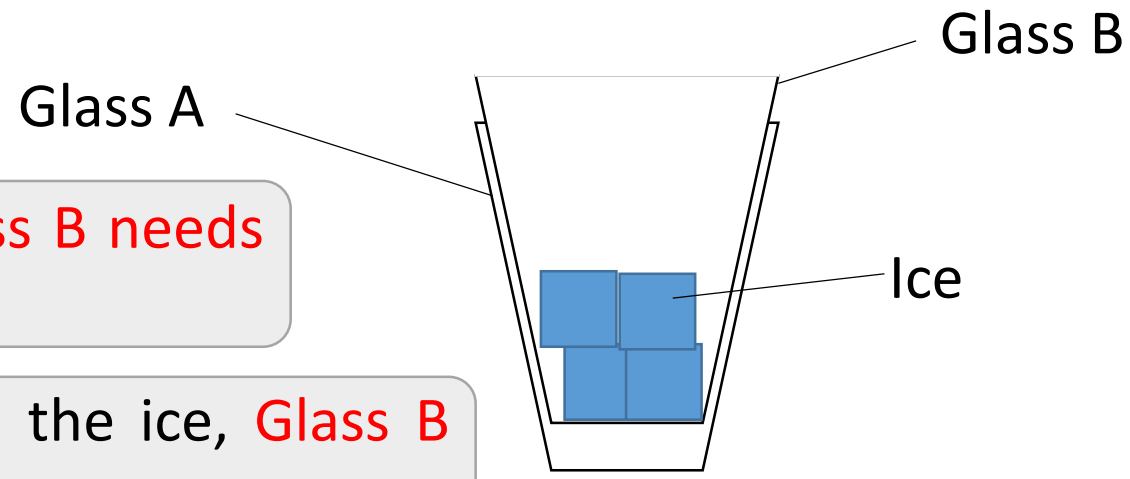
Explain how the glasses are able to separate when she added the ice into the cup.

Step 2: Identify the **topic** and **concept(s)** applicable to the question

EXPLAIN QUESTION 1

Step 3: Analyse. Link concept to situation.
Use OIC Model

<u>Explain</u> how the glasses are able to separate when she added the ice into the cup.



Observe (O) : For the cup to be separate, Glass B needs to contract.

Interpret (I) : Since the Glass B is hotter than the ice, Glass B would lose heat to the ice and the glass would contract.

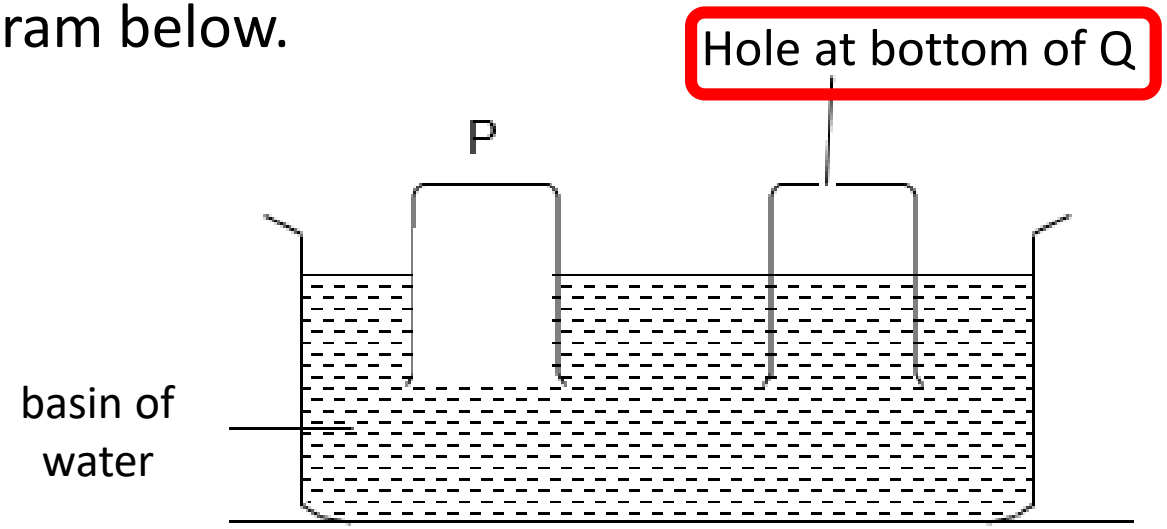
Conclusion (C) : The glasses could be separated as Glass B contracts and becomes smaller.

