



Primary 5 Science Sharing

20th January 2017

Purpose of this sharing is to provide an insight into the changes in the PSLE Science format which will be implemented from this year.

Scope of Briefing

- ❖ Key focus of the 2014 Primary Science Syllabus
- ❖ Changes to PSLE Science
- ❖ New PSLE Science Format
- ❖ Exemplars and Mark Scheme
- ❖ Answering strategies
- ❖ Home Support

2014 Primary Science Syllabus

- To provide the student with a strong foundation in scientific concepts
- To nurture and develop the student's skills and necessary attitudes for Scientific inquiry
- To develop the student in using these process skills to apply the scientific concepts to different contexts

Assessment Objectives (AOs) of PSLE Science

Students should be able to

(1) demonstrate their **knowledge** and **understanding** of scientific concepts (AO1)

(2) use various **process skills** to interpret and analyse data and **apply scientific concepts** to **different contexts** (AO2)

PSLE SCIENCE AOs Weighting

STANDARD SCIENCE

(I) Knowledge with understanding	40%
(II) Application of knowledge and process skills	60%

FOUNDATION SCIENCE

(I) Knowledge with understanding	50%
(II) Application of knowledge and process skills	50%

Format of Paper (Standard Science)

Section	Item Type	No. of Qns	Marks per Qn	Weighting
A	MCQ	28	2	56%
B	OE	12 or 13	2, 3, 4 or 5	44%

Duration of Paper : 1h 45 min

Format of Paper (Foundation Science)

Section	Item Type	No. of Qns	Marks per Qn	Weighting
A	MCQ	18	2	36%
B	Structured OE	6 to 7	2 or 3	14%
		5 to 6	2 or 4	20%

Total: 70 marks, Duration of Paper : 1h 15 min

Distribution of Marks

According to Syllabus Content

Life Science

45% - 55%

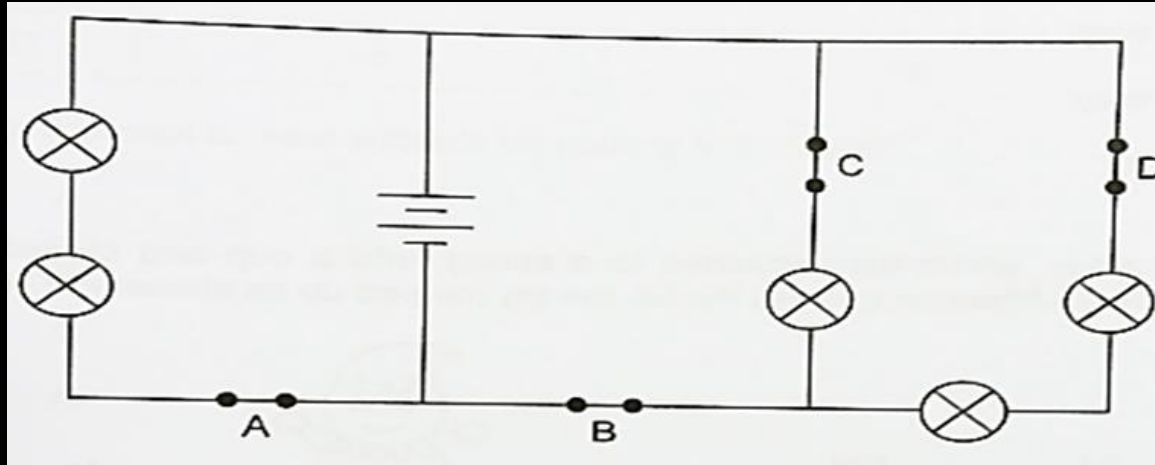
Physical Science

45% - 55%

Exemplar 1

AOII Application

Wenshan set up a circuit as shown.



All five bulbs were lit when all four switches were closed. She wanted the **fewest** number of bulbs to be lit by opening only one switch.

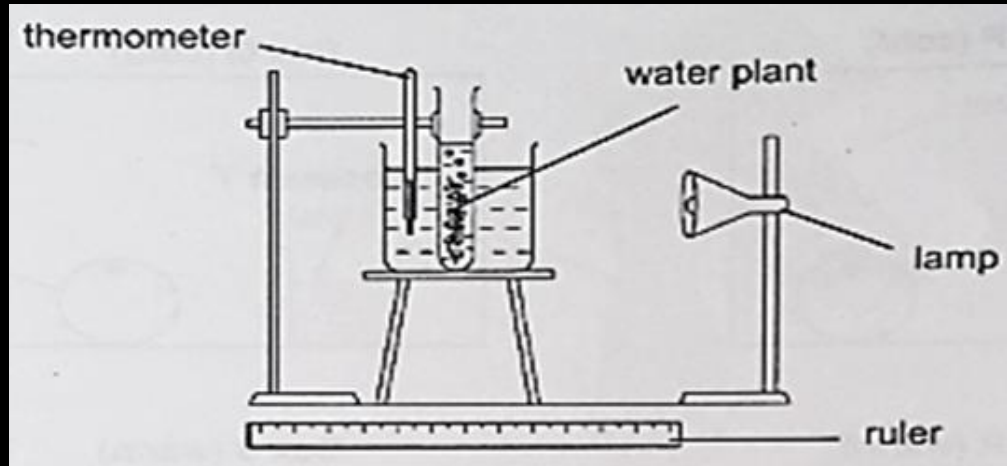
Which switch should she open?

