Hougang Primary School

P5 SCIENCE WORKSHOP FOR PARENTS

Facilitators
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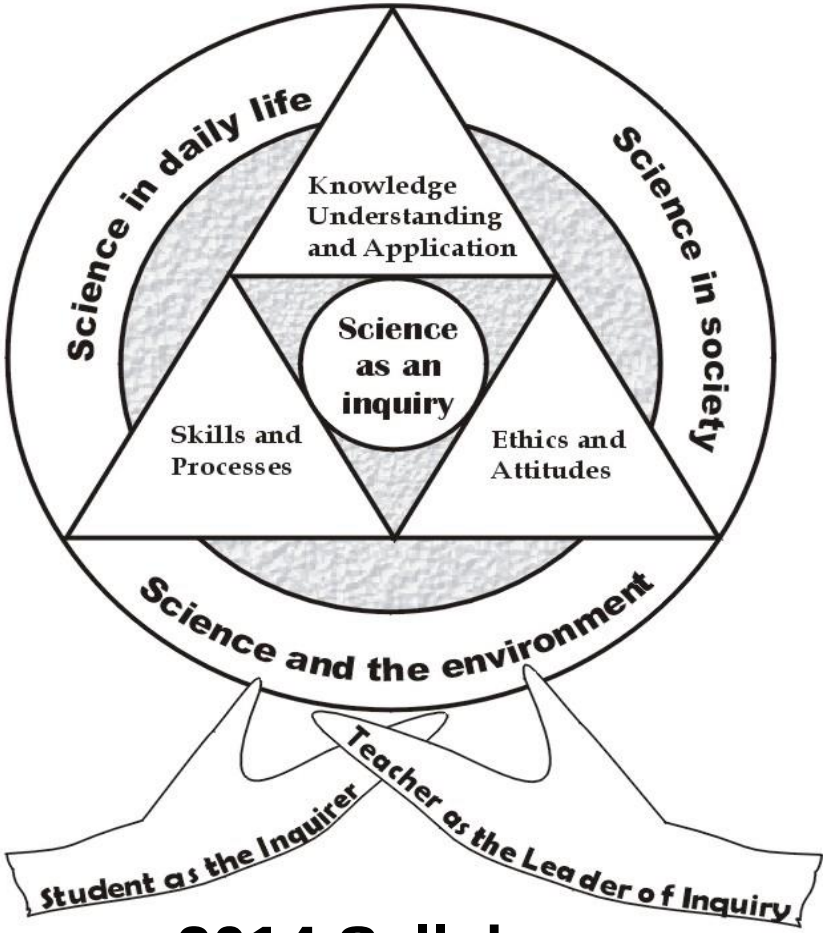
OBJECTIVES OF WORKSHOP

- Identifying concepts tested from key phrases and diagrams used in open-ended questions
- Understand why certain answers are not acceptable
- Apply answering techniques in answering open-ended questions

OVERVIEW

- MOE Science framework
- P5 Themes / Topics
- Resources used in HGP
- Skills and Processes
- Answering Techniques

MOE SCIENCE FRAMEWORK SCIENCE AS AN INQUIRY



2014 Syllabus

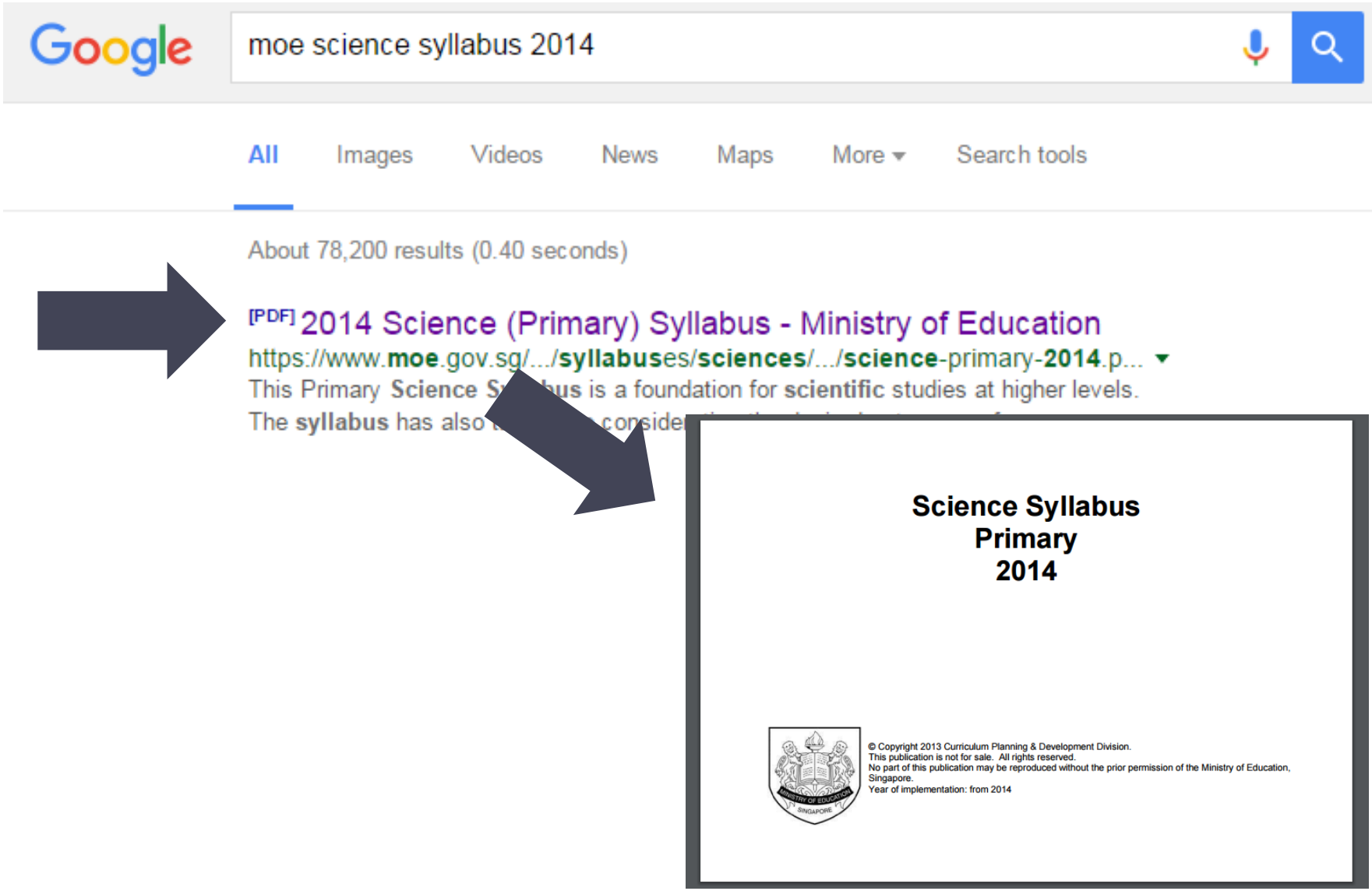
Through nurturing pupils as an inquirer, they:

