WOODLANDS RING PRIMARY SCHOOL

Every Child Is Unique and Able to Excel

2023 Parents Engagement (Science)

Organised by Science Department

Woodlands Ring Primary School

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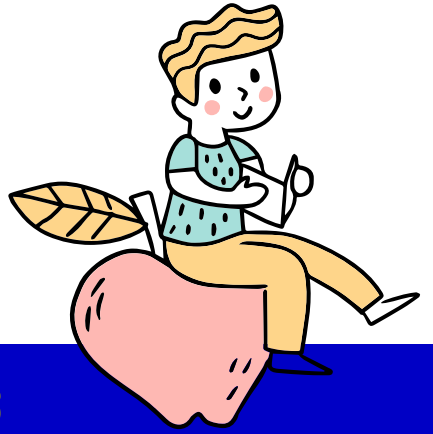
"Parents as Partners in Science Education" is an essential approach to fostering students' interest and success in Science.

Objective:

Promote active parental engagement in their child’s Science education through continuous monitoring and fostering a collaborative partnership with their Science teachers.



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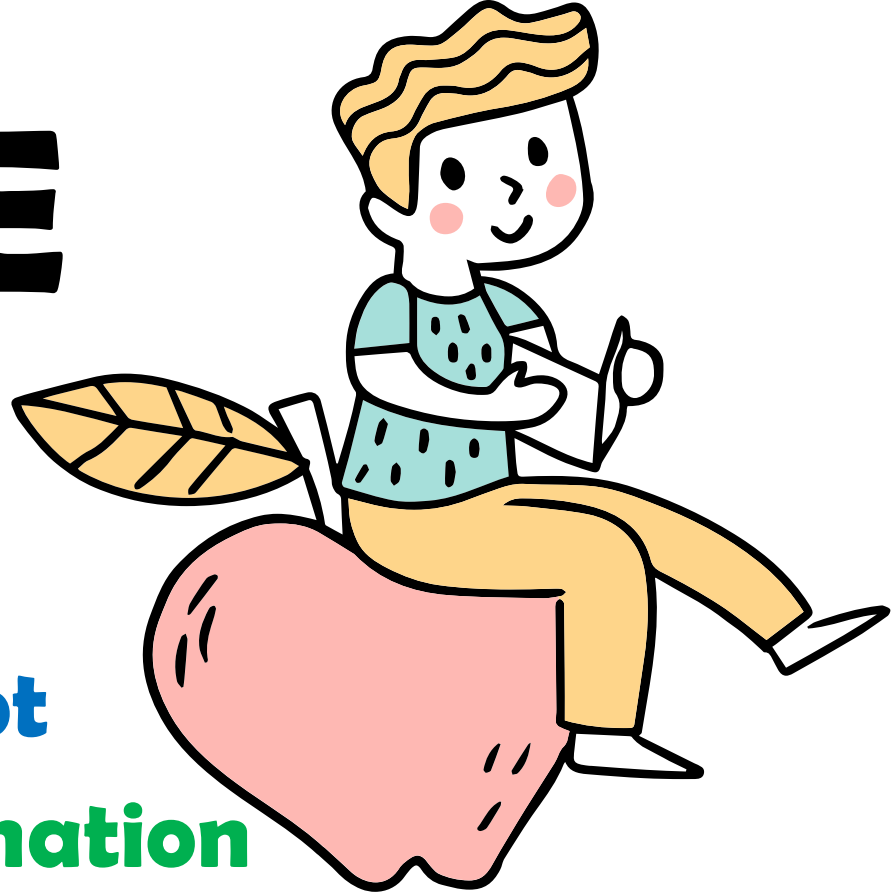
Passionate Learners Gracious Citizens

S.H.I.N.E



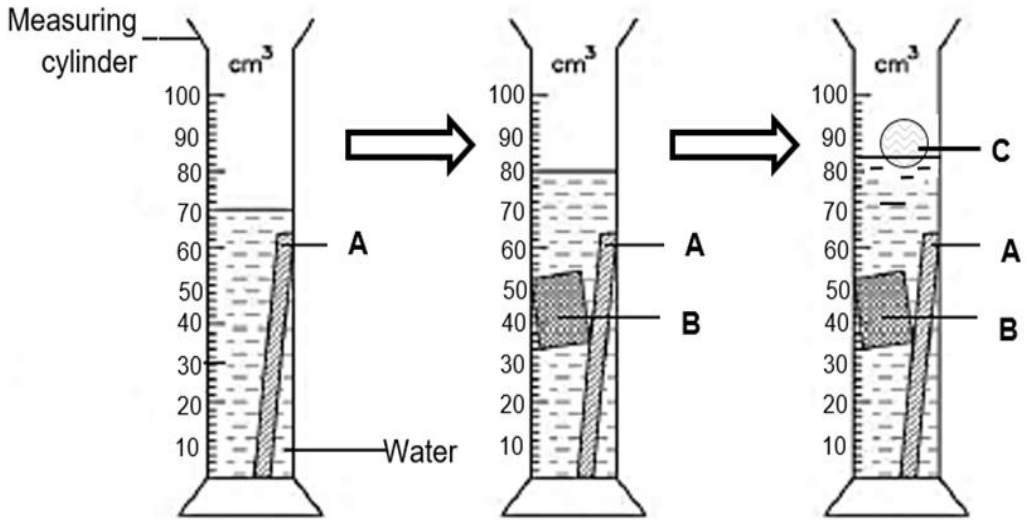
- S - Study the question carefully
- H - Highlight the Keywords
- I - Identify the Scientific Concept
- N - Note down additional information
- E - Explain (Open-ended)/Eliminate (MCQ)

Let us study this question...

Process Skills Involved:

1. Observation
2. Comparing
3. Analysing

Ali put 3 objects of different shapes into a measuring cylinder containing 50 cm^3 of water one after another. The changes in the water level after each object was put in the cylinder are as shown below.



From the readings, Ali made the following conclusions.

A: The volume of object A is 20 cm^3.
B: The total volume of objects A and B is 30 cm^3.
C: The total volume of the three objects is 34 cm^3.

Which of the above conclusions is/are correct?

(1) A only
(2) A and B only
(3) A and C only
(4) A, B and C

H – Highlight the keywords

Highlight key words that will provide clues and context to the questions to help the students understand the question better.

Some of these keywords from the question stem can be used as key words in answering open-ended questions.

