

Genetics & ecosystem

Total mark – 16

Question: 1

2 Genes control some of the characteristics of an organism.

2 (a) Write the words from the box in the correct size order, starting with the smallest structure.

[3 marks]

cell	chromosome	gene	nucleus
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Smallest structure

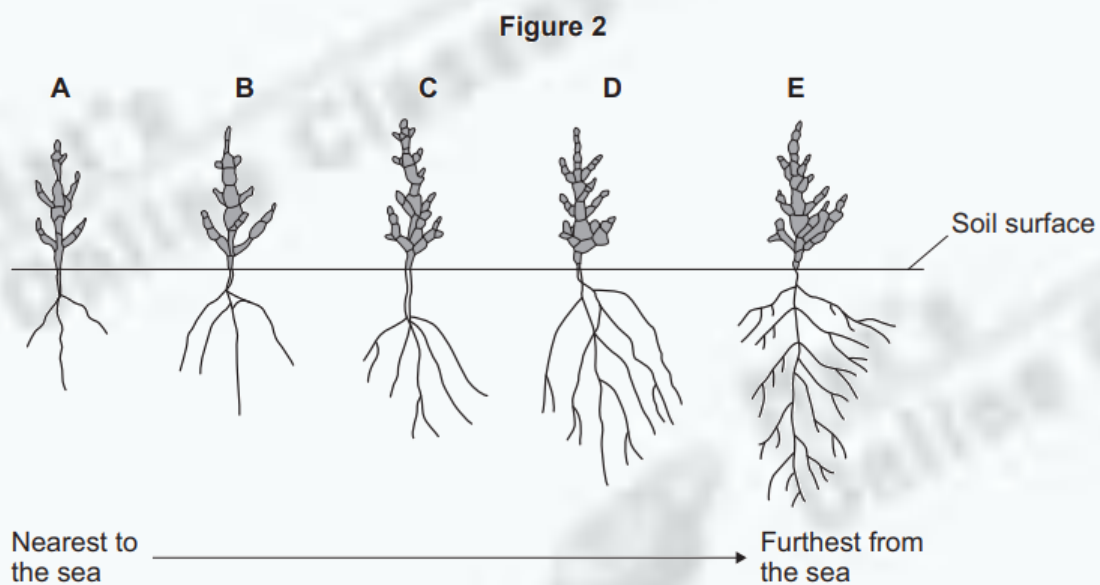


Largest structure

2 (b) Glasswort is a plant that grows on seashores.

Figure 2 shows five glasswort plants, **A**, **B**, **C**, **D** and **E**.

The glasswort plants live on different parts of the same seashore.



- 2 (b) (i)** Describe **two** effects of increasing distance from the sea on the growth of **roots** in glasswort plants.

[2 marks]

1 _____

2 _____

- 2 (b) (ii)** In an investigation, plant **A** was dug up and replanted next to plant **E**.

One month later, the roots of plant **A** were the same as the roots of plant **E**.

Use the correct answer from the box to complete the sentence.

[1 mark]

genes only

the environment only

genes and the environment

The change in the growth of the roots in plant **A** after replanting is due to

_____.

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	gene chromosome nucleus cell	in this order all correct = 3 marks allow 1 mark for each consecutive pair of structures	3	AO1 1.7.1b 1.7.2d
2(b)(i)	(the greater the distance from sea) longer / deeper (roots) more branched (roots)	ignore descriptions of shoot / plant allow more spread out if no other mark awarded allow 1 mark for more / bigger (area) roots	 1 1	AO2 1.7.1a/d
2(b)(ii)	(the) environment (only)		1	AO3 1.4.2b
Total			6	

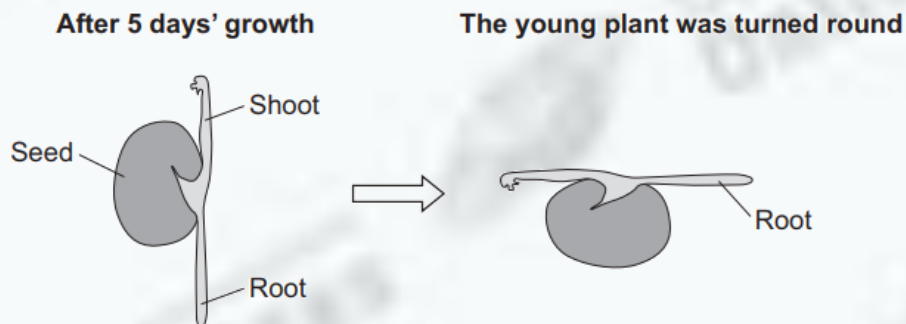
Question: 2

3 A student investigated growth in plants.

The student:

- planted a seed in moist soil
- left the seed to grow for 5 days
- dug up the young plant, turned it round and replanted it, as shown in **Figure 3**.

Figure 3

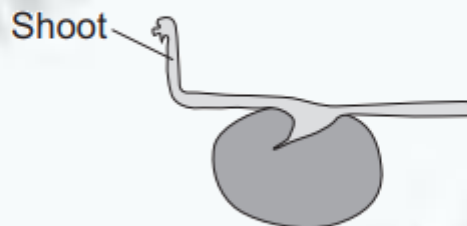


3 (a) (i) Three days later the student dug up the young plant again.

Complete **Figure 4** to show what the root would look like after these 3 days.