- are curious in exploring their natural and physical world
- develop a rich understanding of concepts, principles, models, and theories
- acquire skills and methodologies to solve problems

INQUIRY-BASED LEARNING

- Science is more than knowing facts
- Take ownership of learning
- Application of knowledge to new situations

2014 SCIENCE (PRIMARY) SYLLABUS



THEMES / TOPICS FOR P5

Cycles

- Cycles in plants and animals (Reproduction)
- Cycles in matter and water (Water)

Systems

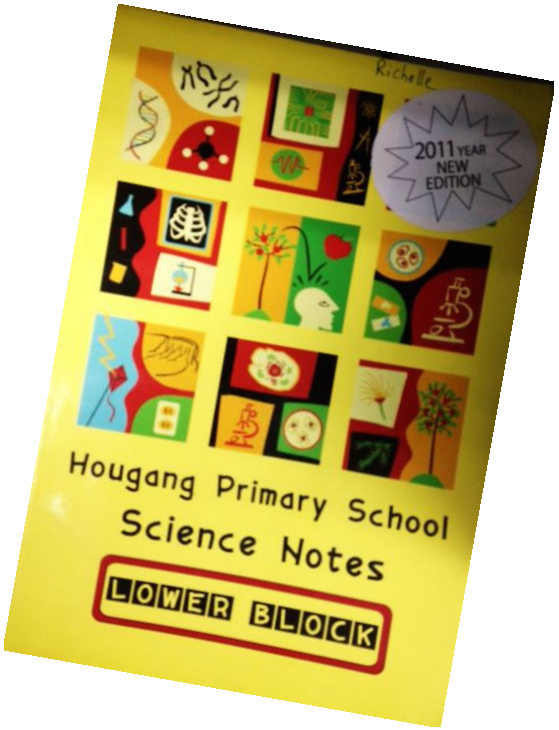
- Plant system (Respiratory and Circulatory Systems)
- Human system (Respiratory and Circulatory Systems)
- Cell system
- Electrical system

Energy

- Photosynthesis

RESOURCES USED IN HGP

- Textbook
- Activity Book
- Science Notes
- Nature Study Exercise Book
  (for note-taking in class)
- Topical Worksheets



SKILLS AND PROCESSES

- Observing
- Comparing
- Classifying
- Using apparatus and equipment
- Communicating
- Inferring
- Formulating hypothesis
- Predicting
- Analysing
- Generating possibilities
- Evaluating
- Creative problem solving
- Decision-making
- Investigation

ANSWERING TECHNIQUES

SOME EXAMPLES OF ADJECTIVES

Variable	Adjective (describe results/data collected)	Common mistakes
Time	shorter (shortest) time, longer (longest) time	faster (fastest) time, slower (slowest) time
Height	higher (highest), lower (lowest)	longer (longest), shorter (shortest)
Depth	deeper (deepest), less deep (least deep), shallower (shallowest)	lower (lowest), higher (highest)
Temperature	higher (highest) lower (lowest)	hotter, cooler more, less, least

ANSWERING TECHNIQUES

SOME EXAMPLES OF ADJECTIVES

Variable	Adjective (describe results/data collected)	Common mistakes
Amount of light	more (most), less (least)	bigger (biggest) amount, smaller (smallest) amount
Amount of heat	more (most), less (least)	hotter (hottest), colder (coldest)
Type of surface	rougher (roughest), smoother (smoothest)	more friction, less friction
Volume	larger (largest), smaller (smallest)	heavier, lighter
Water level	higher lower	more less

ANSWERING TECHNIQUES

SOME EXAMPLES OF QUESTION STEMS

Terms used in Question	What It Necessitates
State (function, variable, property)	Answer straight to the point, no explanation needed.
Give a reason/Explain	Make meaning from information such as diagrams, graphs, question stems and LINK it to the scientific concept
Describe the…	Answer should include processes and details that show the ‘how’
Based on the observation/information/table/graph given..	Use information/data/result given and support it with scientific concept

REPRODUCTION IN PLANTS AND HUMANS

REPRODUCTION IN PLANTS

The diagram below shows reproduction in humans and flowering plants.

Key concept: A process common to both human and flowering plant - Fertilisation

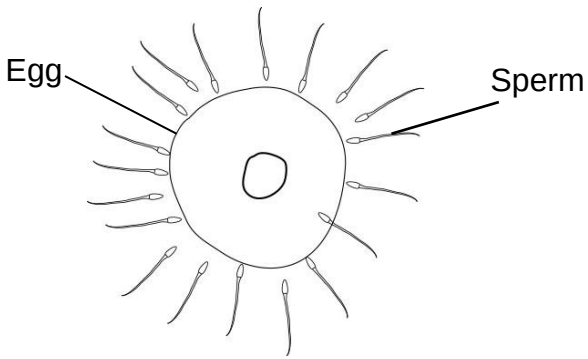


Diagram 1

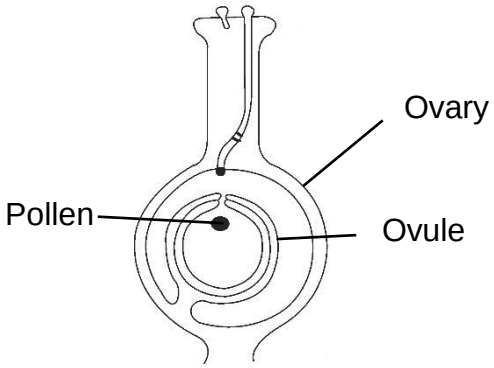


Diagram 2

(a) State the process that is taking place in both diagrams.

