Welcome to the Assessment and Curriculum Sharing

Science

We will be starting shortly

RIVERVALE PRIMARY SCHOOL

Upper Block Science Webinar 2022

17 February 2022

RIVERVALE PRIMARY SCHOOL

Coverage of Webinar

- Upper Primary Science syllabus
- Common alternative conceptions
- Answering higher order thinking questions
- Strategies in helping your child to revise Science

Coverage of the Syllabus

Four themes

Primary 5 & 6

Cycles

- Reproduction of plants and animals
- Water cycle

Systems

- Respiratory and Circulatory systems (plants and humans)
- Cell system*
- Electrical system

Energy

- Energy forms* and uses (Photosynthesis)
- Energy Conversion*

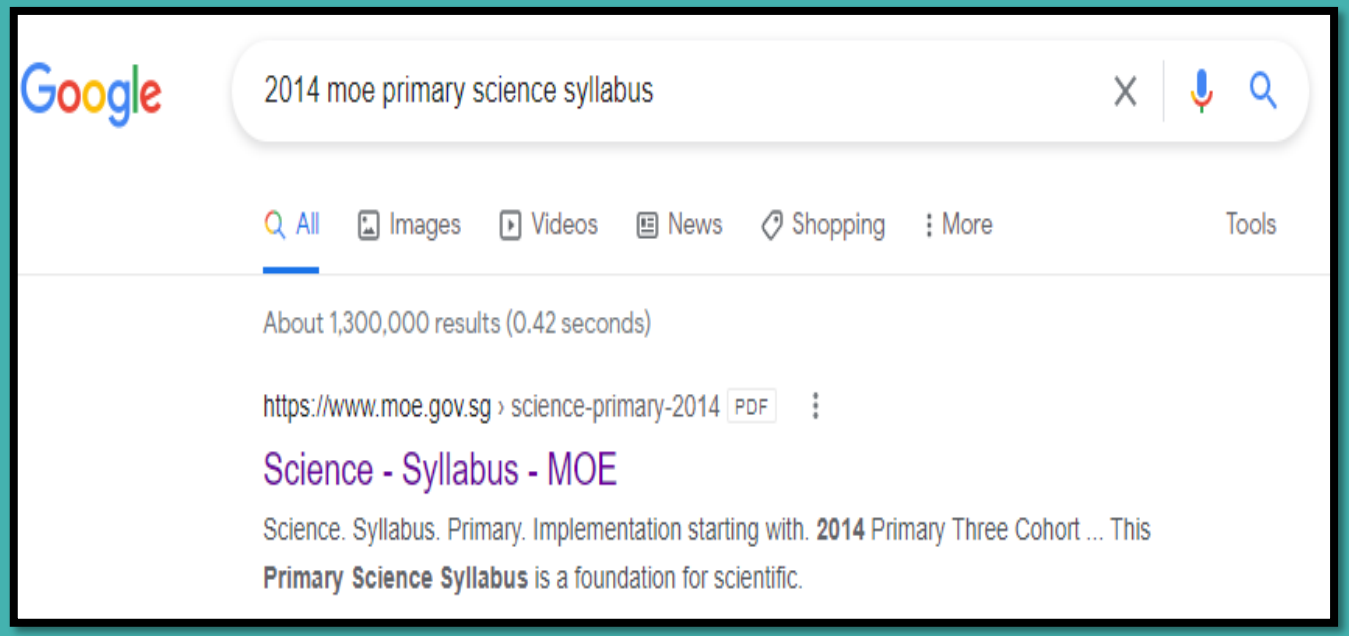
Interactions

- Interaction of forces
- Interactions within the environment

MOE SCIENCE SYLLABUS

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

SCAN ME



Summative Assessment – P5

	Weighted Assessment (Term 1)	Weighted Assessment (Term 2)
Lower Block	P4 System P4 Energy P4 Interactions	P3 Diversity - Materials P4 Energy
P5 Cycles	Reproduction in Plants and Human	Reproduction in Plants and Human Water and Changes of State + The Water Cycle
P5 System		The Plant Transport System Air and the Respiratory System The Circulatory System
Total	30 marks	30 marks
Weighting	10%	10%

Summative Assessment – P5

	Weighted Assessment (Term 3)	End Year Examination (Term 4)
Lower Block	P3 Cycles - Life Cycles P4 Interactions - Magnets	P3 Diversity and Cycles P4 Systems, Energy and Interactions
P5 Cycles	Reproduction in Plants and Human Water and Changes of State + The Water Cycle	Reproduction in Plants and Human Water and Changes of State + The Water Cycle
P5 System	The Plant Transport System Air and the Respiratory System The Circulatory System **The Unit of Life** **Electrical Systems** **Using Electricity**	The Plant Transport System Air and the Respiratory System The Circulatory System The Unit of Life Electrical Systems Using Electricity
P5 Energy		Energy in Food Forms and uses of Energy Sources of Energy
Total	30 marks	100 marks
Weighting	10%	70%

Summative Assessment – P6

	Continual Assessment (Term 1)	Mid Year Examination (Term 2)	Preliminary Examination (Term 3)
Diversity	**Diversity**	**Diversity**	**Diversity**
Cycles	**Cycles**	**Cycles**	**Cycles**
System	**System**	**System**	**System**
Interactions	*Magnets, Forces*	*(Up to Unit 3 of P6 Topics)*	**Interactions**
Energy	**Energy**	**Energy**	**Energy**
Total	100 marks	100 marks	100 marks
Weighting	NA		

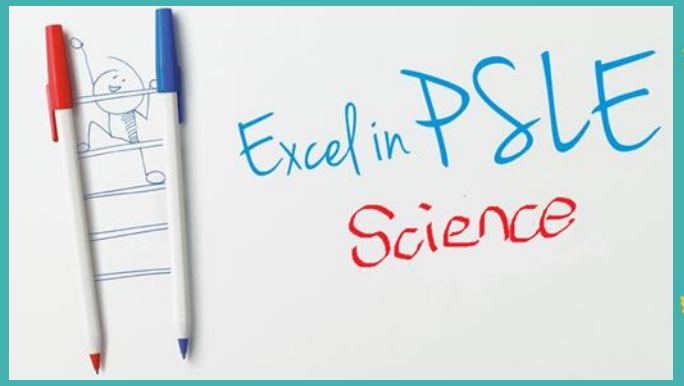
PSLE Coverage

Topics: All topics from P3 to P6

Format of paper – P5/P6 (Standard Science) :

Section A 56m (28 MCQs)

Section B 44m (13/14 Open-ended)



Format of paper – P6 (Foundation Science) :

Section A 36m (18 MCQs)

Section B 14m (6 Fill-in-the-blanks)

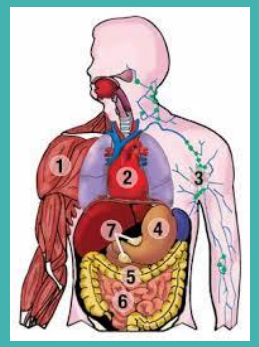
Section C 20m (5-7 Open-ended)

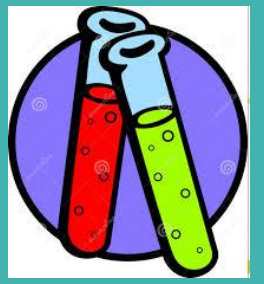
Types of questions:

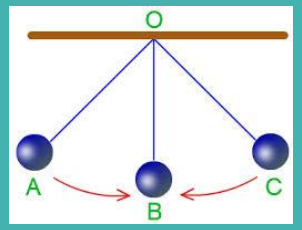
1) Knowledge with application

2) Process skills related

Science to Primary Science







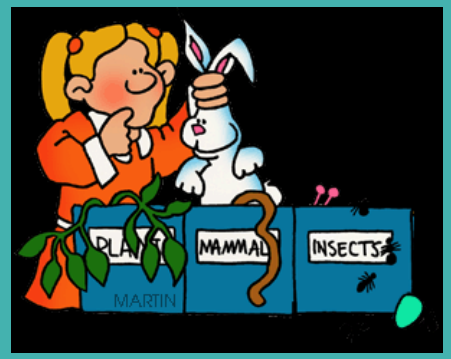
- Many fields or areas in modern science
- Biology, Chemistry and Physics