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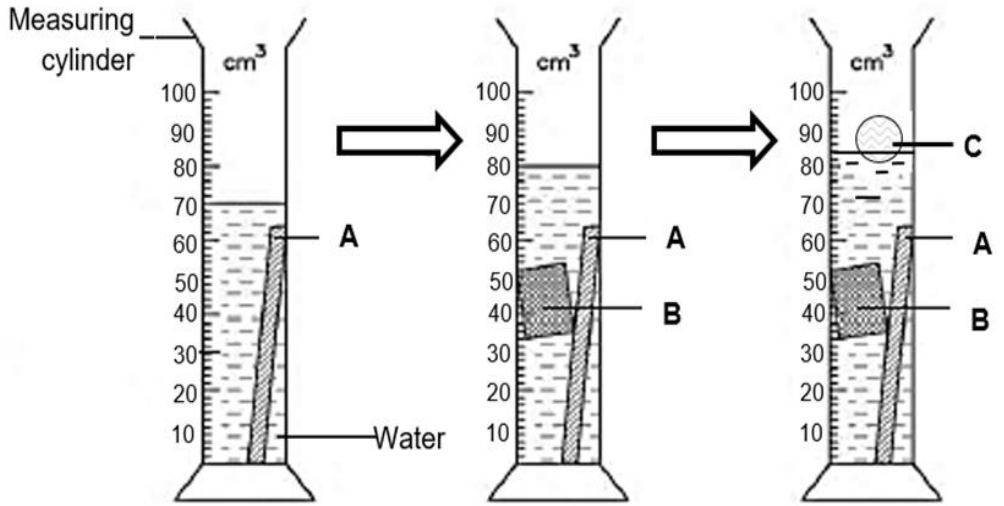

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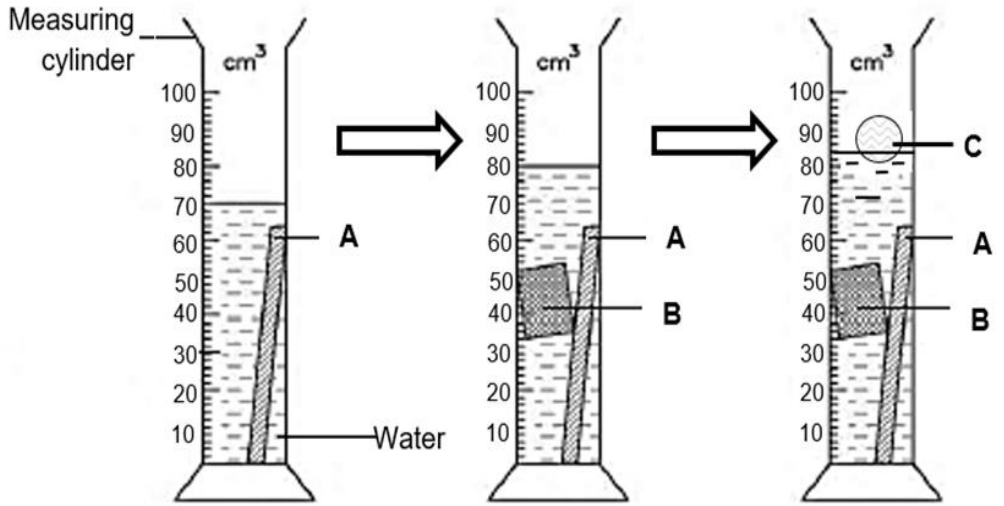
I – Identify the science concept

Identify the topic(s) and science concept(s) tested in this question. (Is it one topic or a combination of two topics?)

Provides the frame for their response. (What are the possible items they can test for the topic?)

Ali put 3 objects of different shapes into a measuring cylinder containing 50 cm^3 of water one after another. The changes in the water level after each object was put in the cylinder are as shown below.



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Note – Note down the science concept

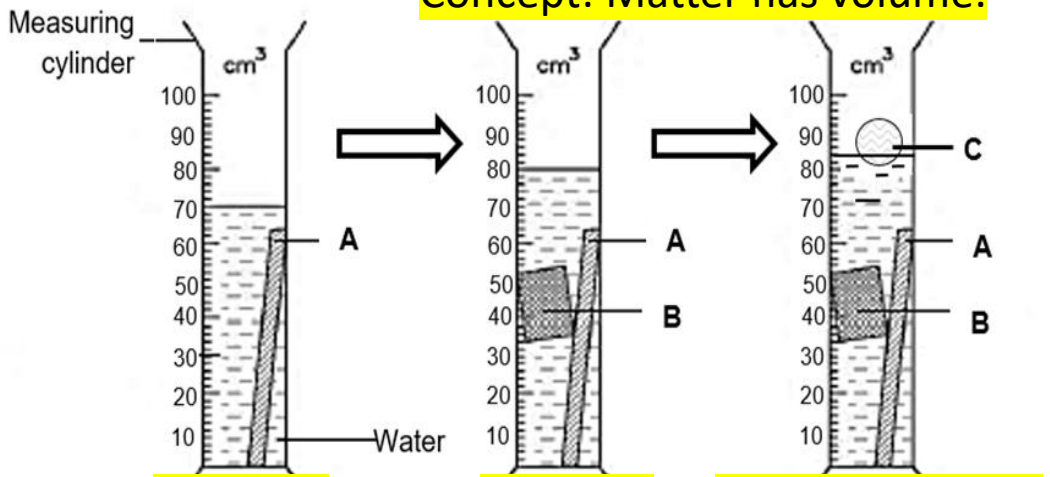
Write down the topic(s) and science concept(s) related to the question.

Write down additional information that is not provided but can be found using the information in the question.

Ali put 3 objects of different shapes into a measuring cylinder containing 50 cm^3 of water one after another. The changes in the water level after each object was put in the cylinder are as shown below.

Topic: Matter

Concept: Matter has volume.



A=20cm^3

B=10cm^3

The volume of C cannot be found as it is not fully submerged in water.

From the readings, Ali made the following conclusions.

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Explain (OE) / Eliminate (MCQ)

MCQ: Eliminate false options to increase the probability of getting correct.

OE: Explain using C.E.R.