Fertilisation ✓

Female part of flower consists of ovary and ovule

(a) What would happen to the flower in diagram 2 after the process in part (a) has taken place?

It would become a fruit ✗ — **Answer is incomplete**

The ovary would swell and become fruit while the ovule would become seed. ✓

REPRODUCTION IN PLANTS

The diagram below shows the reproduction parts of the flowering plant and male human reproductive system

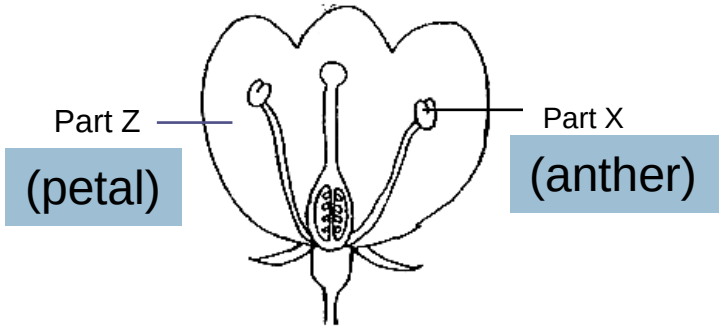


Diagram 1

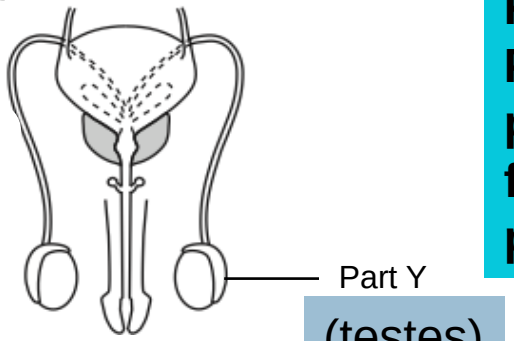


Diagram 2

Key concept: Pollination – part and function of part

(a) State a similarity in the function of X and Y in the above diagrams.

X produces pollen grains and Y produces sperms ✗

No comparison: How are they similar?

Both produce the male reproductive cell. ✓

(b) Part Z is brightly coloured. What is the function of part Z ?

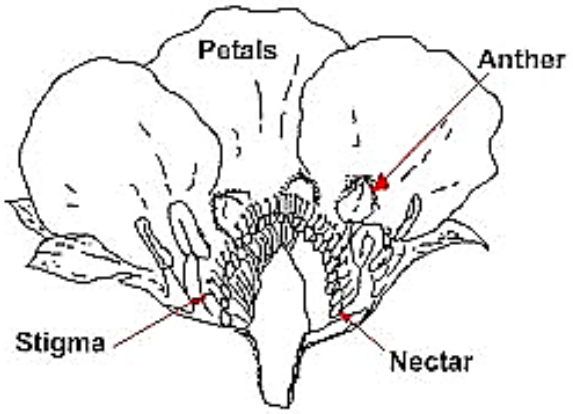
It attracts animals to the flower. ✗

Main process is not mentioned

Part Z attracts animals to pollinate the flower. ✓

REPRODUCTION IN PLANTS

The diagram below shows a flower with a sweet scent.



describe

Key concept: Pollination

Explain how the above flower is pollinated?

It is pollinated by animals

Describe rather than merely stating the method/agent of pollination

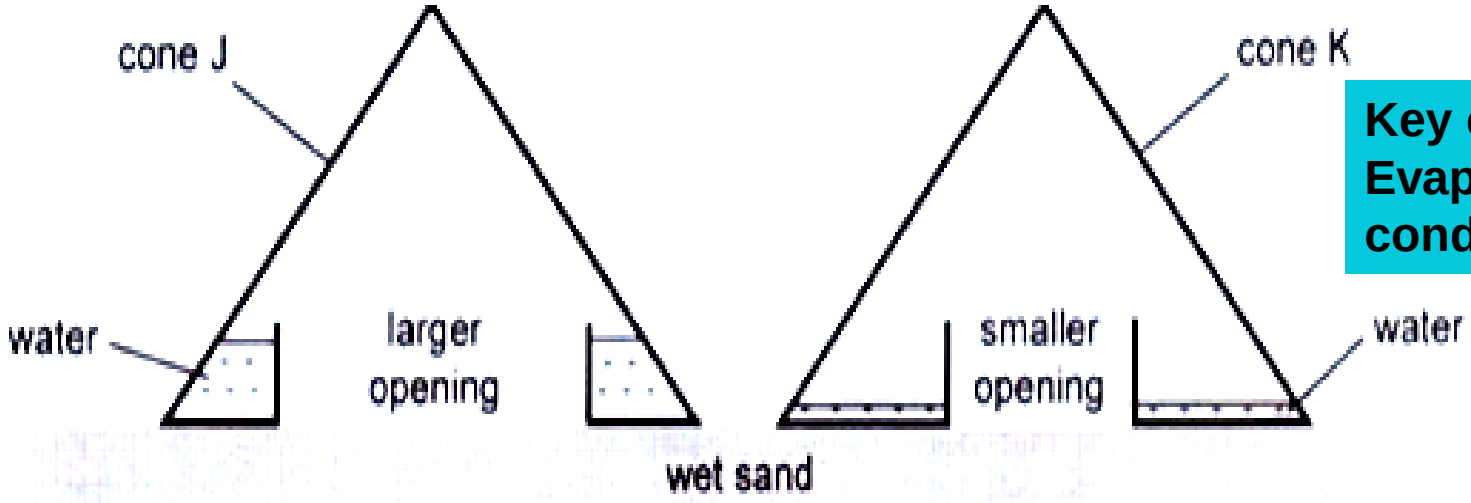
The flower is pollinated by animals when they are attracted to it by its sweet scent. The pollen grains from the anthers will stick on the animals' legs or beaks and get carried to the stigma.