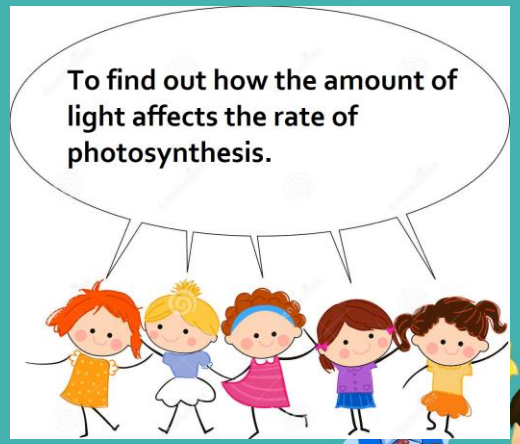
In **Primary Science**,

- Focus is on some aspects of **Biology** and **Physics**
- Strong emphasis on helping pupils to acquire **process skills** that are relevant to the study of Science

Process Skills in Primary Science

- Observe
- Compare
- Classify
- Use apparatus and equipment
- Communicate





Process Skills in Primary Science

- Infer
- Predict
- Analyse
- Generate possibilities
- Evaluate
- Formulate hypothesis

Process Skills in Primary Science

- Processes are complex operations which call upon the use of several skills.
- At the primary level, the processes expected of students are:
  - Creative Problem Solving
  - Decision-Making
  - Investigation

Coverage of Webinar

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Common Alternative Conceptions

- Science misconceptions that students make due to observations in their daily lives without reference to science theories.

- www.kahoot.it

Join at **www.kahoot.it**
or with the **Kahoot! app**

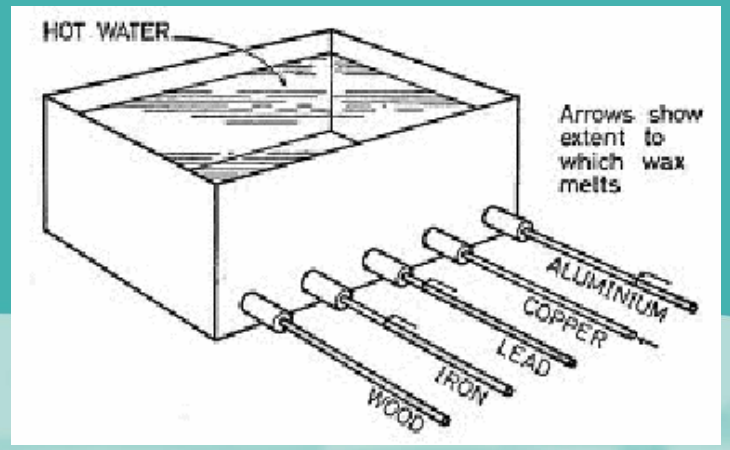
Game PIN:

135 7370

P5 Alternative Conception

✗ Some materials (example plastic) are insulators of heat.

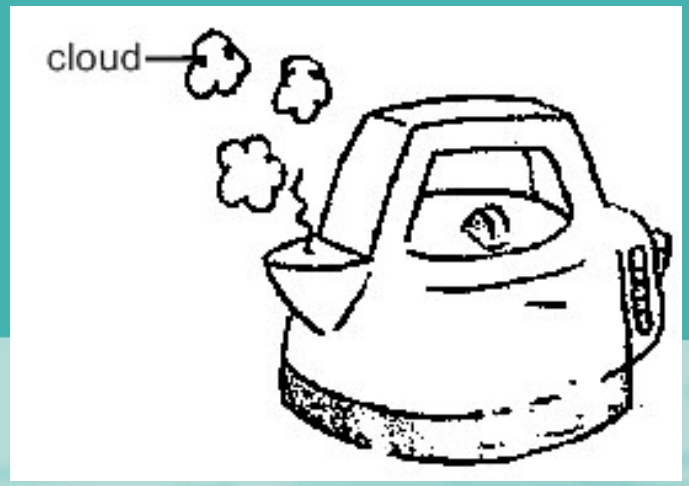
- **<u>Explanation:</u>**
- In primary science, we use the term good or poor (bad) conductors of heat, since all materials will conduct heat. The difference is how fast heat can be conducted through the material. Good conductors allow heat to flow through easily or quickly.



P5 Alternative Conception

✗ When water boils, the white clouds observed is steam.

- **<u>Explanation:</u>**
- Steam and water vapour are colourless and cannot be seen. What is seen is actually white clouds of tiny water droplets. Water vapour condenses and forms tiny water droplets (white clouds) when it comes into contact with the cooler surrounding air.



P6 Alternative Conception

- Weight is the same as mass.

- **Explanation:**

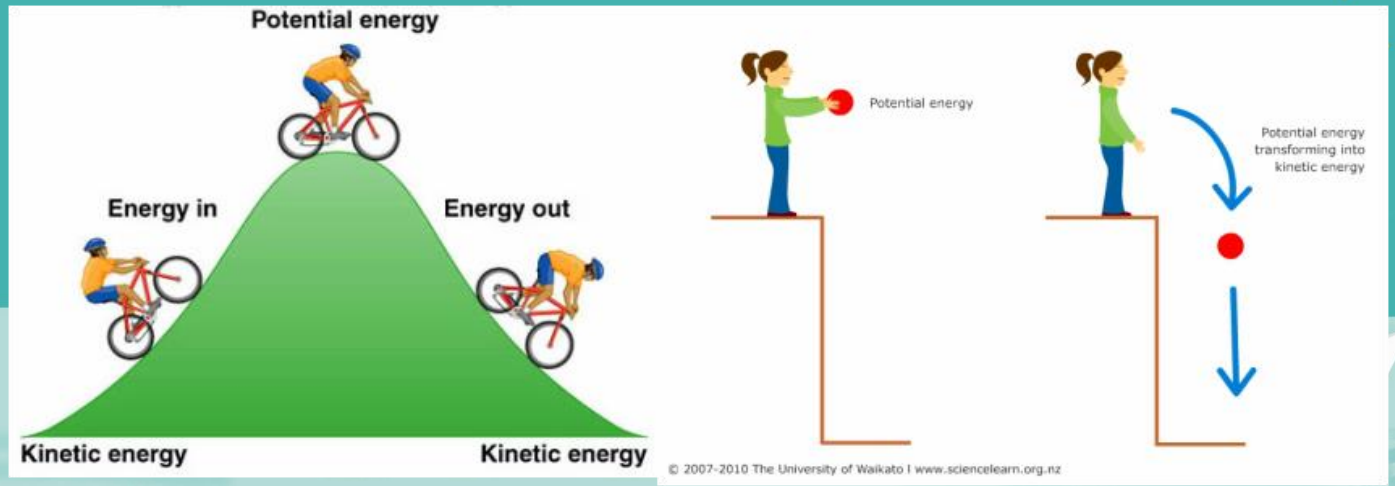
- Mass refers to the amount of matter an object possesses.
- Weight is the pull of gravity on this amount of matter.
- Mass of an object will not change regardless of the location. Weight of an object will change depending on the force of gravity at the location (example: weightlessness in space)

P6 Alternative Conception

- ✗ Force is often confused with energy.
- ✗ The higher an object is, the more gravitational force it has.

Explanation:

- The higher an object is, the more gravitational potential energy it has.
- **Gravitational force remains** nearly constant when an object is close to surface of the Earth.