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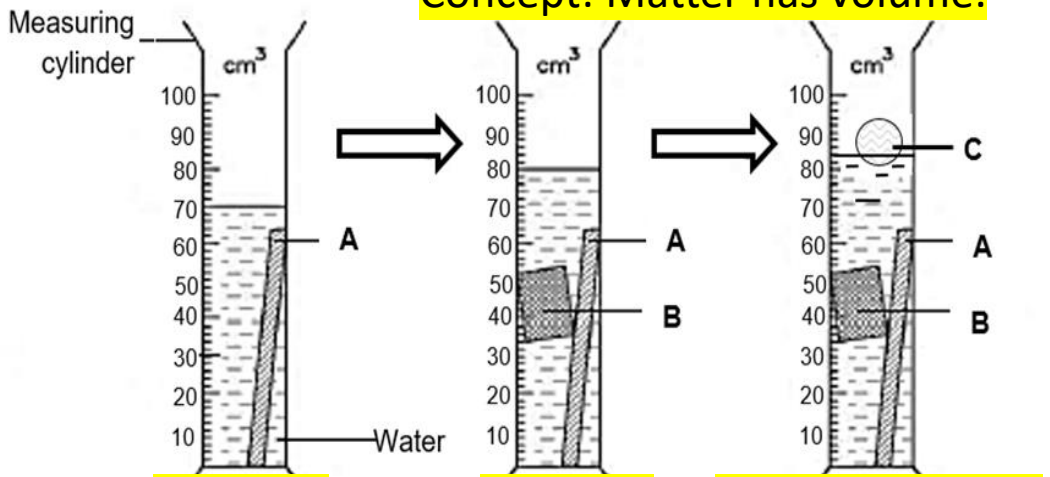

$A=20cm^3$ $B=10cm^3$ The volume of C cannot be found as it is not fully submerged in water.