CYCLES IN MATTER AND WATER

QUESTION 38 (PSLE 2014)

On a sunny day, Huiwen placed two plastic cones, J and K, on wet sand. Cones J and K were similar but J had a larger opening at the base than K.

After several hours, she saw some water collected at the base of each cone as shown.



Key concept: Evaporation and condensation

QUESTION 38 (PSLE 2014)

(a) Explain how the water was collected.

The water evaporated into water vapour and then condensed into water.

Partial answer: where the water comes from and where condensation takes place is important

The water from the wet sand evaporated into water vapour. The water vapour then lost heat to the cooler inner surface of the cone and condensed into water droplets.

IMPORTANT to mention COOLER surface as water vapour loses heat for condensation

QUESTION 38 (PSLE 2014)

Key concept: Factors affecting the rate of evaporation

(b) More water was collected in cone J than in cone K. Explain why.

More water was evaporated ✗

Concepts tested: factors affecting rate of evaporation Answer did not mention which factor.

Cone J has a larger opening which leads to a greater exposed surface area of the water so more water evaporated. ✓

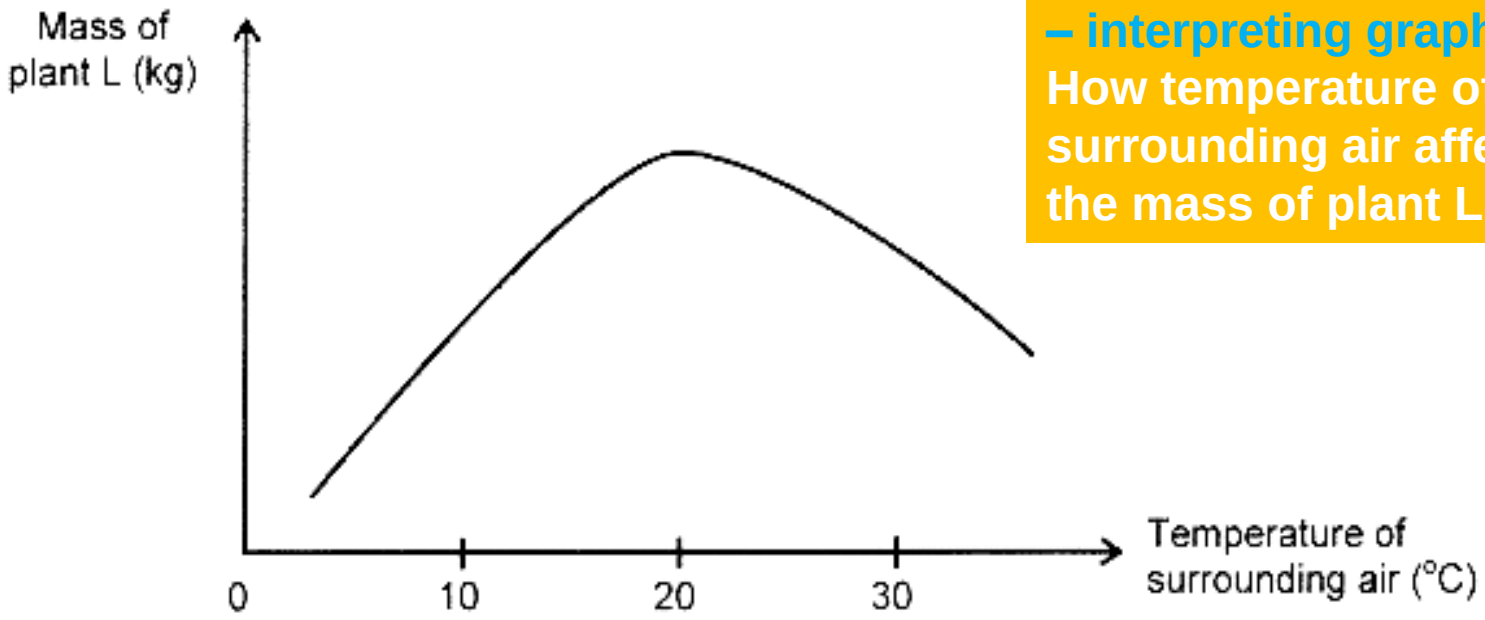
PHOTOSYNTHESIS

QUESTION 36 (PSLE 2015)

A farmer conducted an experiment to investigate the effect of temperature of surrounding air on the growth of plant L over a period of time.

The graph below shows the result of the experiment.

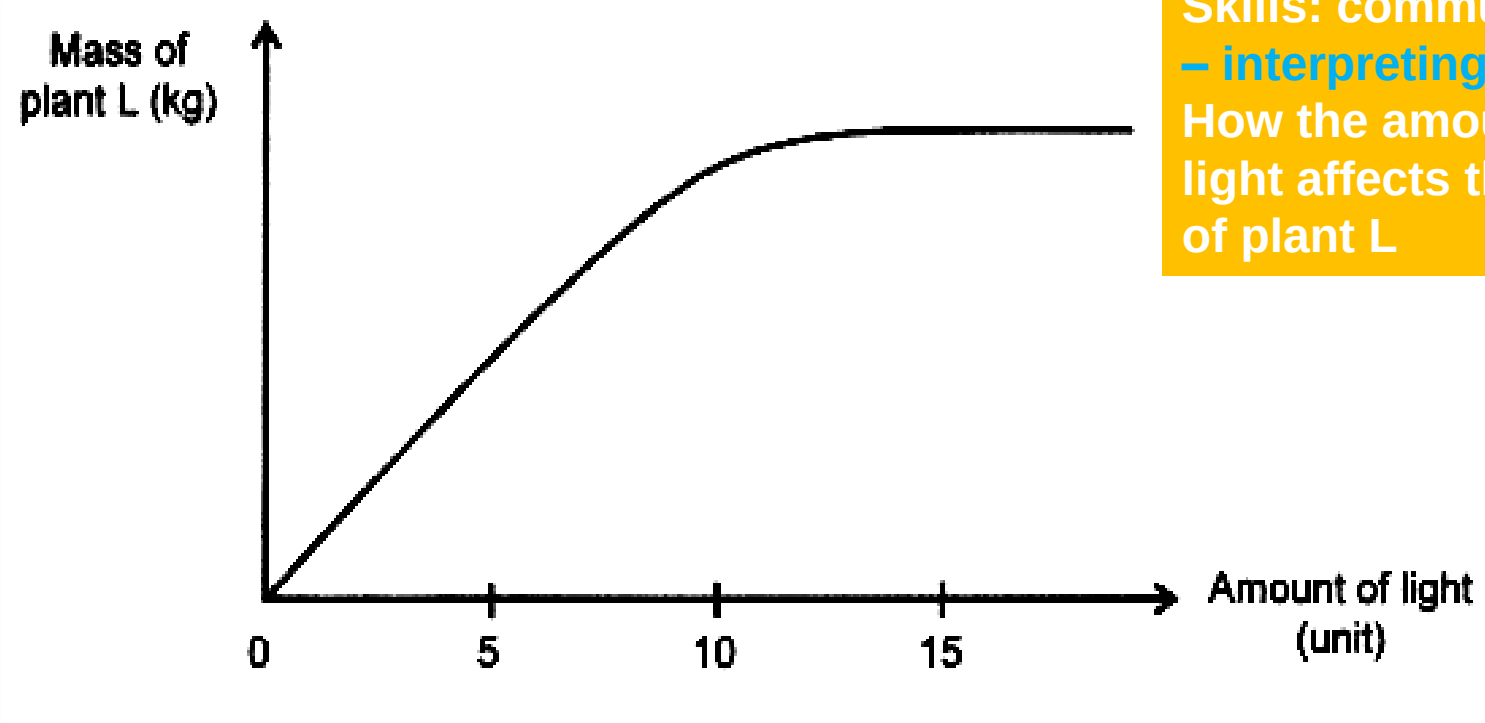
Skills: communicating – interpreting graph
How temperature of surrounding air affects the mass of plant L