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Techniques in Answering Science Questions

- Types of questions
- How to craft answers (some dos and don'ts)

Possible types of questions

- Application of concept
- State an observation
- Relationship / Conclusion
- Experimental set-ups
  - Critique / Improve on set-up / Choosing sets of set-ups / Variables

- Application
  - Expected results
- Explain / Why
  - Comparisons
  - Observations
  - Results
  - Experimental results
- Sequencing (process)

Some question words…

1. **State** – To write down a fact
2. **Relationship** – How the variable tested affects the observation
3. **Explain** – link science concept into explanation
4. **Compare** – to group things based on common characteristics
5. **Classify** – to identify similarities and differences between objects, concepts or processes

Some question words…

6. **Why** – Give reason
7. **What** – stating some observation, variable, object etc…
8. **Which** – choose the right object, variable etc…
9. **When** - time
10. **How** – method. Way of doing something etc…

Steps to Answering Questions

1. Identify and highlight key information
2. Identify Concepts and Scientific Vocabulary
    - Activate prior knowledge
3. OIC (To make sense of the question)

Answering techniques (OIC)

- Observation – What we can observe/see from the question.
- Interpretation – What does the observation imply or mean.
- Conclusion – Link answer to the question setting / concept in the question.

Identifying Key Information and Using prior Knowledge

The characteristics of plant X and plant Y of the same species is shown below.

Plant	Height of plant	Characteristics of fruits
X	Medium	Large and sweet
Y	Tall	Small and sour

Tom pollinated the flowers from plant X with pollen grains from plant Y. After a while, the flowers developed into fruits and Tom planted the seeds obtained from the fruits.

Scientific vocabulary:

- Characteristics
- Inherit
- Parent
- Offspring
- Pollination

Concept: plant reproduction, heredity, pollination

Q1 - Cycles

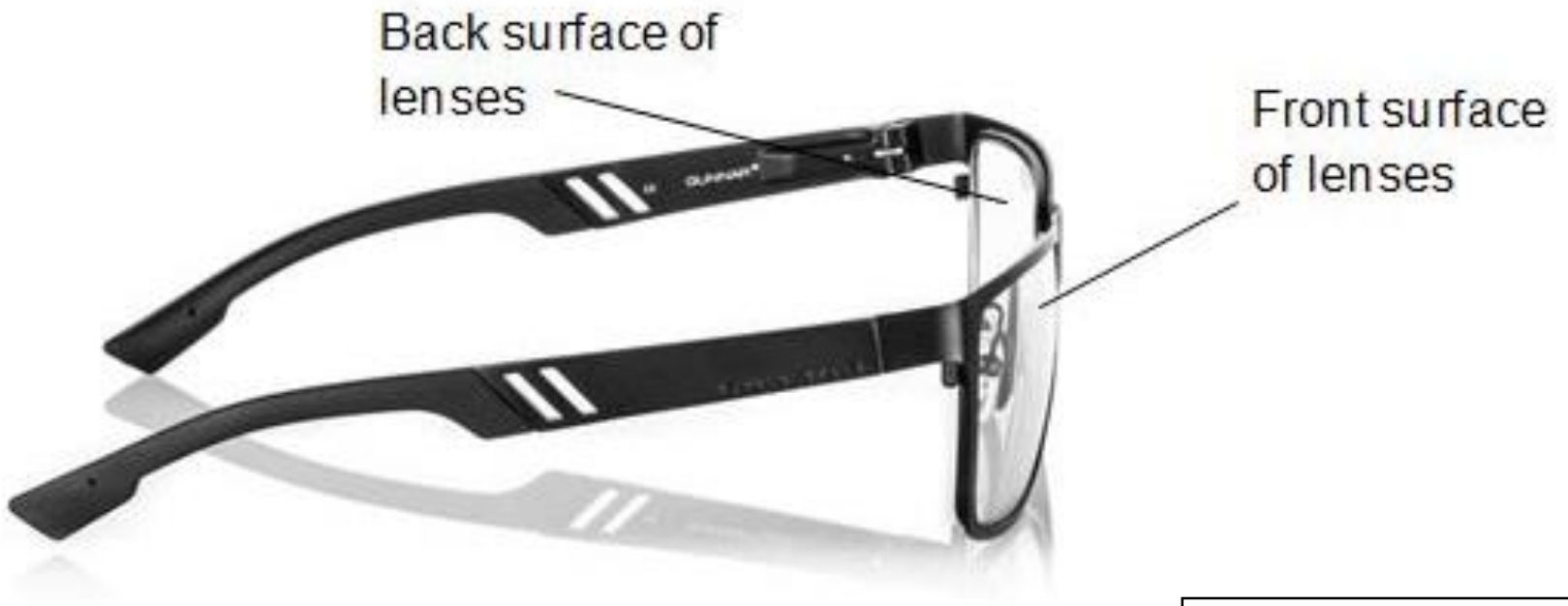
Benjamin boarded an air-conditioned bus. When he alighted from the bus, he noticed that there were tiny water droplets forming on the lenses of his spectacles.

Scientific vocabulary:

- Heat loss
- Condensation/ Condenses
- Change state
- Water droplets
- Water vapour

Concept: water cycle, condensation

Q1 - Cycles



(a) State the surface(s) of the lenses that had water droplets forming on them.

Both the back and front surfaces.

OIC:

- O : The bus was air – conditioned. The air outside the bus was warmer.
- I: The warm water vapour would touch the surfaces which are cooler, lose heat and condense to become water droplets.
- C: So, since both front and back surfaces are cooler, both surfaces will have water droplets.
-

Benjamin boarded an air-conditioned bus. When he alighted from the bus, he noticed that there were tiny water droplets forming on the lenses of his spectacles.

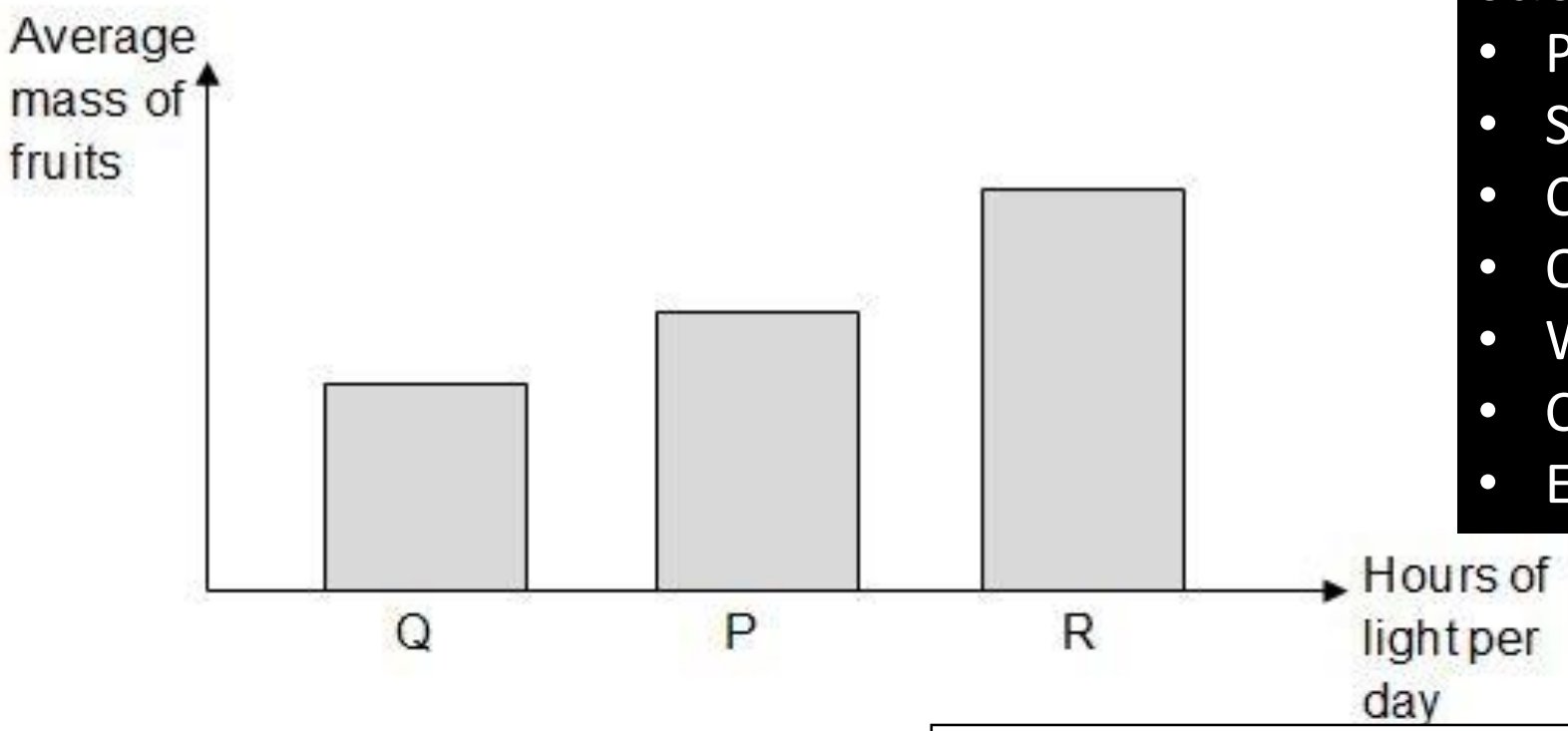
Process Skills involved
- **Observing**
- **Analysing**
- **Communicating**