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Pupils' Work

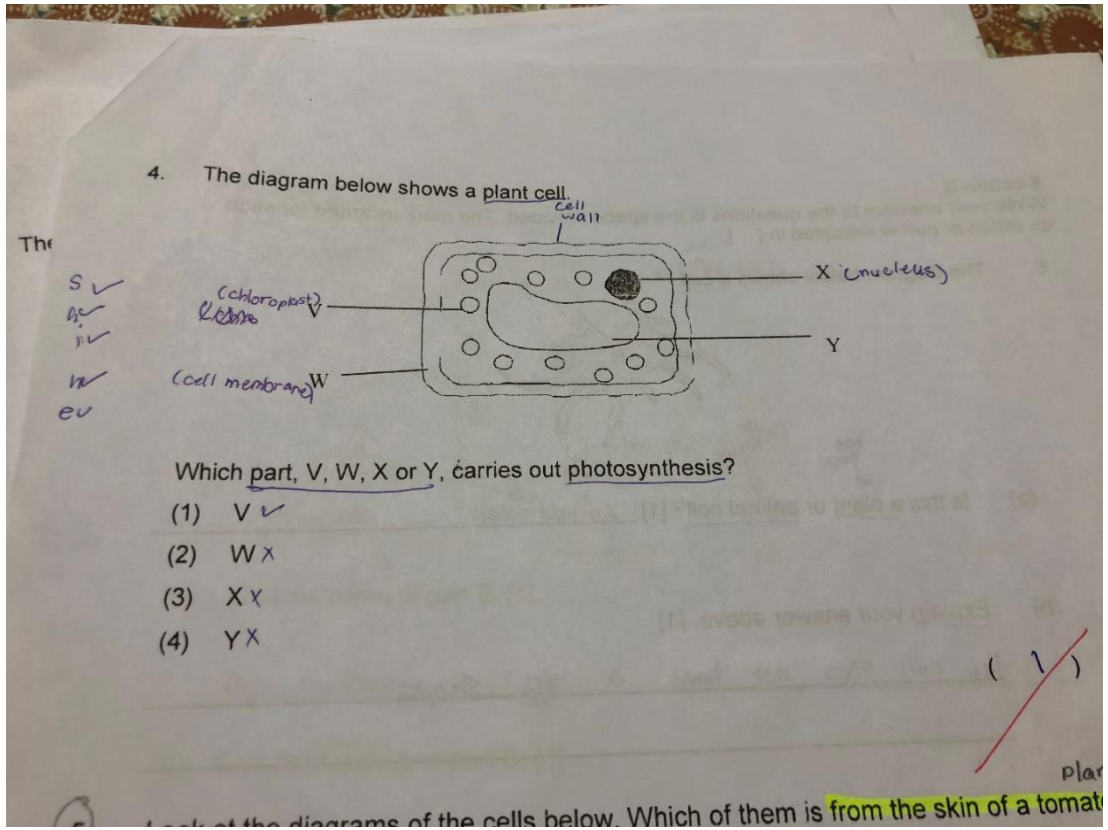


Photo 1
Using SHINE, correct answer

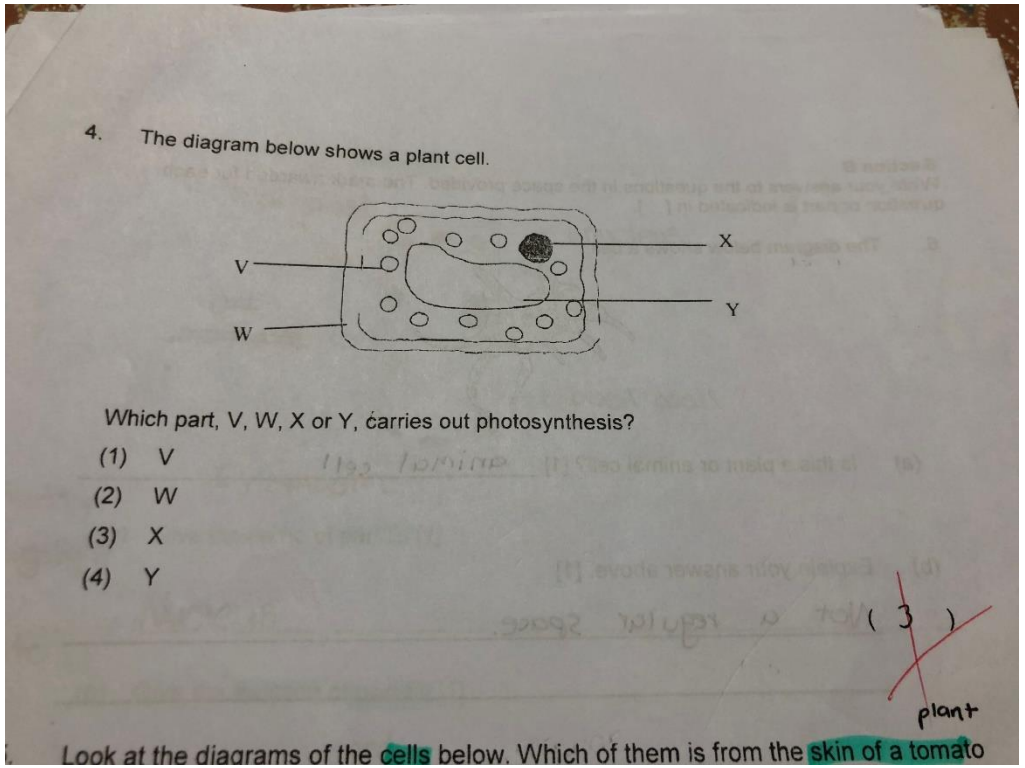
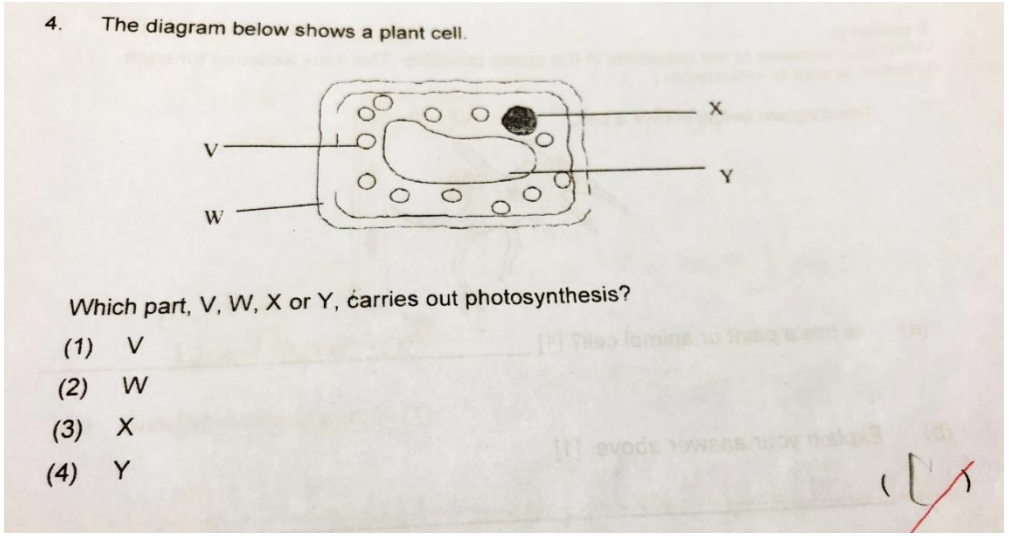