QUESTION 36 (PSLE 2015)

He then conducted another experiment to investigate the effect of the amount of light on the growth of plant L over a period of time.

The graph below shows the result of the experiment.

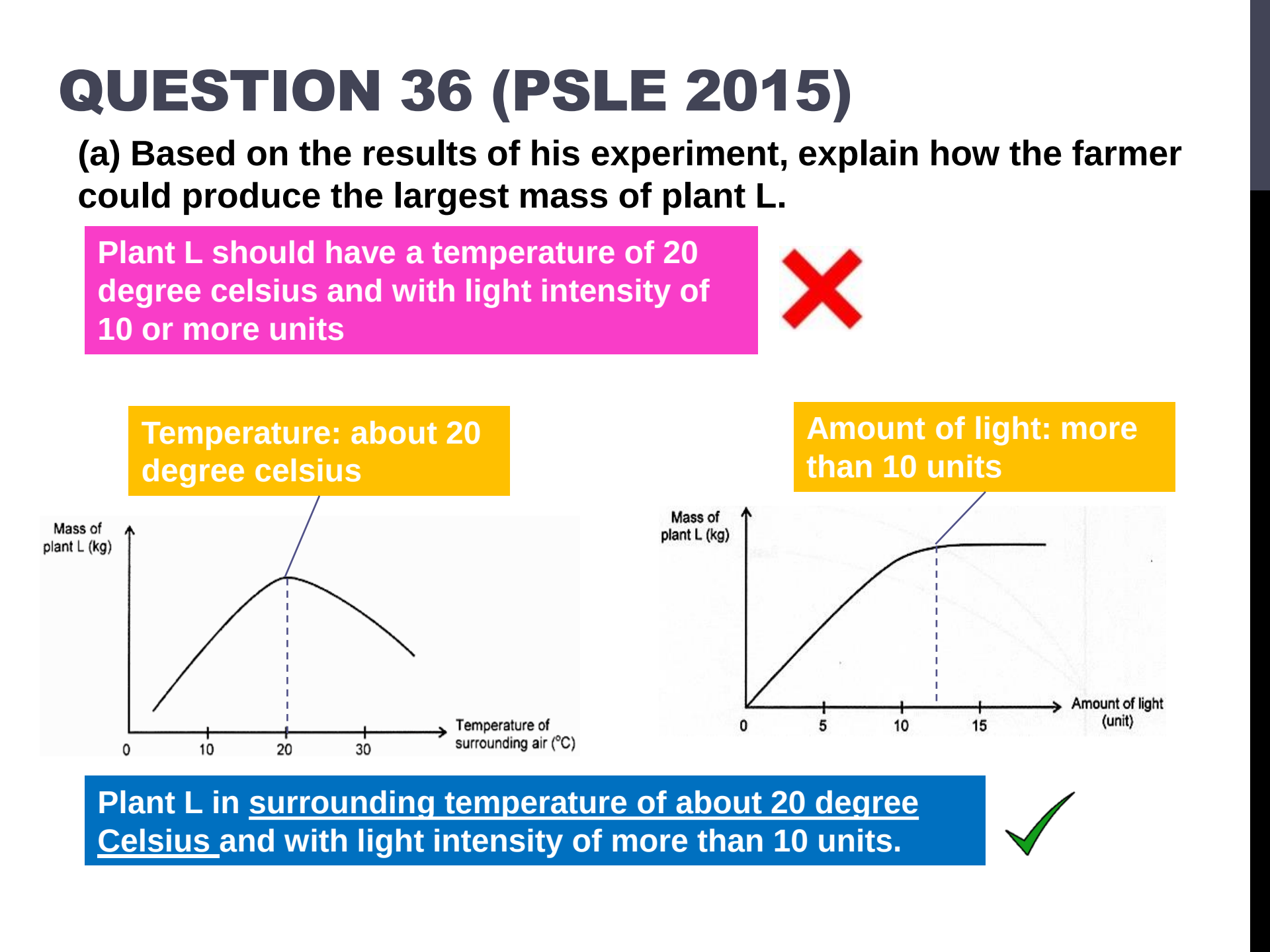


Skills: communicating – interpreting graph
How the amount of light affects the mass of plant L

QUESTION 36 (PSLE 2015)

(a) Based on the results of his experiment, explain how the farmer could produce the largest mass of plant L.