(b) Explain how water droplets are formed in part (a). [2]

Warm water vapour from the surrounding touches the cold back and front surfaces of the glass, loses heat and condenses to form water droplets.

Q2 - Energy

Kor Pin exposed three similar plants, P, Q and R, to different duration of light each day and measured the average mass of the fruits on the plants after a week. The plants were placed in similar pots with similar types and amount of soil. He plotted the results in a graph as shown below.

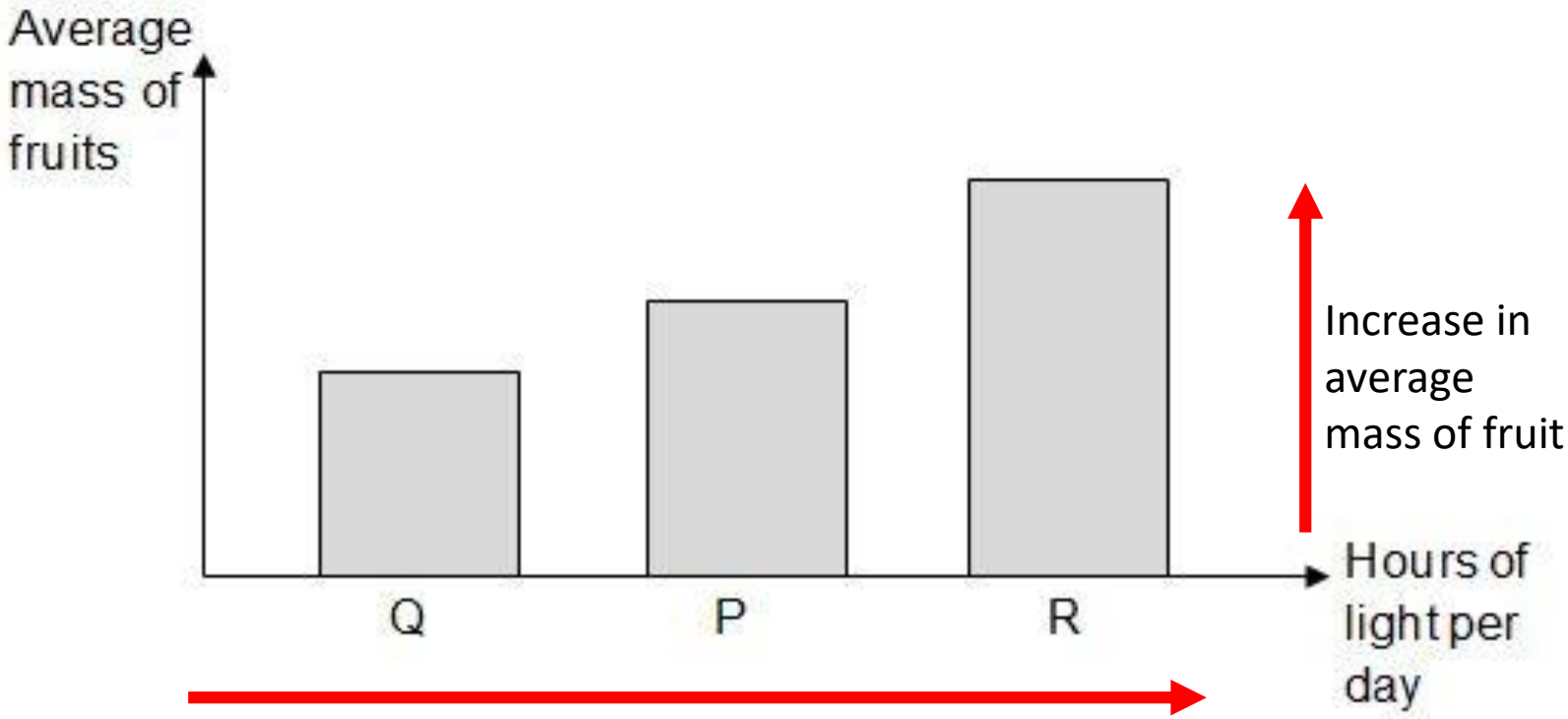


Scientific vocabulary:

- Photosynthesis
- Sunlight
- Chlorophyll
- Oxygen gas
- Water
- Carbon dioxide
- Excess food

Concept: Photosynthesis, excess food stored as starch

Q2 - Energy



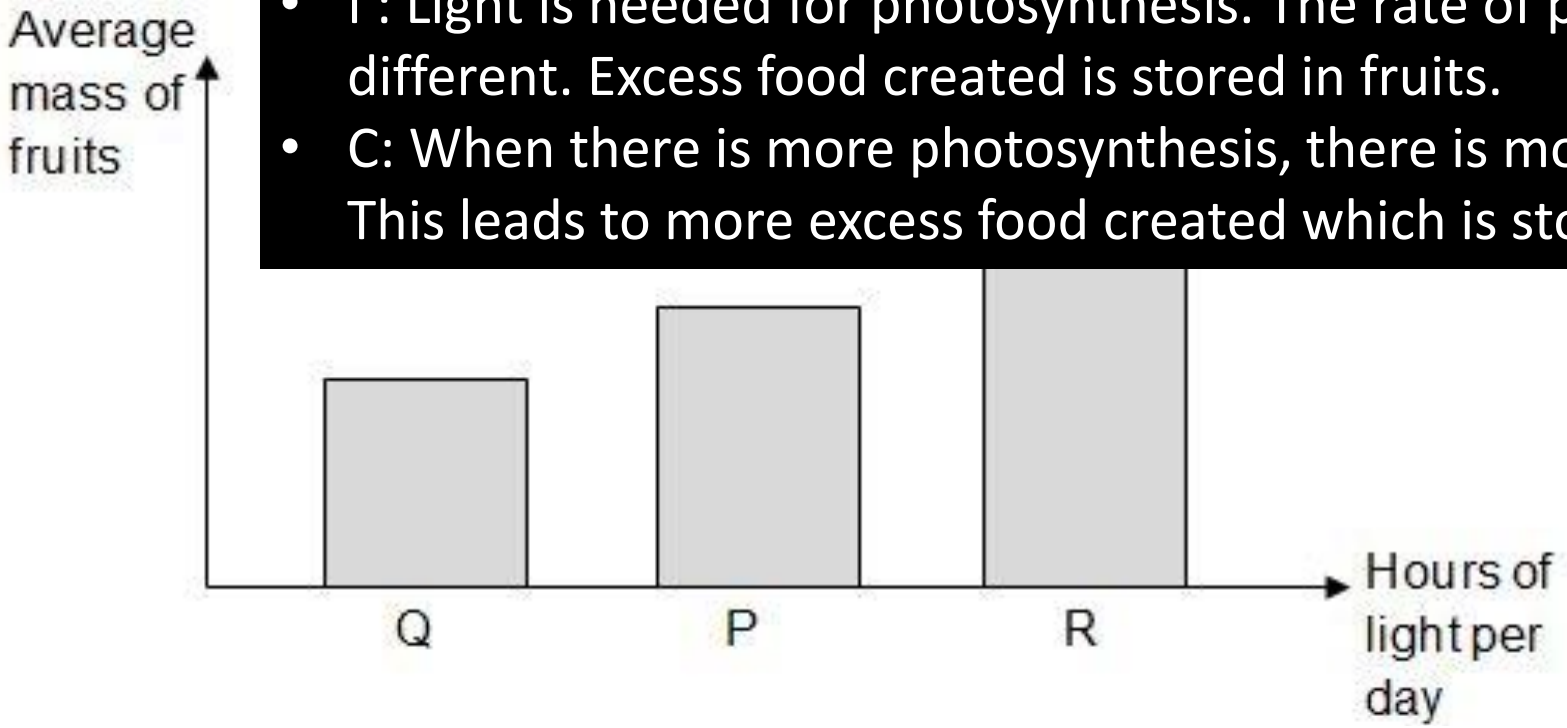
(a) State the relationship between the duration of light received by the plants per day and mass of the fruits. [1]