Student A's Answer	Student B's Answer
Glass B becomes smaller so it can be separated.	Glass B loses heat to the ice, contracts and becomes smaller. Thus, it can be separated from glass A. ✓

EXPLAIN QUESTION 2

Step 1: Identify and interpret the **key information** given in the question (highlight/annotate)

In an air-conditioned room, Sally inverted containers, P and Q, vertically into a basin of water. She observed water entered container Q while no water entered container P as shown in the diagram below.



Topic: Matter

Concept: Matter (gas) has volume and occupies space.

She then realised there is a small hole at the bottom of container Q.

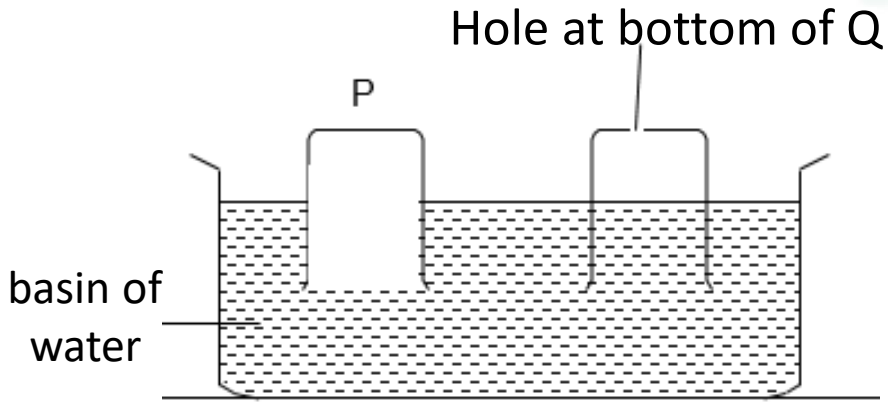
(a) **Explain** how the small hole could cause water in the basin to enter container Q.

Step 2: Identify the **topic** and **concept(s)** applicable to the question

EXPLAIN QUESTION 2

Step 3: Analyse. Link concept to situation.
Use OIC Model

(a) **Explain** how the small hole could cause water in the basin to enter container Q.



Observe (O) : Water enters container Q but not container P. There is a hole at the bottom of Q.

Interpret (I) : Air occupies space in the container. The air in container Q is able to escape allowing water to enter.

Conclusion (C) : Air from container Q escapes through the hole and water enters to fill up the space occupied by the air

Student A's Answer	Student B's Answer
Air escapes through the hole.	As air **in container Q** escapes through the hole, water enters from the basin into Container Q to fill the space. ✓

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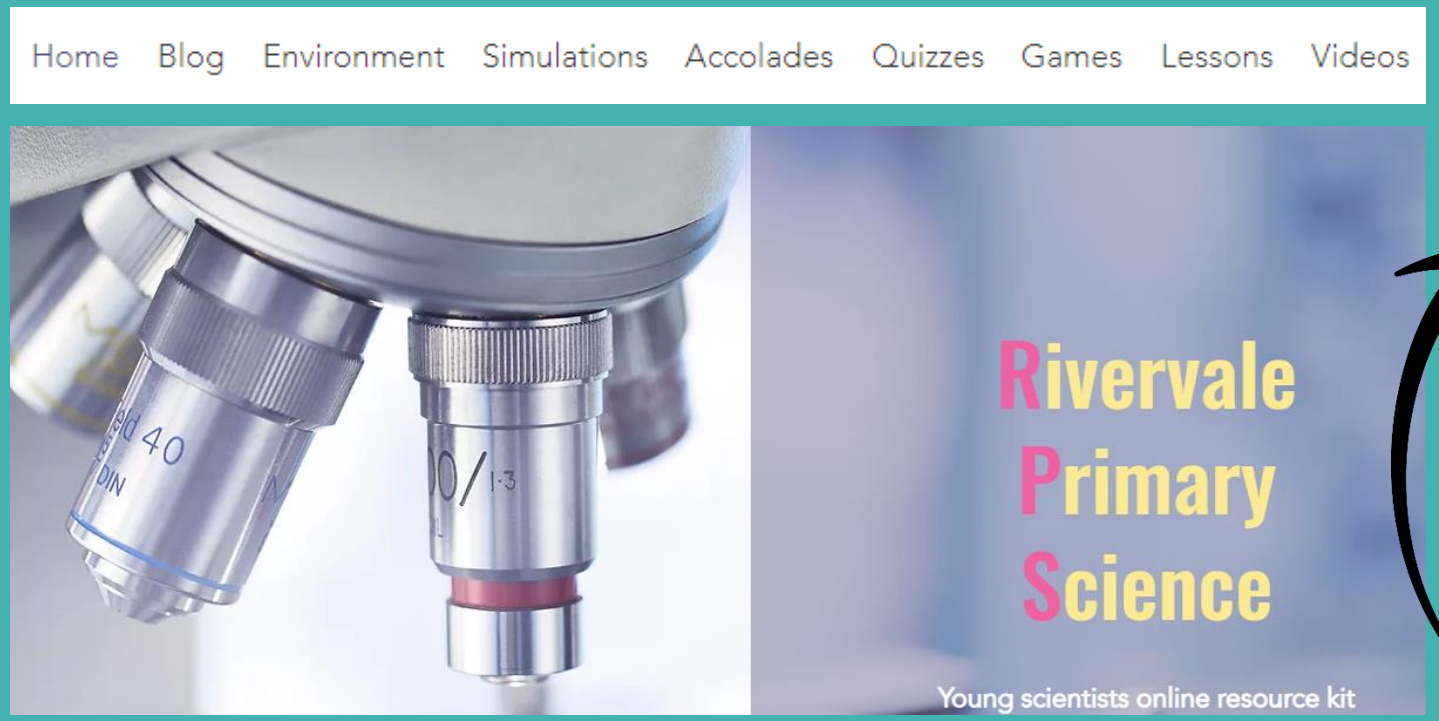
SCIENCE AROUND US