Plant L should have a temperature of 20 degree celsius and with light intensity of 10 or more units



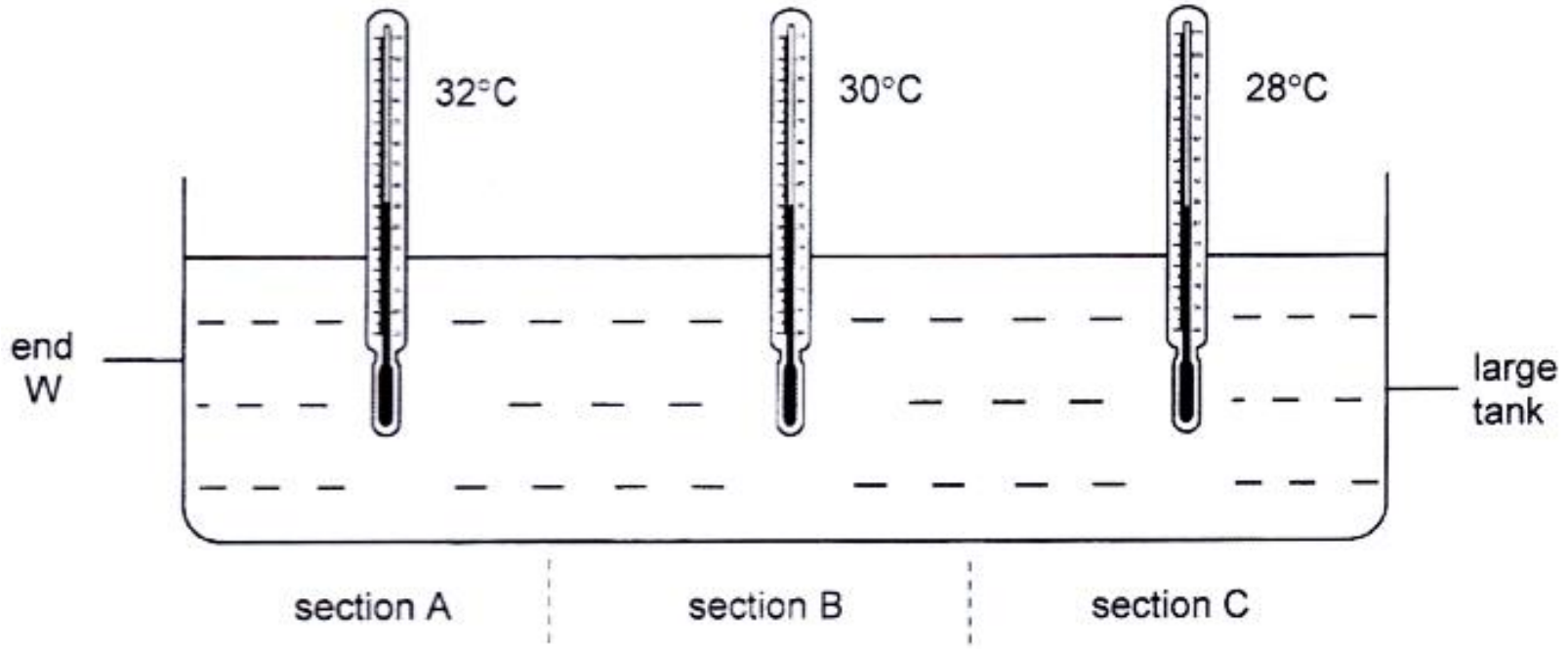
Temperature: about 20 degree celsius

Amount of light: more than 10 units

Plant L in <u>surrounding temperature of about 20 degree Celsius</u> and with light intensity of more than 10 units.

QUESTION 33 (PSLE 2014)

Azmi used the set-up below to study the temperature at which fish F prefer to live in. He knows that the amount of oxygen in the water decreases when the temperature rises.



QUESTION 33 (PSLE 2014)

Skills – interpreting table

Azmi put 30 similar fish F into the tank in section A. After some time, the number of fish found in each section of the tank was recorded as shown

Section	A	B	C
Number of fish	1	4	25

(a) From the data, which temperature did fish F prefer to live in?

Section C ✗

28°C ✓

QUESTION 33 (PSLE 2014)

(b) In February 2014, hundreds of dead fish were found floating in a river of Singapore. It was reported that the fish died due to a long period of hot weather.

Key concept: relating respiration to intake of oxygen

Based on Azmi's study, give a reason why the fish died.

Amount of oxygen in the river decreases ✗

Incomplete answer: anchoring concept - respiration, is missing. Application: Answer did not show how this caused the fish to die

Hint: hot weather implies temperature rise – "He knows that the amount of oxygen in the water decreases when the **temperature rises**" **– amount of oxygen decreases**

As there is less oxygen in the water due to the hot weather so the fish in the river **could not get enough oxygen** for respiration. ✓

QUESTION 33 (PSLE 2014)

Key concept: relating photosynthesis to giving out oxygen for fish to respire

(c) There were many fish and green plants in the water of another river. When there was no sunshine for a long period, many fish died. Give a reason why the fish died.

The green plants could not photosynthesize.

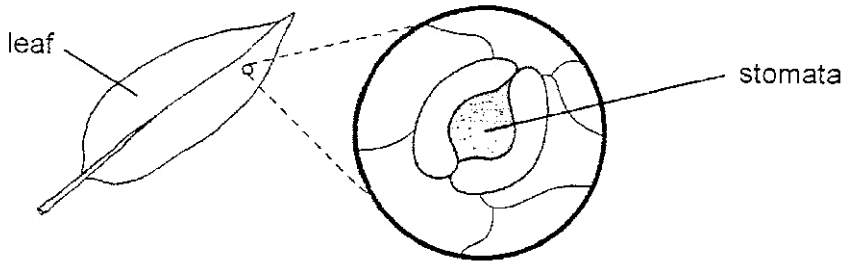
Incomplete answer: anchoring concept - respiration is missing. Application: Answer did not show how this caused the fish to die

Hint: no sunshine implies that green plants cannot make food due to the absence of light

The green plants could not carry out photosynthesis so no oxygen was produced for the fish to take in for respiration.

QUESTION 37 (PSLE 2011)

Leaves have tiny openings called stomata on their surfaces.