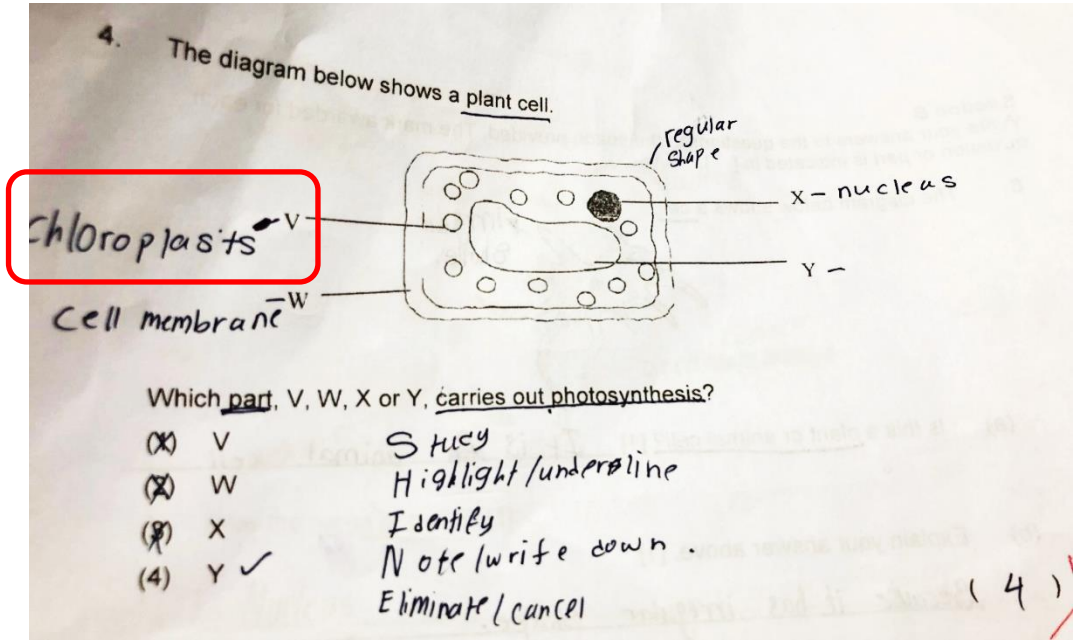
Photo 2
Not using SHINE, wrong answer

Examples of pupils' work



Pupil 3

Not using SHINE, correct answer



Pupil 4

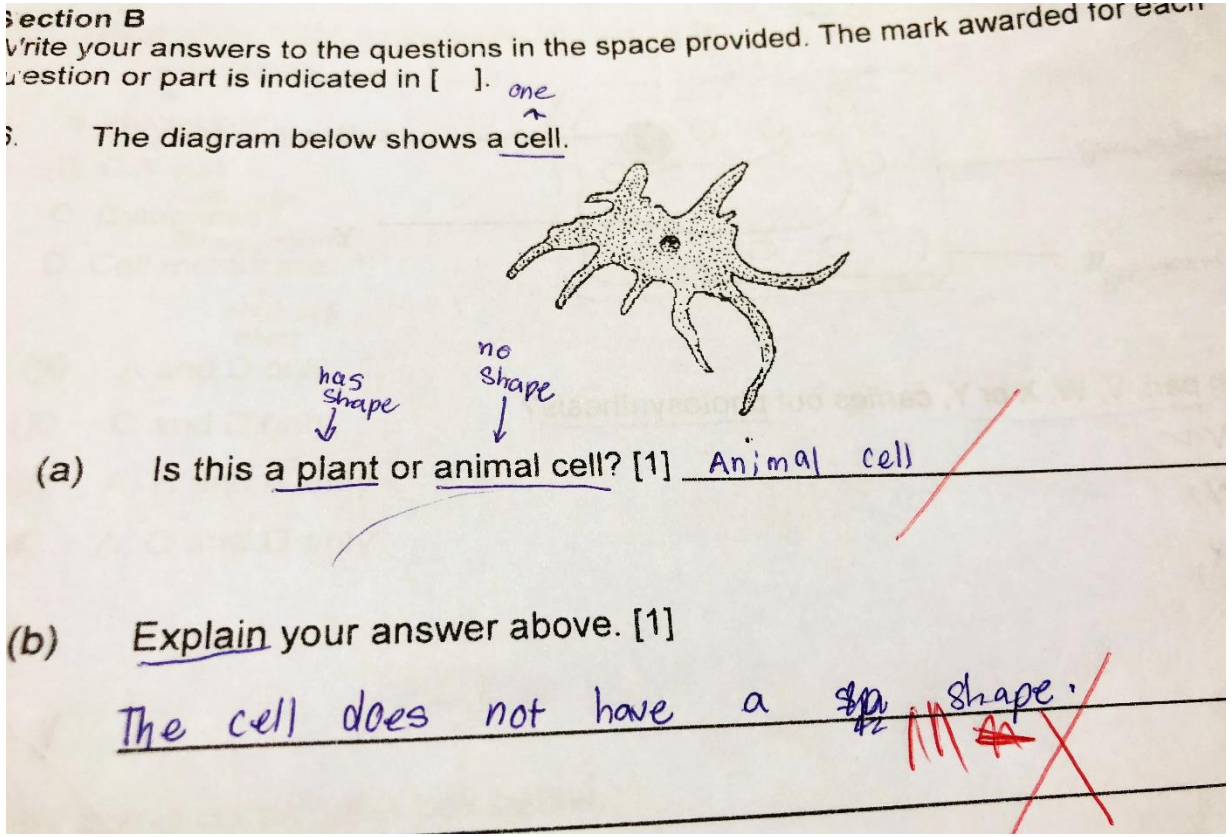
Using SHINE, wrong answer

What could have gone wrong for Pupil 4?

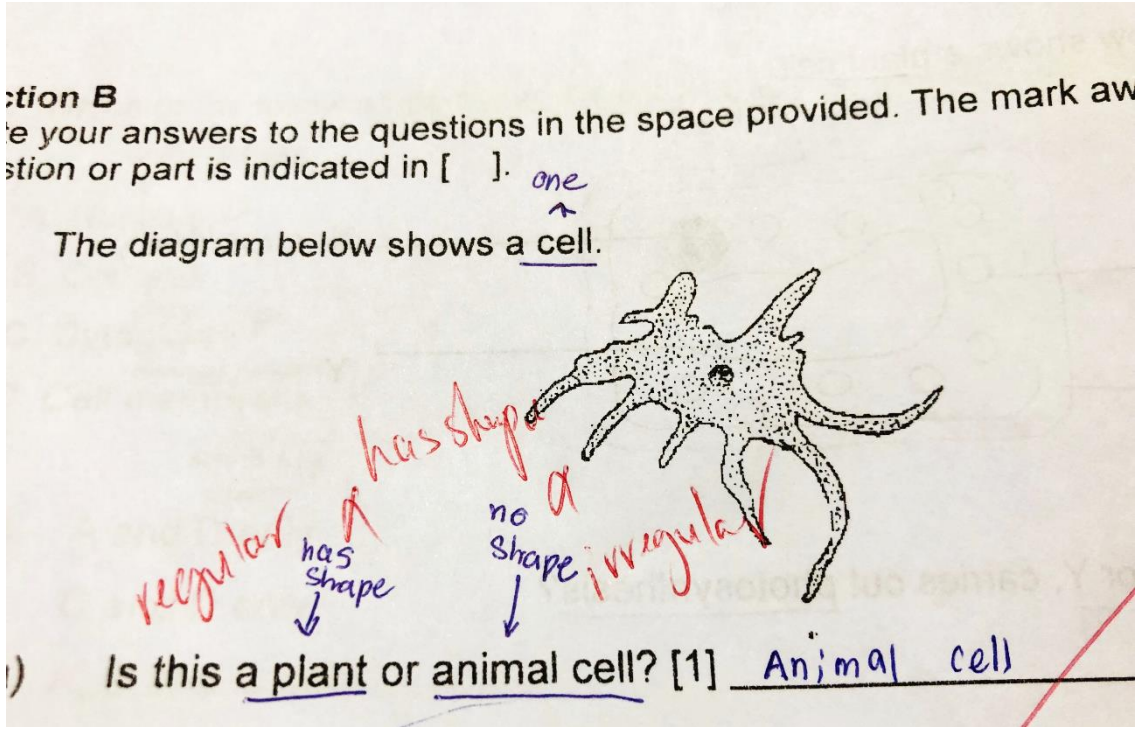
- Did not know the function of chloroplasts
- Did not know the process of photosynthesis
- Did not understand the relation between photosynthesis and chloroplasts

→ Teacher is able to use this to assess pupil's understanding of the topic.

Examples of pupils' work



Pupil 5



Pupil 5
Teacher's feedback

What could have gone wrong for Pupil 5?

- Misunderstanding of regular = has shape, irregular shape = no shape

➡

Teacher is able to use this to assess pupil's understanding of the topic.

Why S.H.I.N.E?

- **For Pupils**

Provide a structure for them to plan, monitor and reflect

Making their thinking process and routine more visible

- **For Teachers**

Assess pupils' conceptual understanding of Science concepts

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Answering Technique

WOODLANDS RING PRIMARY SCHOOL

Every Child Is Unique and Able to Excel

Science Answering Techniques
C-E-R

C: Claim

E: Evidence

R: Reasoning

"Inquiring Learner, Ethical Practitioner"

C.E.R: What? Why?

Science C.E.R.

Claim - Evidence - Reasoning

WHAT IS IT?

CLAIM (the answer)
The claim is a statement you believe to be true that solves a scientific question or problem.