Rivervale Primary Science website

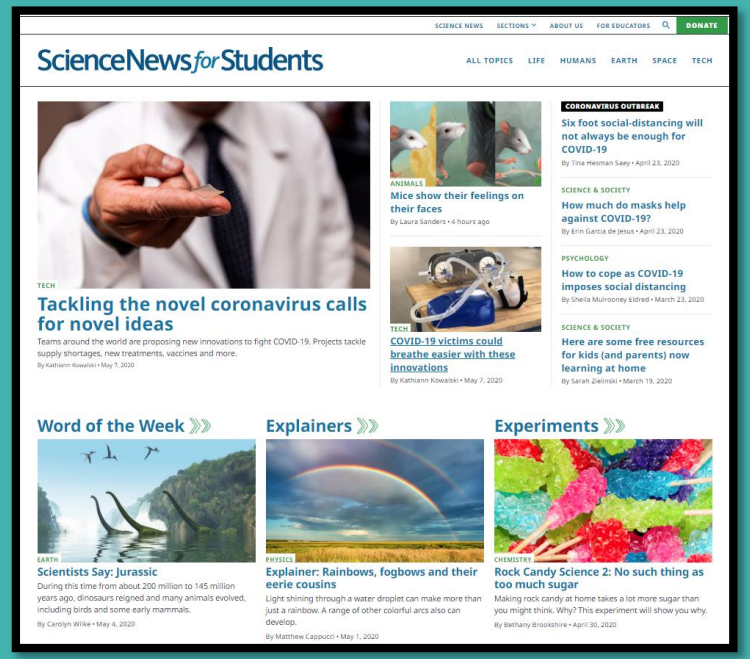


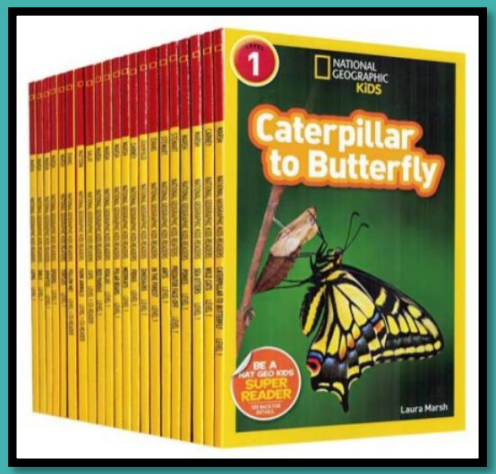
scan ME

https://rivervalescience.wixsite.com/2020

SCIENCE AROUND US

- Newspapers
- National Geographic
- Animal Planet
- Discovery Channel



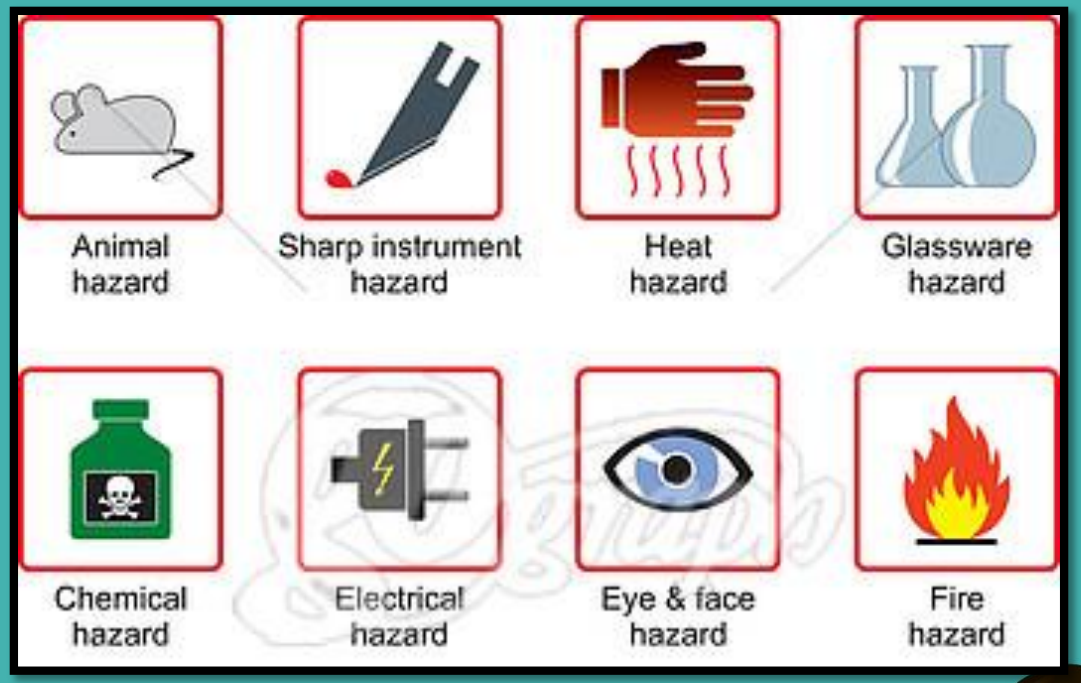


SCIENCE AROUND US

- Young Scientist Magazines
- Science Adventures
- Simple experiments at home

SCIENCE AROUND US

- Things to note while doing experiments at home
  - Safety
  - Helping your child to see the aim, variables and conclusion



SCIENCE AROUND US

Relate everyday experiences and questioning:

- Observing living things
- Comparing living things
- Cold apple placed on table

SCIENCE AROUND US

Relate everyday experiences and questioning:

- Materials used in a bicycle
- Boiling water / cooking
- Heating electrical appliances
- Magnetic toys

Fun websites for kids

- How Stuff Work

http://www.howstuffworks.com

- National Geographic kids

http://video.nationalgeographic.com/video/kids/

- National Geographic channel

http://video.nationalgeographic.com/video/national-geographic-channel

- NASA

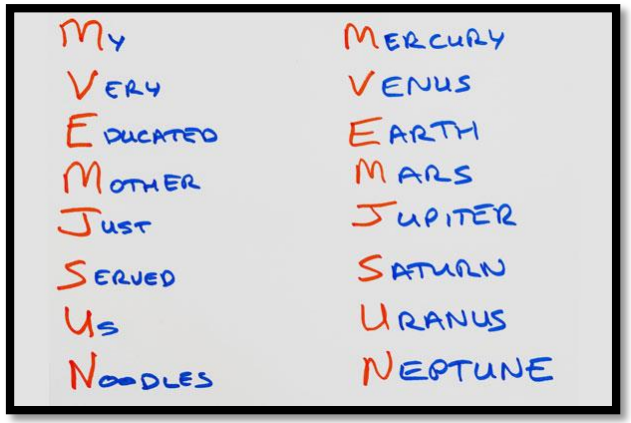
https://www.nasa.gov/kidsclub/index.html