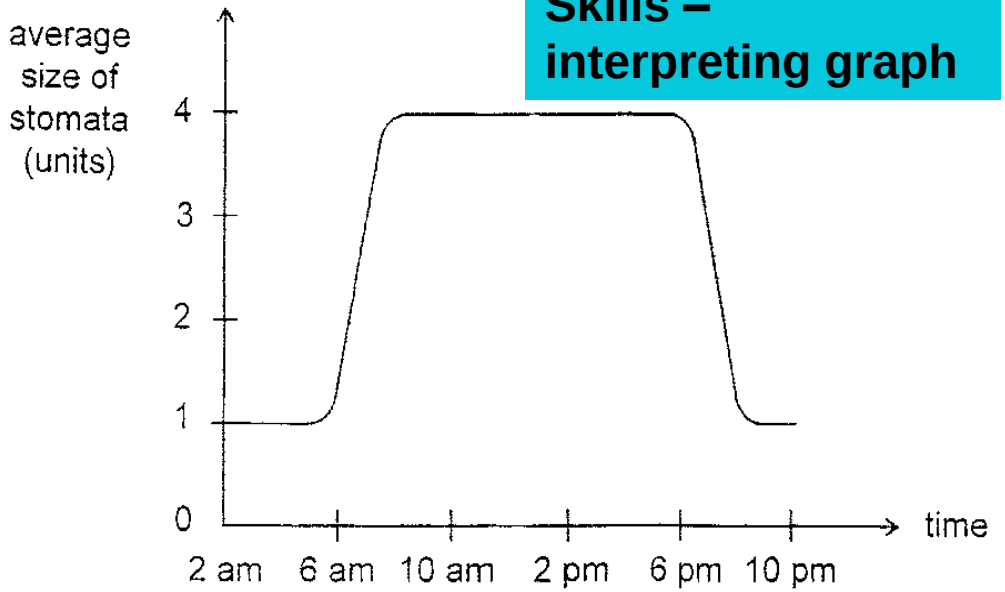


Some of the gases that move through the stomata are oxygen, carbon dioxide and water vapour.

QUESTION 37 (PSLE 2011)

Skills – interpreting graph

Rashid measured the changes in the size of the stomata of a plant placed by the window at different times of the day. He plotted his results as shown.



(a) Based on the results, what effect did light have on the size of the stomata.

(b) How does the change in size of stomata in (a) help in photosynthesis?

QUESTION 37 (PSLE 2011)

(a) Based on the results, what effect did light have on the size of the stomata.

The size of the stomata changes with the amount of light from 2 a.m. to 10 p.m.

Did not explain how the size of the stomamta changes with the amount of light

Interpreting graph:
Different time of the day implies different amount of light
Greater amount of light resulted in bigger size of the stomata

The size of the stomata increases with greater amount of light.

QUESTION 37 (PSLE 2011)

(b) How does the change in size of stomata in (a) help in photosynthesis?

More light is trapped when stomata is bigger so plant photosynthesizes more.

Wrong concept: Light is trapped by chlorophyll, not stomata.

Linking up concepts:
From part (a), link more light to bigger size of stomata→ allowing more carbon dioxide to be taken in → higher rate of photosynthesis

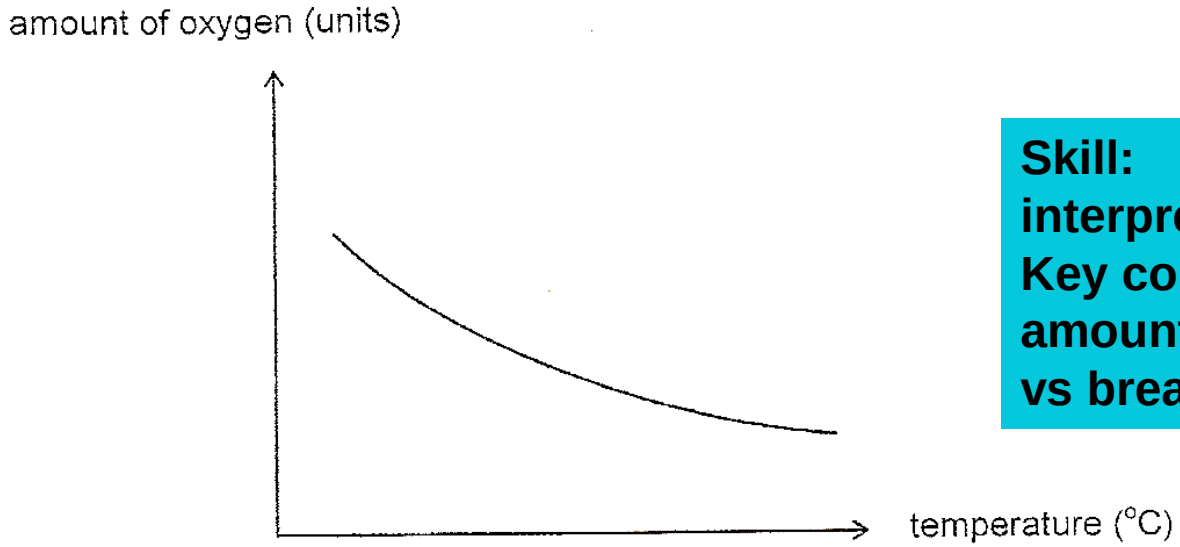
Factors affecting rate of photosynthesis:
(a) Amount of light - chlorophyll
(b) Amount of water - roots
(c) Amount of carbon dioxide - stomata

When the stomata is bigger, it allows more carbon dioxide to be taken in. Hence more photosynthesis can take place.

Key concept: Factors affecting the rate of photosynthesis

QUESTION 34 (PSLE 2012)

Jim conducted an experiment to measure the amount of oxygen present in the water of his fish tank at different temperatures. His results are shown in the graph below.



Skill:
interpreting graph
Key concept:
amount of oxygen vs breathing rate

Jim observed some fish in the tank. He noted that the breathing rate of the fish increased when the temperature of the water in the fish tank increased.

Using the results of the experiments, explain this observation.

QUESTION 34 (PSLE 2012)

Jim observed some fish in the tank. He noted that the breathing rate of the fish increased when the temperature of the water in the fish tank increased.