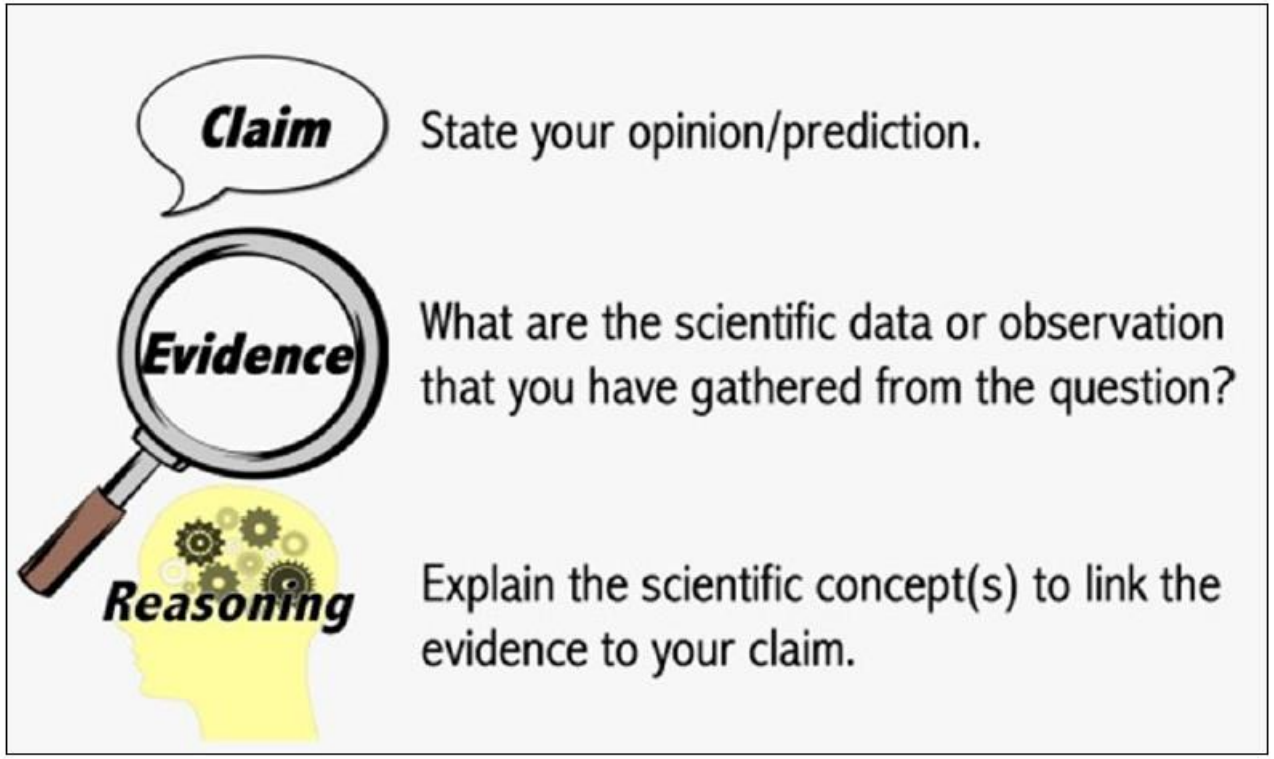
EVIDENCE (the clues)
The evidence is the data or research you gathered, including observations, investigations, reading, videos, and any other information.

REASONING (the why?)
The reasoning shows *how* the evidence answers the question or solves a problem.

WHY SHOULD I USE IT?

Claims, evidence and reasoning help you work through problems to arrive at a *scientific explanation.* Approaching a question using C.E.R. helps you develop a better understanding of the problem and gives you the ability to communicate your thoughts clearly and scientifically.

C.E.R: How?



What is a claim?

A claim is:

-a choice that you make

-a sentence

When do we use a claim?

To answer a question that requires you to make a choice out of a two or more options

Example of a claim…

1. Brand X is the worst effective detergent in removing stains from clothes.

What is a Reason?

A reason contains an explanation based on the evidence gathered.

What is CER?

Scientific Explanation = **C**laim-**E**vidence-**R**eason

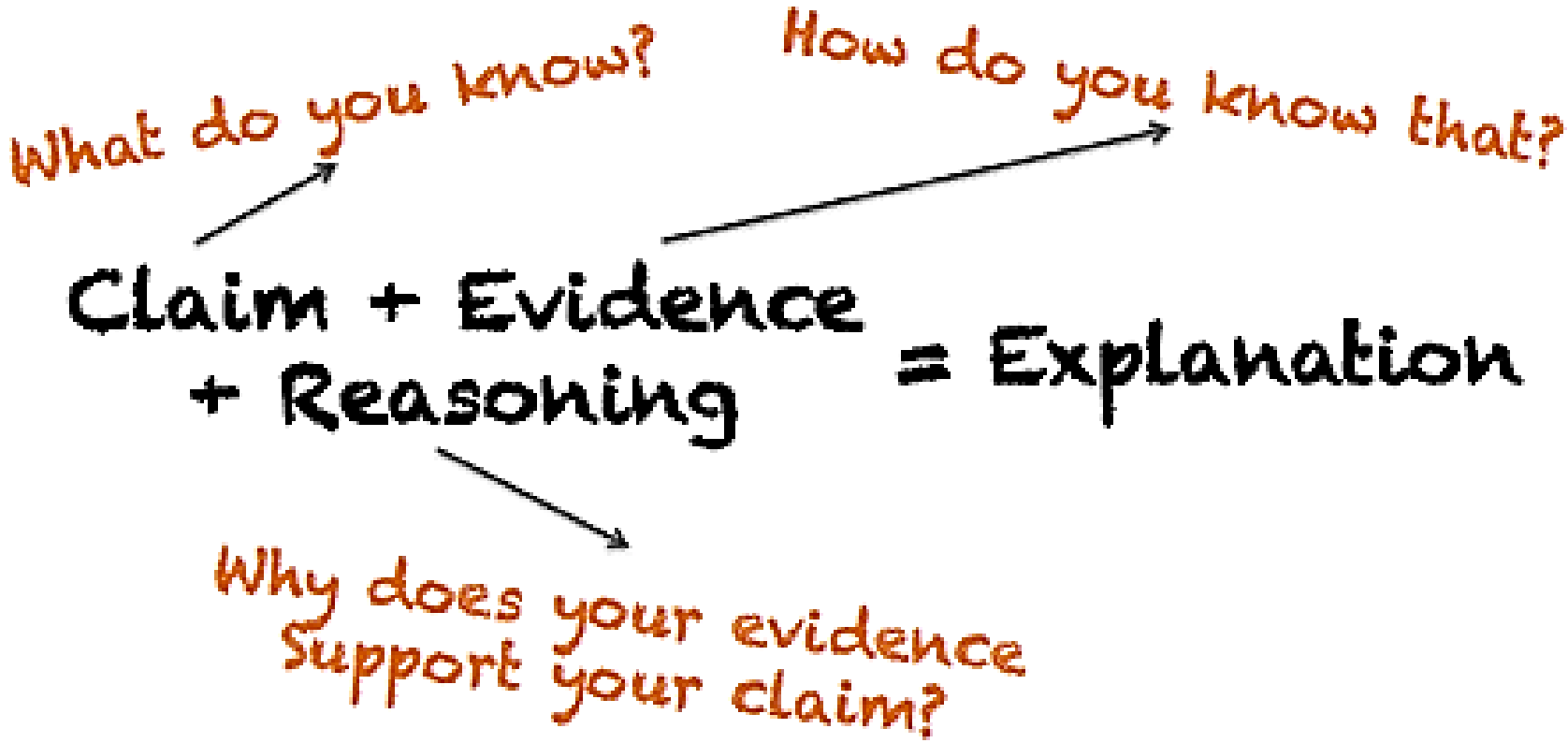


Image retrieved from: http://www.edutopia.org/blog/science-inquiry-claim-evidence-reasoning-eric-brunsell

What is a scientific explanation?