As the duration of light received by the plants per day increases, the mass/size of the fruits increases

Q2 – Energy

OIC:

- O : Different fruits are exposed to different amounts of light.
- I : Light is needed for photosynthesis. The rate of photosynthesis is different. Excess food created is stored in fruits.
- C: When there is more photosynthesis, there is more food produced. This leads to more excess food created which is stored in the fruits.

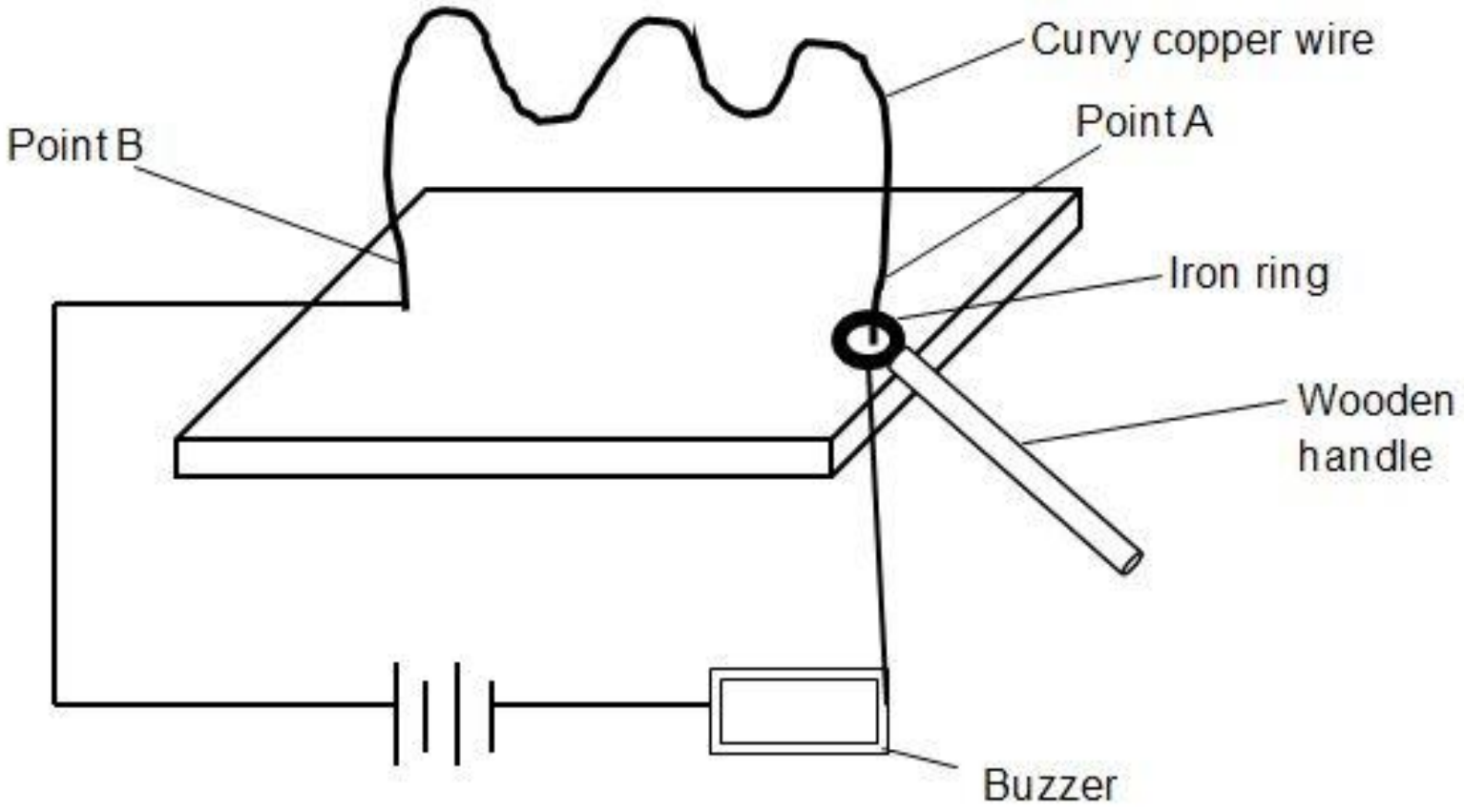


(b) Give an explanation for the results obtained in the experiment [1]

When there is more light, there is more photosynthesis taking place and more excess food is transported to the fruits causing the mass to increase.