Using the results of the experiments, explain this observation.

When temperature of water increased, the fish felt hotter so they breathed faster.

Wrong concept

Increase in temperature led to decrease in oxygen

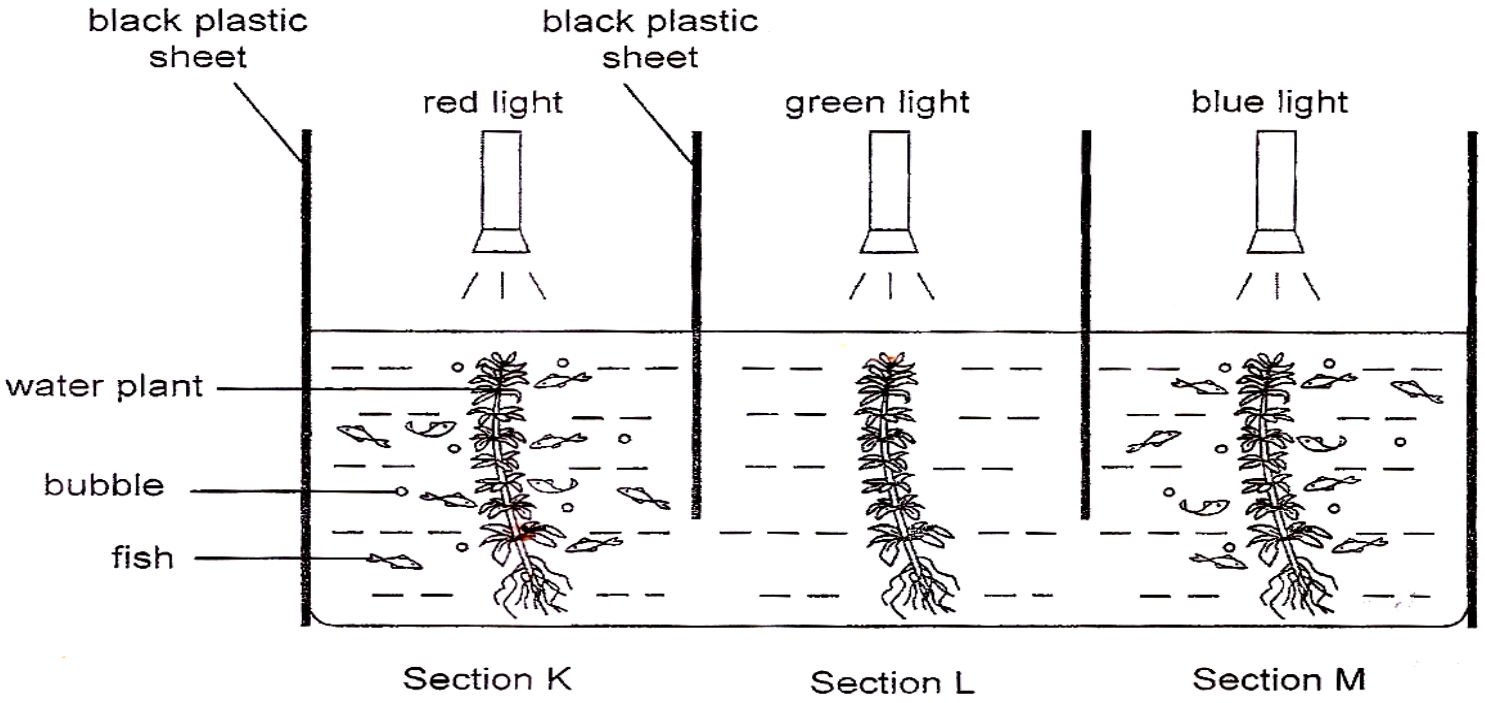
Incomplete answer: answer did not explain why fish breathed faster

Increased in temperature caused amount of oxygen in water to decrease so fish has less oxygen and so they breathed faster.

QUESTION 37 (PSLE 2012)

Amanda set up an experiment in a dark room to find out which coloured light(s) red, green or blue could be used for photosynthesis.

She used a tank divided into three sections K, L and M by black plastic sheets as shown in the diagram below. The coloured lights were of the same brightness.



QUESTION 37

Key concept: oxygen given out during photosynthesis

She introduced some fish into each section which has a water plant with green leaves. After some time, she observed bubbles and the fish in sections K and M only.

(a) Give a reason why the fish were found in sections K and M only.

There was enough oxygen in sections K and M. ✗

Did not explain why there was enough oxygen by linking it to the aim

Aim: to find out which coloured light(s) red, green or blue could be used for photosynthesis

The plants could photosynthesize and give out oxygen for the fish to breathe. ✓

QUESTION 37

She introduced some fish into each section which has a water plant with green leaves. After some time, she observed bubbles and the fish in sections K and M only.

(b) What can Amanda conclude about which coloured light(s) could be used for photosynthesis?

Plants could photosynthesize in sections K and M.

Did not link answer to the aim

Conclusion: link the aim to the results.

The plants could photosynthesize under red and blue lights.

BACK HOME

- Practise good answering habits in daily work
- Do byte-size revision after science lesson
- Make notes effectively – learning maps, concept maps, diagrams
- Practise process skills
- Make Science relevant in daily lives
- Keep all Science textbooks, notes and worksheets from P3 to P6

REFERENCE

- MOE, Ministry of Education Singapore science syllabus primary 2014 Retrieved from https://www.moe.gov.sg/docs/default-source/document/education/syllabuses/sciences/files/science-primary-2014.pdf
- Singapore Examinations and Assessment Board. (2013). *PSLE Examination Questions 2009 – 2013 Science.* Singapore: Educational Publishing House Pte Ltd.
- Singapore Examinations and Assessment Board. (2015). *PSLE Examination Questions 2013 – 2015 Science.* Singapore: Educational Publishing House Pte Ltd.

You have Questions

We have Answers


Thank
You!

PARENTS' EVALUATION AND FEEDBACK FOR PARENTS' WORKSHOPS 2018

Please scan the QR Code or use the link to give us your valuable feedback. Thank you.

https://tinyurl.com/y9m65zxr

PARENTS' WORKSHOPS 2018

Presentation slides will be available on our school website within one week after the workshops.