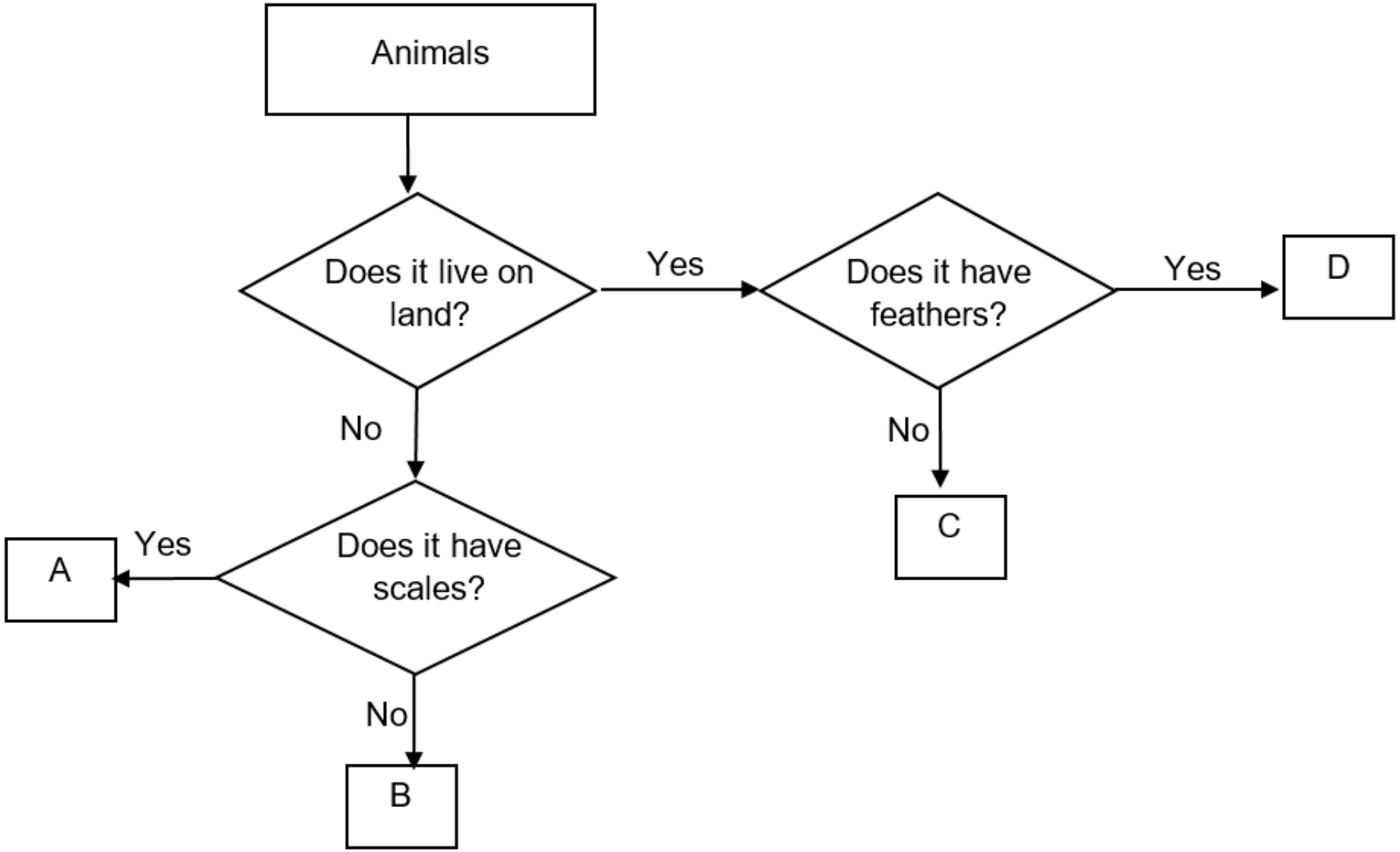
A scientific explanation has three parts:

- **C**laim – a ***statement or choice*** to answer a question
- **E**vidence- interpret **data to *prove*** your claim
- **R**eason – a ***scientific principle or concept*** that ***links <u>why</u> the evidence supports the claim***

Worked example

Study the following flowchart given.

Example 1



Clara said that D is a mammal. Do you agree with Clara? Explain your answer.

Answering with C.E.R.

Claim	No
Evidence	D has feathers.
Reason	Mammals have hair.

→ Taken from flowchart

Ans:

[C]No. [E] D has feathers. [R] Mammals have hair. Thus D is not a mammal.

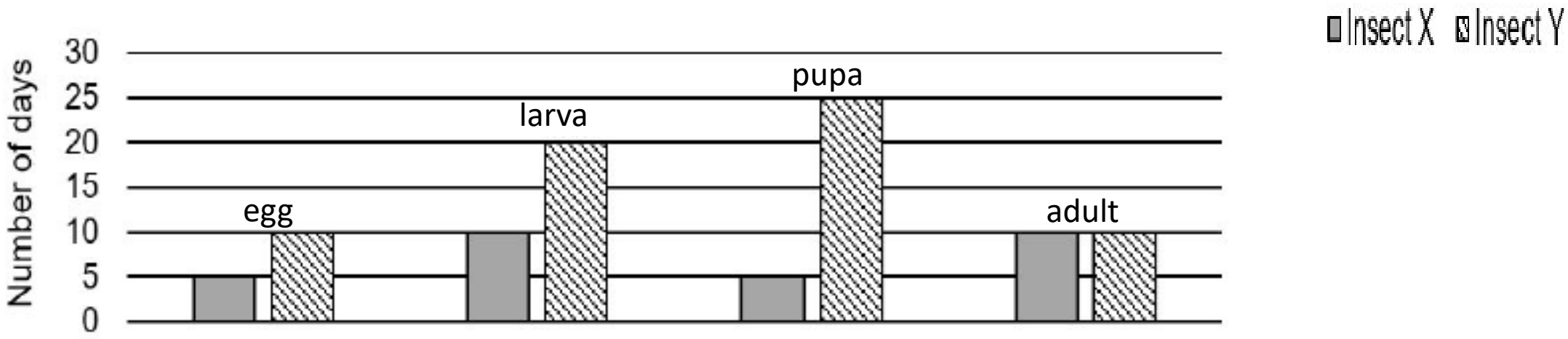
C	✓
E	✓
R	✓

Let us look at some common wrong answers.