- (1) A
- (2) B
- (3) C
- (4) D

Exemplar 2

AOII Application

Meifen wanted to find out how temperature affects the number of bubbles produced by a water plant.



She set the temperature of water at 10°C and switched on the lamp. She counted the number of bubbles produced per minute. Next, she repeated the experiment at 20°C and 30°C . Her results are as shown.

Temperature ($^{\circ}\text{C}$)	Number of bubbles produced per minute
10	4
20	12
30	25

(a) Based on Meifen's results, how does temperature affect the rate of photosynthesis? [1]

(b) Meifen also wanted to find out if the amount of light affects the number of bubbles produced.

Describe how Meifen could carry out the experiment without changing any of the above apparatus. [2]

Answering part (a) - Key ideas

(a) Based on Meifen's results, how does temperature affect the rate of photosynthesis? [1]

- ❖ Relationship between the two variables
- ❖ Independent variable → Temperature of water
- ❖ Data shows increase in the temperature of water results in the increase in the rate of the number of bubbles produced per minute (Evidence)
- ❖ Thus, rate of photosynthesis increases when temperature increases. (Concept)

Answering part (b) - Key ideas

(b) Describe how Meifen could carry out the experiment without changing any of the above apparatus. [2]

- ❖ Required to suggest suitable changes to the experiment given the change in the aim of the experiment
- ❖ Thus, distance between light source and water plant must be changed while keeping all other variables the same
- ❖ Number of bubbles produced per minute should be counted and compared

Exemplar 3

AOII

Application

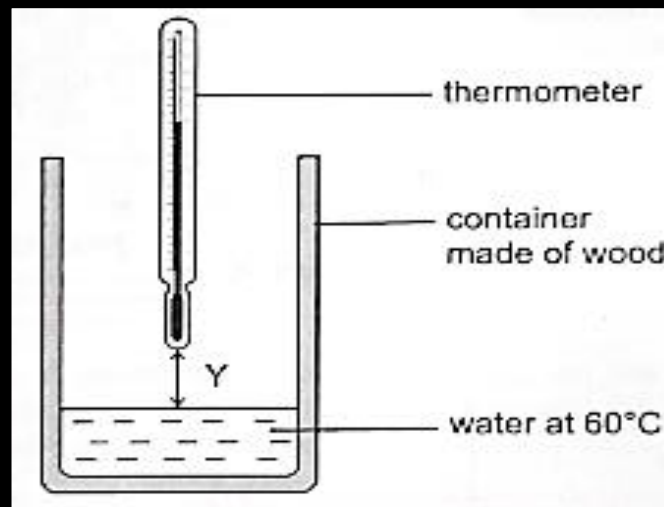
(in Real – World Context)

Exemplar 3

- ❖ An experiment is given as a scenario for the first part of the question. Students need to recognise the key idea based on the experiment and data given.
- ❖ In the second part of the question a real-world context will be given for students to apply this key idea.
- ❖ This type of test item that comes with a parallel example is the current trend observed in Primary Science Assessment.

Martin filled a container made of wood with water at 60°C . The temperature of water remained at 60°C throughout the experiment.

He measured the temperature of the air at various distance, Y , from the water surface.



His results are shown below.

Distance Y (cm)	2	4	6	8	10	12
Temperature of air ($^{\circ}\text{C}$)	42	36	32	29	27	27

- (a) Explain how using a container made of wood helped to make the experiment more accurate. [1]
- (b) Give a reason why the experiment had to be conducted over a short period of time. [1]
- (c) Based on the above results, what is the relationship between the temperature of the air and distance Y? [1]

Analysing part (a) - Key ideas

(a) Explain how using a container made of wood helped to make the experiment more accurate. [1]

- ❖ Wood is a poor conductor of heat, it conducts heat away slowly (from the water to the surrounding)
- ❖ This ensures that temperature of hot water does not drop quickly. Otherwise, it will affect the temperature of the air that is being measured.

Analysing part (b) - Key ideas

(b) Give a reason why the experiment had to be conducted over a short period of time. [1]

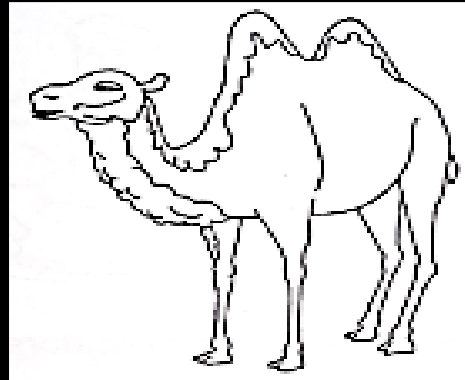
- ❖ The temperature of water will not remain constant as water will lose heat to the surrounding
- ❖ it will affect the temperature of the air that is being measured.

