

- 1 A student did an experiment to investigate growth in plants. He took five seeds and planted them in some compost. They were planted outdoors within 1 square metre.

Plant number	Height (cm)				Mean growth rate cm/day
	Day 2	Day 4	Day 6	Day 8	
1	2.5	4.0	5.0	6.4	
2	2.0	3.5	4.5	5.6	0.7
3	1.5	2.3	3.0	3.2	0.4
4	2.5	3.5	4.2	4.8	0.6
5	0.5	0.9	1.4	1.6	0.2

- 1 (a) (i) Calculate the mean growth rate per day for plant number 1. [2 marks]

6.4 / 8 [1]

Be careful not to add up all the numbers and divide by 4!

Mean growth rate = 0.8 [2] cm/day

- 1 (a) (ii) The lowest growth rate recorded by the student was for plant number 5.

Give two environmental factors may have caused plant number 5 to have the lowest growth rate. [2 marks]

Any two from:

Lack of nutrients [1]
Minerals [1]
Water [1]
Sunlight [1]

The 'lack of' is very important. Don't just say 'nutrients' or 'water' You can also say 'too little' or 'not enough'

- 1 (a) (iii) Suggest a factor other than an environmental one which might have caused the plant to have the lowest growth rate. [1 mark]

Genes/DNA/genetics [1]

- 1 (a) (iv) Height of the plant may not be the best measure of growth of the plants in the experiment.

Suggest why. [1 mark]

Could grow a lot but not in height/could grow lots of leaves/growth of branches [1]

A suggest question - think carefully and remember lots of possible correct answers for suggest questions.

1 (b) The diagram below shows the Sahara desert ant.



The air temperature in the desert can reach up to 60°C with the sand reaching even higher temperatures. The Sahara desert ant is well adapted to survive.

Scientists describe the ants as **extremophiles**.

What is meant by the term **extremophile**?

[2 marks]

Animals/plants that can tolerate extreme conditions [1]
such as very high or low temperature/pressure or high salinity [1]

1 (b) (i) Here are some facts about the ants.

- They deliberately come out at the hottest point in the day to eat insects which have died from the heat exposure.
- They only stay out for short periods.
- They have long legs and move quickly across the sand.

Explain why these features help the ant to survive.

[4 marks]

Hottest part of the day - reduce or avoid competition or other insects can't deal with/ tolerate high temperatures. Or hottest part of the day is when insects die [1]

Short periods - reduce the amount of time they are in the heat.[1]

Long legs to stay higher above the (hot) sand or so body doesn't touch the hot sand [1]

Move quickly - reduce amount of time in contact with the sand. [1]

A big question - always important to structure your answer.
In this one, the answer is broken down to explain each individual adaptation.

(Total 12 marks)

End