

Pondweed and light

Argue like a scientist: Claim, Evidence, Reasoning.



NAME _____ CLASS _____ DATE _____

LEARNING GOAL

I can write a scientific argument using data as evidence.

SUCCESS CRITERIA

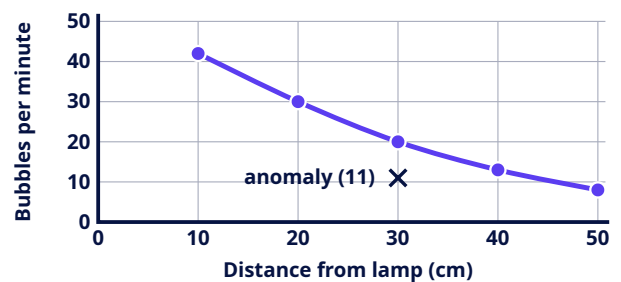
- ☐ I can make a **claim** backed by **numbers**.
- ☐ I can explain the pattern with a **science idea**.
- ☐ I can judge how **strong** the evidence is.

1 How does lamp distance affect the rate of photosynthesis in pondweed?

A lamp shone on pondweed from five distances. Oxygen bubbles were counted for one minute, three times each.

DISTANCE (CM)	REPEAT 1	REPEAT 2	REPEAT 3	MEAN
10	42	45	39	42
20	30	28	32	30
30	19	21	11	20*
40	13	12	14	13
50	8	9	7	8

(11) anomaly. *Mean of 19 and 21 only. Values in bubbles per minute.



2 MODEL Which wrap keeps hot water warm longest: foil, wool or nothing?

C Claim. Wool keeps hot water warm for longest.

E Evidence. Mean drop in 20 minutes: wool 12 °C, foil 18 °C, unwrapped 25 °C.

R Reasoning. Wool traps air, a poor conductor, so less thermal energy is transferred.

3 Now write your own CER

6 marks

Carry on writing after each starter. Quote **two or more means, with units**, and use the useful words.

C Claim: *As the lamp moves further away, the rate of photosynthesis*

E Evidence: *At 10 cm the mean was ___ bubbles per minute, but*

R Reasoning: *This happens because plants use light energy to*

STRENGTH OF EVIDENCE

Enough repeats? ☐ Yes ☐ No

Anomaly left out? ☐ Yes ☐ No

Fair test? ☐ Yes ☐ No

Same pattern every time? ☐ Yes ☐ No

My evidence is (circle):

weak **fair** **strong**

USEFUL WORDS

photosynthesis **light energy** **oxygen**

rate **intensity**

Spot the weak CER

Three pupils used the same data. None of their answers is quite right.



4 Judge each answer, then fix it

6 marks

Tick the parts each answer really has, circle its biggest problem, then rewrite the weakest part.

ANSWER A Has: ☐ C ☐ E ☐ R

BIGGEST PROBLEM: CIRCLE ONE

no claim

no numbers

no science idea

overclaims

"The closer the lamp, the more bubbles there were, because plants like light."

MY REWRITE

ANSWER B Has: ☐ C ☐ E ☐ R

BIGGEST PROBLEM: CIRCLE ONE

no claim

no numbers

no science idea

overclaims

"At 10 cm there were 42 bubbles per minute and at 50 cm there were 8. At 30 cm one result was 11."

MY REWRITE

ANSWER C Has: ☐ C ☐ E ☐ R

BIGGEST PROBLEM: CIRCLE ONE

no claim

no numbers

no science idea

overclaims

"As the lamp moves further away, photosynthesis slows down. This proves that the distance causes photosynthesis."

MY REWRITE



GO FURTHER

The lamp also gives out heat. How could this make the 10 cm result unfair, and how would you control it?

5 Peer feedback

Swap sheets with a partner

	MISSING	PARTLY THERE	STRONG
C Claim answers the question	☐	☐	☐
E Two or more numbers, with units	☐	☐	☐
R Science idea explains the link	☐	☐	☐

ONE THING THAT WORKS

ONE THING TO IMPROVE

Feedback from _____

After feedback, how confident are you writing a CER?



Not yet



Getting there



Got it