Analysing part (c) - Key ideas

(c) Based on the above results, what is the relationship between the temperature of the air and distance Y? [1]

- ❖ Key idea → Relationship between distance Y and the temperature of air
- ❖ As distance Y increases temperature of air decreases

(d) Animal H lives in the desert.



It stands on the hot sand with its four long legs.

- (i) Based on Martin's findings, explain why having long legs is an advantage for animal H. [1]
- (ii) The temperature in the desert gets very low at night. Animal H has thick fur to help it adapt to life in the desert. Explain why having thick fur is an advantage for animal H. [1]

Answering part (di) - Key ideas

(di) Based on Martin's findings, explain why having long legs is an advantage for animal H. [1]

- ❖ Long legs help to keep the camel's body away from the hot sand
- ❖ Reduces the amount of heat the body gains from the hot sand

Answering part (dii) - Key ideas

(dii) The temperature in the desert gets very low at night. Animal H has thick fur to help it adapt to life in the desert. Explain why having thick fur is an advantage for animal H. [1]

- ❖ Heat from the body would not be lost quickly to the cold surroundings
- ❖ **Concepts from different topics are tested here. (Heat energy and animal adaptation to surrounding temperature)**

Mark Scheme

- Broad and flexible
- Marks awarded for conceptual understanding
- Mark scheme includes setters' expected answers
- Student's answers that are different from the mark scheme are carefully evaluated and included as acceptable answers if they are conceptually correct
- Marks are not awarded for merely stating 'correct' key words in the answer statement.
- Answer must be specific to the context.
- Answers must show evidence of understanding of relevant concepts and mastery of skills . Such answers will be given due credit.

Conceptual Understanding

Knowing and understanding scientific knowledge is important.

But simply acquiring scientific knowledge does not prepare a student sufficiently for the examination.

Scientific knowledge is only useful when a student knows which situations to apply it in and how to modify it for new situation.

Implications

- ❖ Accurate understanding of concepts is very, very important
 - ✓ **Make connections** between concepts learnt
 - Materials & Magnets
 - Heat & Energy
 - Global Warming
 - ✓ **Apply** concepts / skills in new situations (YIP)
 - ✓ **Give reasons** for choices made
- ❖ Revision of concepts learnt from P3 to P4

Gearing towards PSLE

- ❖ Revise P3, P4 and P5 work which forms the bulk of PSLE Questions
- ❖ Concepts covered in P3 and P4 are tested through more challenging questions

Environment Blog

- ❖ Blog used to teach topic of Environment
- ❖ Learning resources on the topic of Environment will be uploaded
<http://henryparkpri.moe.edu.sg/departments/science>
- ❖ Students required to access the blog
- ❖ Encourages self-directed learning
- ❖ Link on HPPS website for easy access
- ❖ Real world problems such as pollution & global warming will be introduced
- ❖ Please allow your children access to the blog from home

Answering Technique

Claim → Evidence → Reasoning

Claim → Evidence → Reasoning (CER)

Claim

- ❖ Answer to the question!
- ❖ Usually the easiest for the students

Evidence

- ❖ Must be appropriate / precise (usually quantitative data)
- ❖ Must be sufficient

Reasoning

- ❖ Explains how the evidence supports the claim
- ❖ Often includes scientific principles

CER Example

Frictional Force

A ball was rolled over four different surfaces M, N P and Q with the same amount of force applied.

The table below shows the time taken for the ball to come to a stop on each surface.

Surface	Time taken for ball to come to a stop (seconds)
M	40
N	52
P	37
Q	68

(a) Based on the results in the table above, which surface was the roughest? Explain your answer. [2]

Suggested Answer

CER APPROACH

P is the roughest. [claim]

Time taken for the ball to come to a stop on P was the shortest [evidence - 1m],

as the amount of friction between the ball and P is the greatest [explanation - 1m]

Go Beyond the Classroom

- ❖ Read widely, beyond the text book
For example, Singapore Scientist
- ❖ Watch Science Programmes - Documentaries on TV
For example, Animal Planet and Discovery Channel
- ❖ Helps to understand how concepts can be applied in varied contexts

P5 Science Curriculum Updates

P5 SCIENCE TOPICS:

SEMESTER 1:

- (1) WATER
- (2) ENVIRONMENT
- (3) CELLS
- (4) REPRODUCTION IN PLANTS & ANIMALS

SEMESTER 2:

- (5) YI PROJECT
- (6) HUMAN & PLANT SYSTEMS
- (7) ELECTRICAL SYSTEM

P5 Science Curriculum Updates

P6 SCIENCE TOPICS:

SEMESTER 1:

- (1) PHOTOSYNTHESIS
- (2) ENERGY CONVERSION
- (3) FORCES
- (4) PHYSICAL CHARACTERISTICS OF ENVIRONMENT
- (5) FOOD CHAINS AND FOOD WEBS

SEMESTER 2:

- (5) POPULATIONS AND COMMUNITIES
- (6) ADAPTATIONS