Q3 - Systems

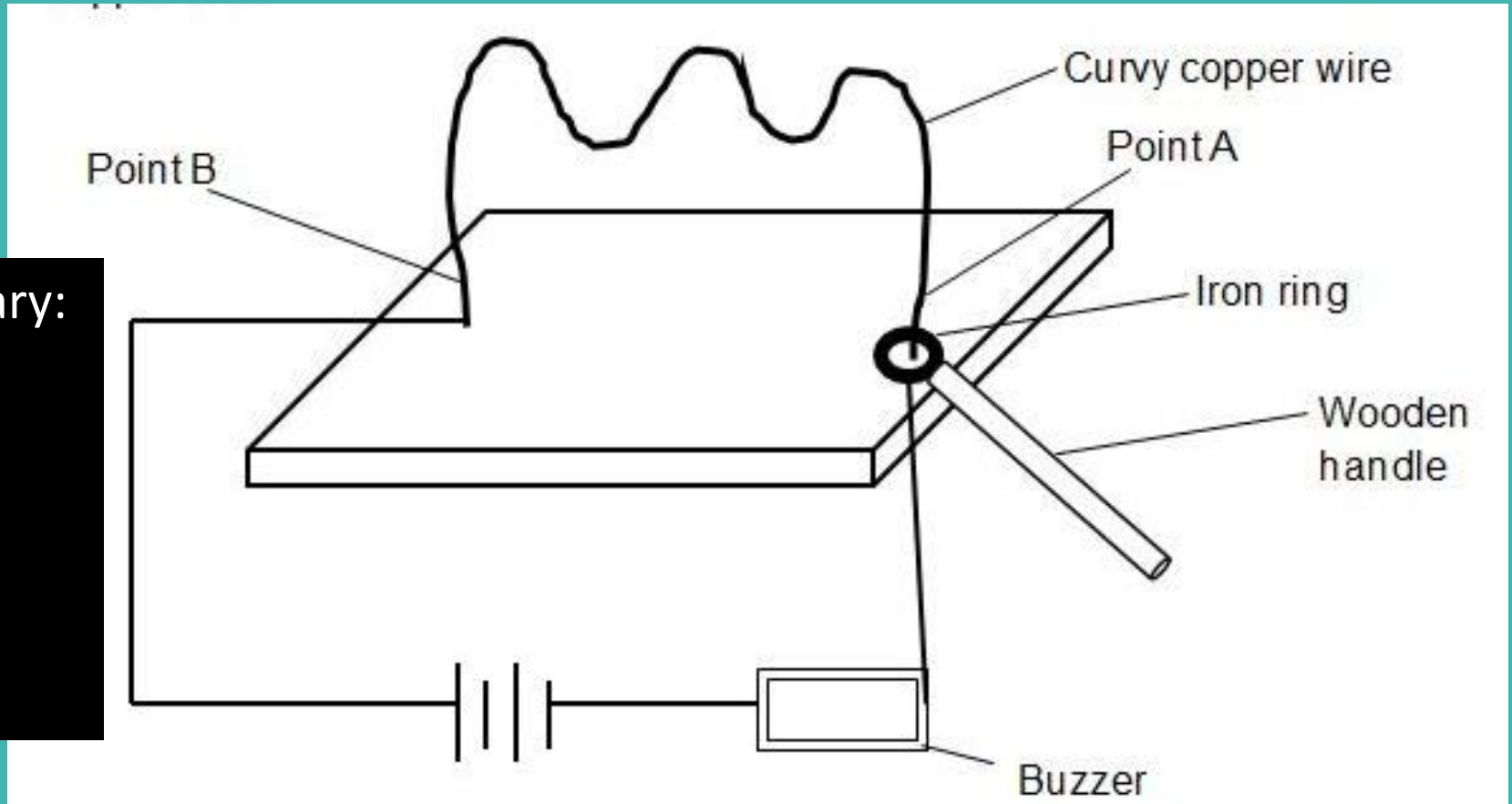
Ben set up a game as shown in the diagram below. The objective of the game was to move the iron ring from point A to point B without touching the curvy copper wire.



Q3 - Systems

Scientific vocabulary:

- Closed circuit
- Open circuit
- Conductors of electricity
- Insulators of electricity



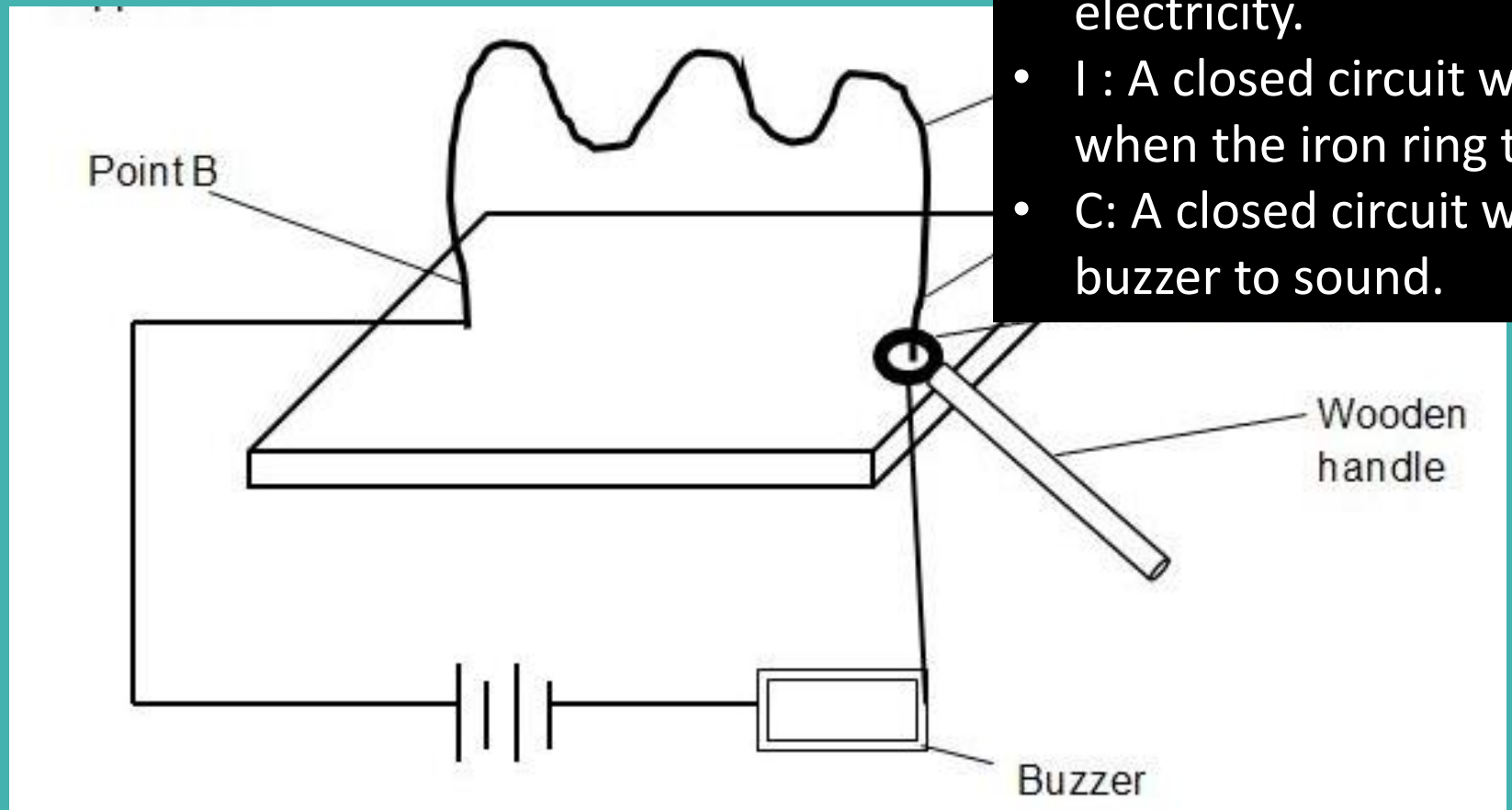
(a) What would happen when the iron ring touches the curvy copper wire? [1]

Concept: Electrical system, conductors of electricity

Q3 - Systems

OIC:

- O : Iron ring is a conductor of electricity.
- I : A closed circuit will be formed when the iron ring touches the wire.
- C: A closed circuit will caused the buzzer to sound.



(a) What would happen when the iron ring touches the curvy copper wire? [1]

The buzzer would sound.

(b) Explain your answer in part (a) [1]

The iron ring is a conductor of electricity. So, when it touches the wire, a closed circuit would be formed and electricity will flow through the circuit and buzzer.

OIC:

- O : Iron ring is a conductor of electricity.
- I : A closed circuit will be formed when the iron ring touches the wire.
- C: A closed circuit will caused the buzzer to sound.

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Help your child revise Science

- Importance of key concepts / ideas
- Strategies for recall
  - Mnemonics
  - Mind maps / concept maps
- Regular revision

Importance of key concepts and ideas

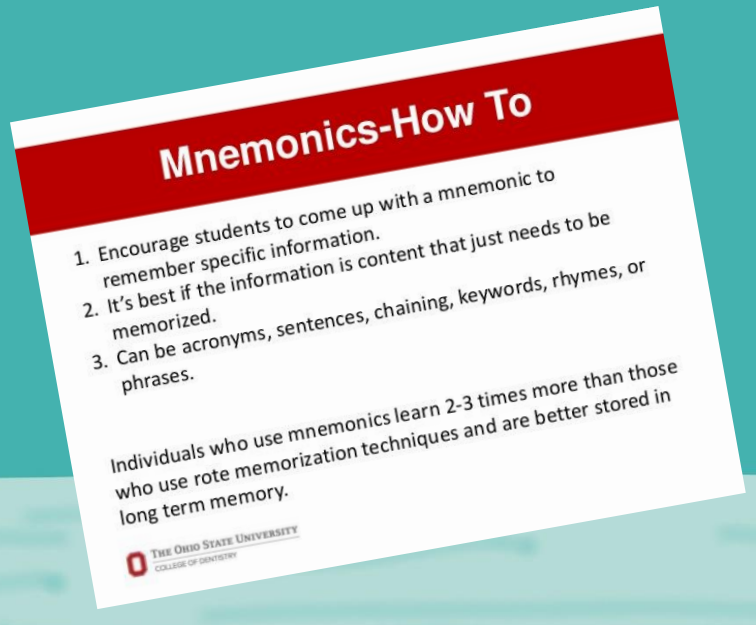
- Key concepts are the main scientific ideas that explains why/how something occurs.
- Key ideas are concepts that are explained/expressed using scientific vocabulary.
- Scientific vocabulary are scientific words used in science that have specific meanings, different from daily usage.