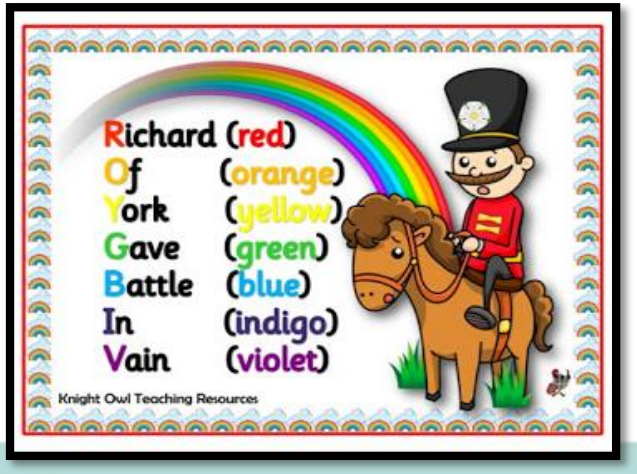
- Discovery channel kids

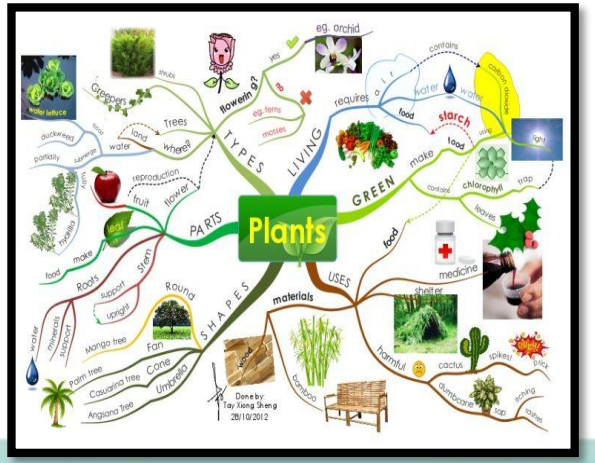
http://kids.discovery.com/tell-me

Helping your child to revise Science

- Strategies to recall key concepts / ideas
  - Mnemonics
  - Mind maps







Mnemonics

- A learning technique that aids memory.
- To improve long term memory, mnemonic systems are used to make recall easier as it helps us to **organize** and **retain** information.

Steps to create Mnemonics

1. Take the information that you need to remember and choose **one word** out of each of the phrases that is meaningful.
2. Choose the **first letter** from each of these words.
3. Make a word **(acronym)** or sentence from it or a combination from it.
4. The sentence should be made easy to remember by making it **humorous**.

Mnemonics Examples

Seeds need

W Warmth

O Oxygen / Air

W Water

to germinate

Plants need

S Sunlight

A Air

W Water

to make food

Mnemonics Examples

P3: Properties of Materials

S Strength

T Transparency – Ability of material to allow light to pass through

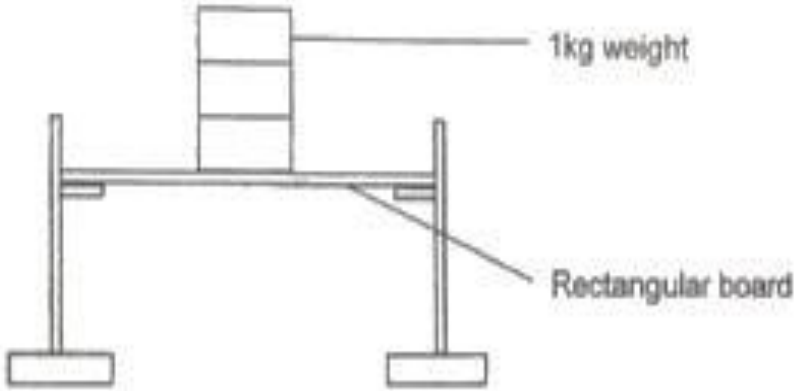
A Absorbs water or not (waterproof)

F Flexibility

F Float / Sink

Use of Mnemonics

Sam conducted an experiment using 3 rectangular boards, A, B and C, which were made of different materials. Using the set-up shown below, he continued adding 1kg weight onto the board until it breaks. He recorded the amount of weights that each board could support before breaking.



(a) Which property of the rectangular board was he testing?