Answer	Reason why it's wrong
No. D has no hair.	- Only has claim and evidence - No reason (no science concept) to explain why having no feathers makes D a non-mammal
No. Mammals have hair, give birth to young alive and breathe through lungs.	- No evidence from flowchart to prove why D is not a mammal - The reason has all the characteristics about mammal, which does not apply to the question (only need to mention outer covering).

Example 2

The graph below shows the number of days insect X and Y are at the different stages in their life cycles.



Based on the information provided, which insect reproduces faster?

Answering with C.E.R.

Claim	X
Evidence	The number of days X remain in egg, larva and pupa stages are shorter than insect Y.
Reason	The days X takes to reach from egg stage to adult stage is shorter than Y. Thus it will reproduce faster than Y.

→ Taken from the graph

Ans:

[C] X. [E] The number of days X remain in egg, larva and pupa stages are shorter than insect Y. [R] The days X takes to reach from egg stage to adult stage is shorter than Y. Thus it will reproduce faster than Y.

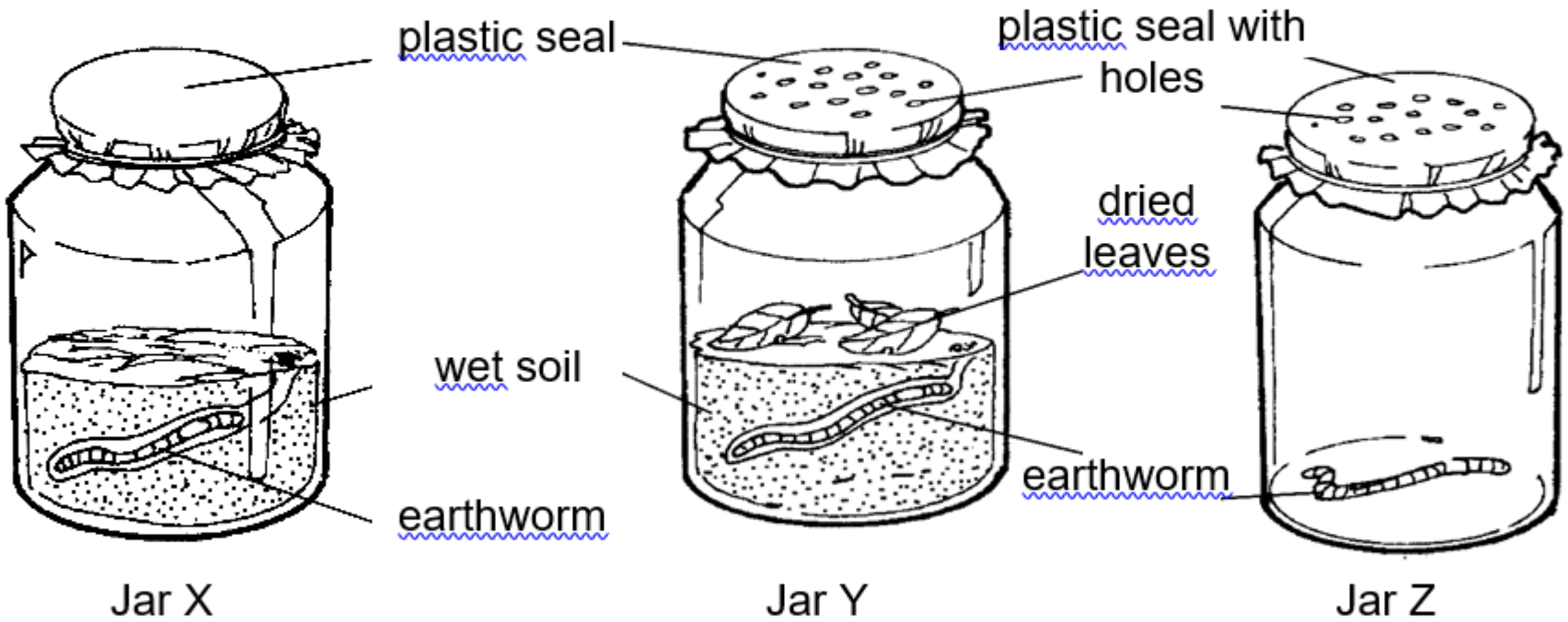
C	✓
E	✓
R	✓

Let us look at some common wrong answers.

Answer	Reason
X. It has a shorter larva and pupa stage than insect Y.	- Only has claim and evidence - No reason (did not link that having a shorter larva and pupa stage lead to reproducing faster)
X. It reached adult stage faster than insect Y.	- Only has claim and reason - No evidence from graph to compare the stages of insects X and Y

Example 3

Bernard wanted to investigate the conditions needed for living things to survive. He put an earthworm each in three similar jars under different conditions. Earthworm eats dried leaves and prefers dark and wet places.



After one week, in which jar(s) will the earthworm be able to survive? [1]

Answering with C.E.R.

Claim	Jar Y
Evidence	In Jar Y, there is air, food and water for the earthworm to survive. In Jar X, there is no air and food. In Jar Z, there is no water and food.
Reason	Living things need air, food and water to survive.

→ Taken from the graph

Ans:
[C] Jar Y. [E] In Jar Y, there is air, food and water for the earthworm to survive. In Jar X, there is no air and food. In Jar Z, there is no water and food. [R] Living things need air, food and water to survive.

C	✓
E	✓
R	✓

Let us look at some common wrong answers.

Answer	Reason
Jar Y. Living things need air, food and water to survive.	- Only has claim and reason - No evidence from diagram to prove why earthworm will survive in Jar Y and not in Jars X and Z.
Jar Y. It has air, food and water for the earthworm to survive.	- Only has claim and evidence - No reason (no science concept) to link evidence to the importance of having air, water and food for the survival of the earthworm.

Q & A