Importance of key concepts and ideas

- Scientific vocabulary are used in answers to explain scientific concepts better, with lesser room for errors.
- The current testing of Science is on scientific concepts and their application in different situations.
- There is a need to relate how an answer relates to a concept or how the concept is applied.

Mnemonics

- 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 (Example)

Seeds need

- Warmth
- Oxygen / Air
- Water

to germinate

Seed dispersal prevents overcrowding and reduces competition for

- Space
- Sunlight
- Water
- Minerals

Strategies to help in recalling

Mind maps

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

Example of mind map

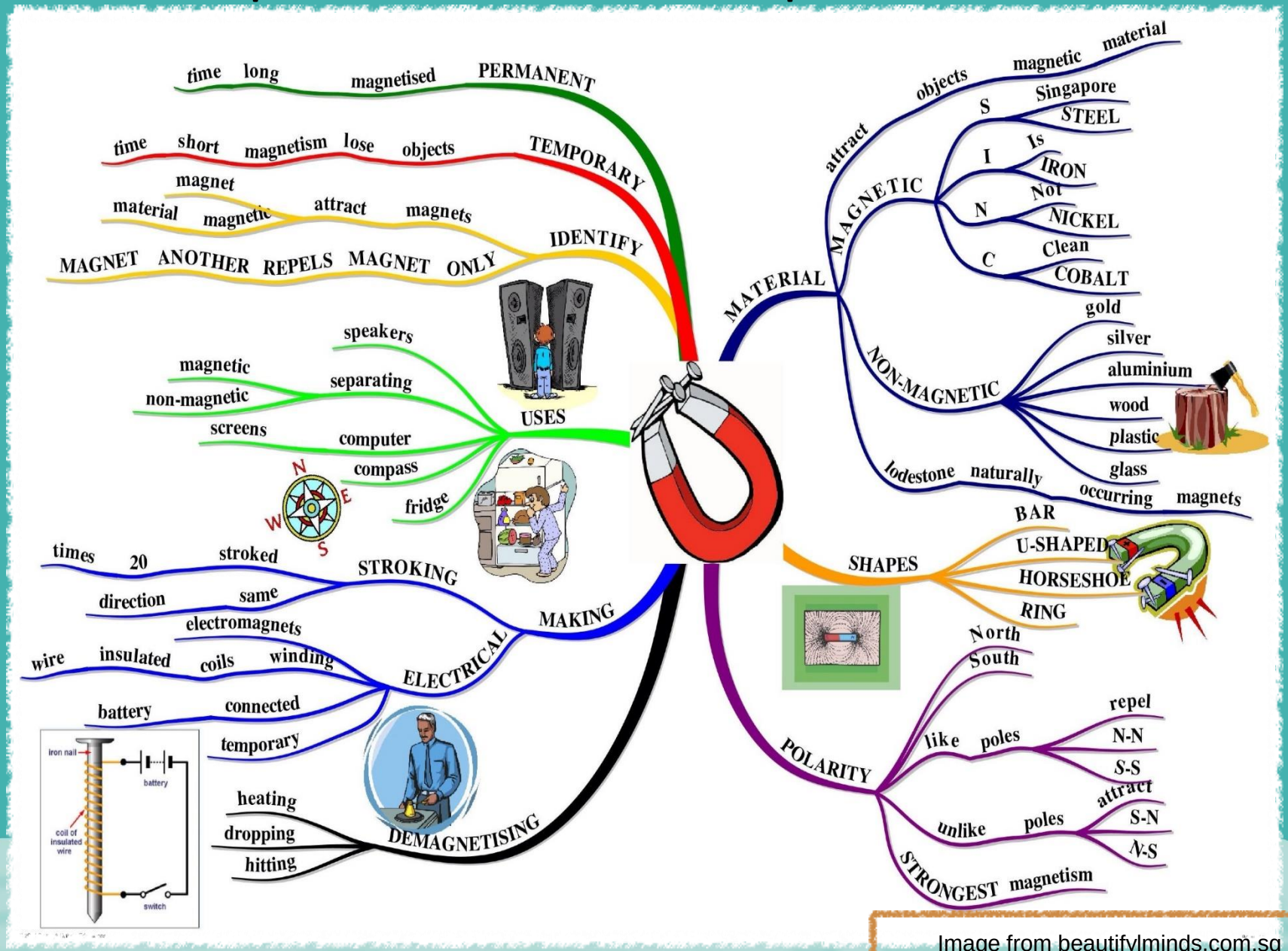
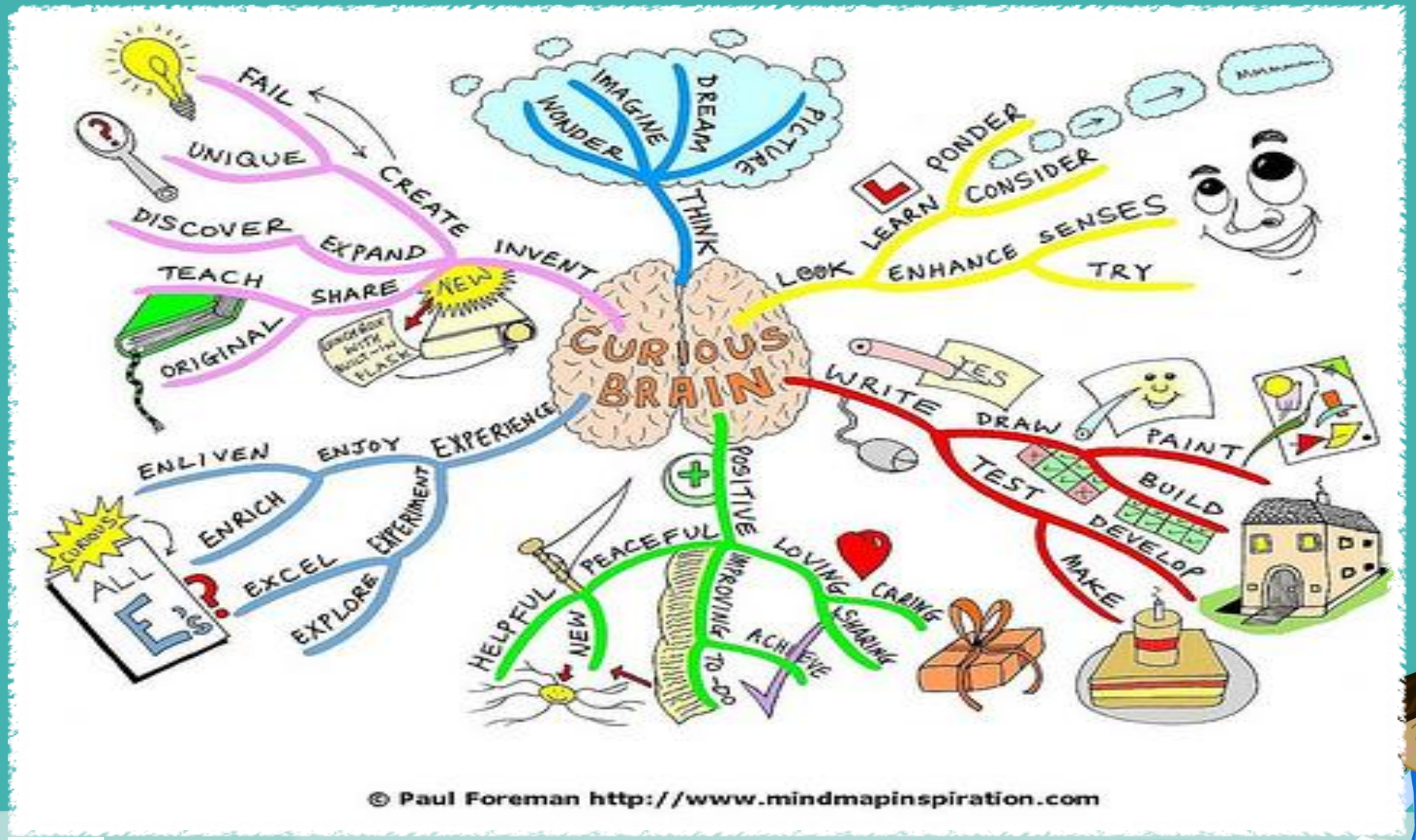