Strength of the rectangular board

Rectangular boards	Amount of weights it could support
A	1 kg
B	4 kg
C	3 kg

Mnemonics Examples

P3: Properties of Materials

S Strength

T Transparency – Ability of material to allow light to pass through

A Absorbs water or not (waterproof)

F Flexibility

F Float / Sink

Mind map

- A graphic organizer
- Represent words, ideas, tasks, or other items linked
- Arranged around a central key word or idea

Benefits of using Mind maps

- Help students **recall** previous knowledge and **identify areas with misconceptions** or that have been forgotten
- Help students to **understand and retain** latest knowledge
- **Connect** prior knowledge with new knowledge
- Identify things that students have forgotten or has not been able to make connections

Mind map

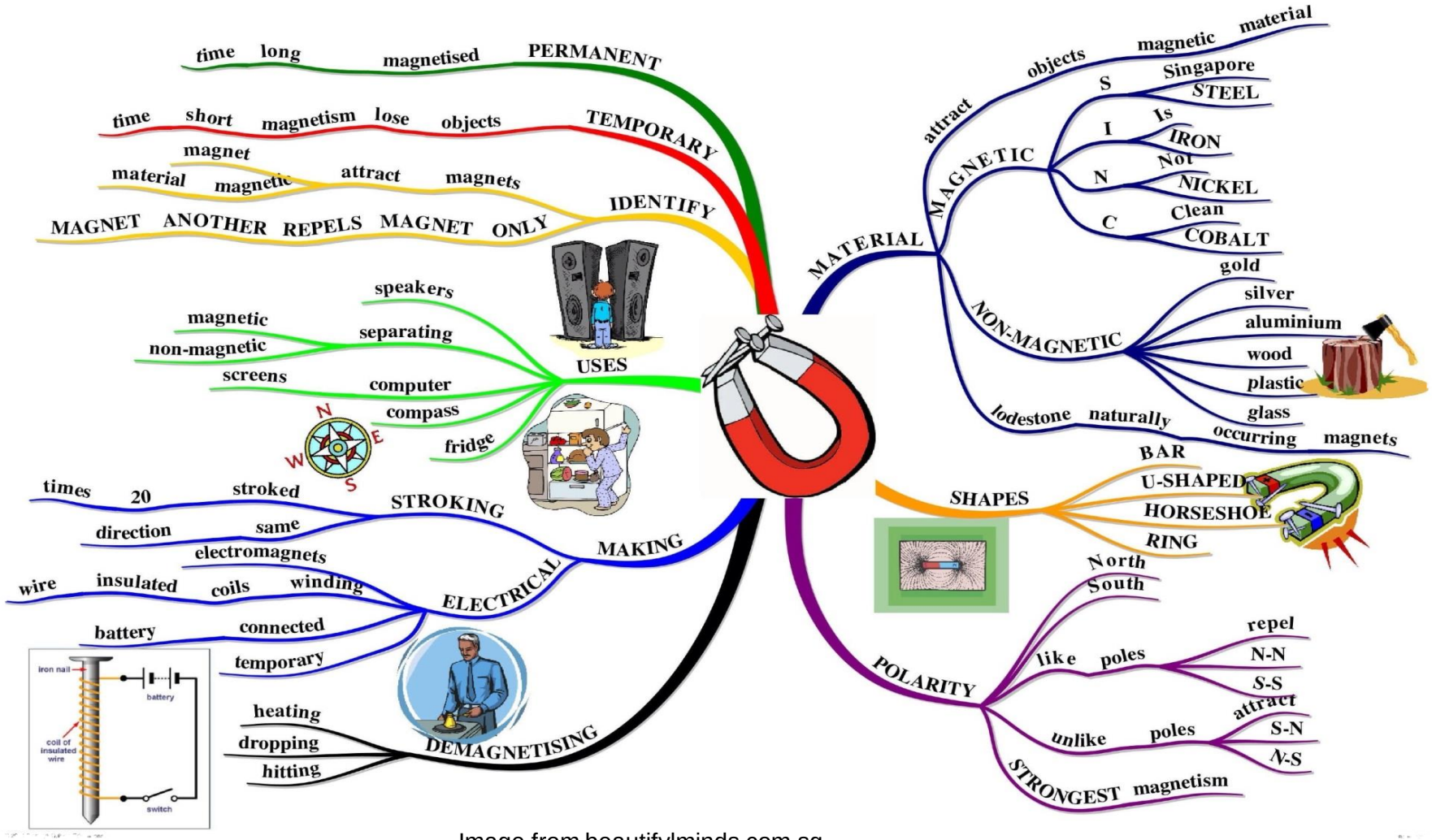


Image from beautifylminds.com.sg


THANK
YOU