Image from beautifylminds.com.sg

Example of mind map

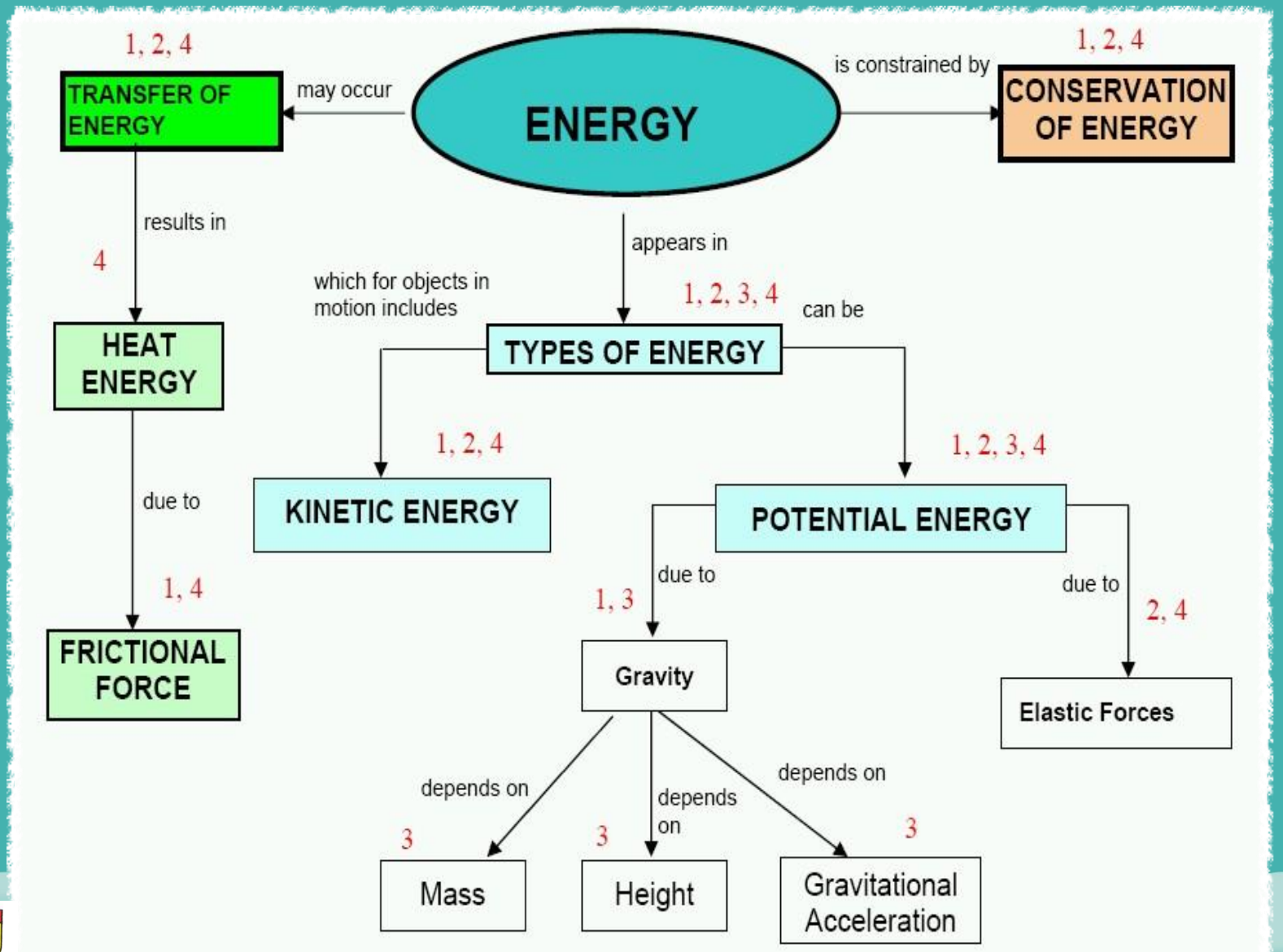


Strategies to help in recalling

Concept maps

- A diagram showing the relationships among concepts
- Graphical tool for organizing and representing knowledge
- Represented as boxes or circles, are connected with labeled arrows in a downward-branching hierarchical structure
- Linking phrases such as "gives rise to", "results in", "is required by" or "contributes to"

Example of concept map

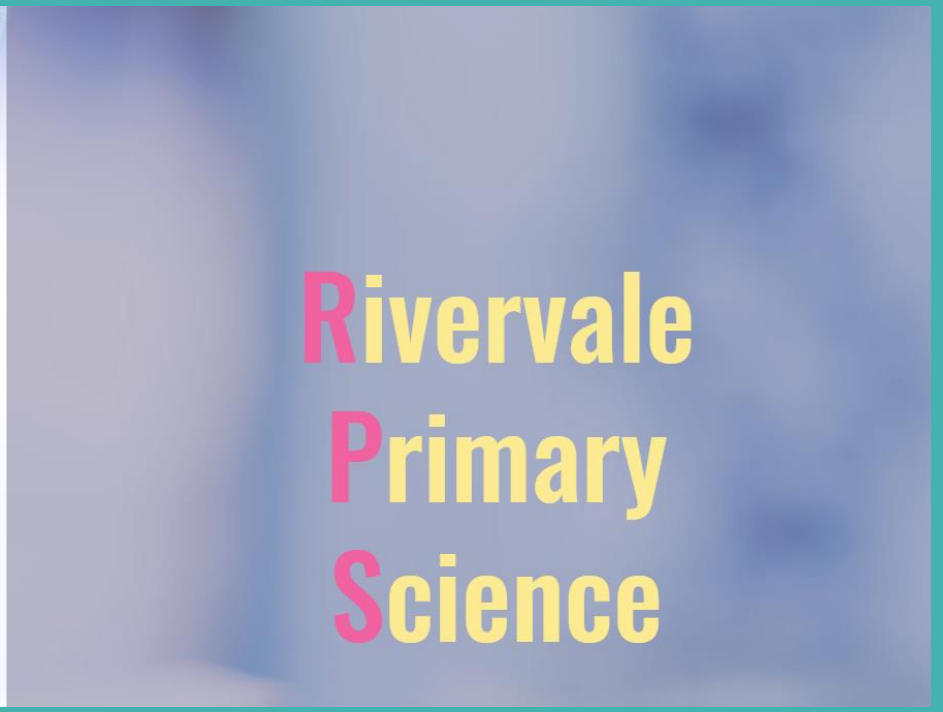


Uses of mind maps and concept maps

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

School Science Website.

- https://rivervalescience.wixsite.com/2020



YOUR FEEDBACK MATTERS


THANK
YOU