[1 mark]

Figure 4



3 (a) (ii) The shoots of plants grow upwards.

Give **two** reasons why shoots grow upwards.

[2 marks]

Tick (✓) **two** boxes.

Shoots grow towards moisture.

☐

Shoots grow towards light.

☐

Shoots grow in the direction of the force of gravity.

☐

Shoots grow against the force of gravity.

☐

Shoots grow away from light.

☐

3 (b) Hormones control the direction of growth in roots and shoots.

3 (b) (i) Name **one** plant hormone.

[1 mark]

Draw a ring around the correct answer.

auxin

LH

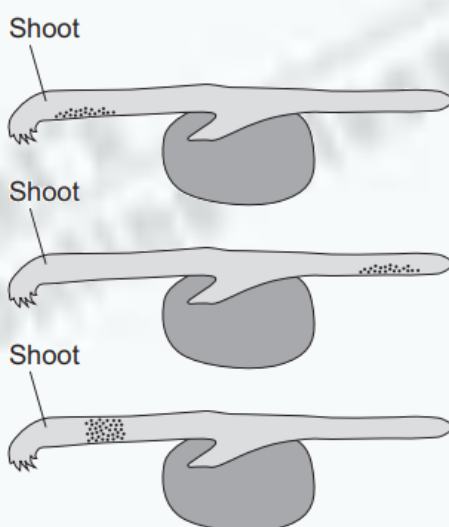
statin

3 (b) (ii) In plant shoots, where there is more plant hormone the cells grow faster.

Which distribution of plant hormone would cause the shoot to grow upwards?

[1 mark]

Tick (✓) **one** box.



Key

Each dot represents one unit of plant hormone

☐☐☐

3(a)(i)	Figure 4 completed to show downward growth of root	judgement by eye to within 45° of vertical ignore any addition to shoot ignore any lateral roots ignore at what point downward growth occurs	1	AO2 1.2.3a
3(a)(ii)	Shoots grow towards light. Shoots grow against the force of gravity.		1 1	AO1 1.2.3a
3(b)(i)	auxin		1	AO1 1.2.3b
3(b)(ii)			1	AO3 1.2.3c
Total			5	

Question: 3

- 6 (a) Which term describes organisms that can tolerate very hot or very cold places?

Draw a ring around the correct answer.

[1 mark]

an environmental
species

an extremophile
species

an indicator
species

- 6 (b) **Figure 7** shows photographs of an Adelie penguin and a chinstrap penguin. Adelie penguins and chinstrap penguins live in the Antarctic at temperatures below 0 °C.

Figure 7

Adelie penguin



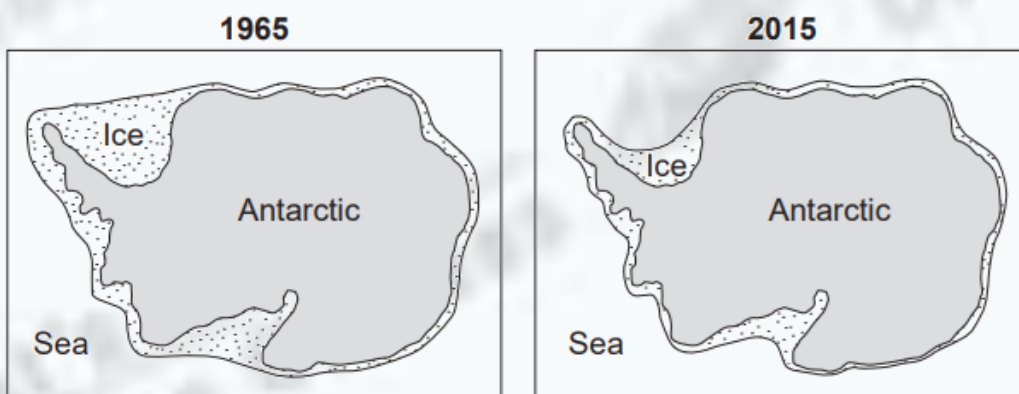
Chinstrap penguin



Adelie penguins spend most of their time on the ice around the Antarctic.
Chinstrap penguins live mainly in the sea around the ice.
Since 1965 the number of Adelie penguins has **decreased** by 6 million.

Figure 8 shows changes to the ice around the Antarctic over the past 50 years.

Figure 8



- 6 (b) (i)** Use information from **Figure 8** to explain why the number of Adelie penguins has decreased since 1965.

[2 marks]

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- 6 (b) (ii)** Suggest what has happened to the number of chinstrap penguins since 1965.

Draw a ring around your answer. **increase / decrease**

Give a reason for your answer.

[1 mark]

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.....

- 6 (c)** The number of penguins can be used to monitor changes in temperature of the environment.

Temperature readings could also be taken using a thermometer.

What is the advantage of using penguins, instead of a thermometer, to monitor changes in temperature of the environment?

Tick (✓) **one** box.

[1 mark]

Living organisms show long-term changes.

☐

Thermometers cannot measure temperatures below 0 °C.

☐

Thermometers do not give accurate readings.

☐

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	an extremophile species		1	AO1 1.4.1e
6(b)(i)	smaller ice area	allow smaller amount of ice allow less ice	1	AO2 1.4.2a/b
	(so) less habitat	allow fewer places to live / nest	1	
6(b)(ii)	either increase as more sea to live in or as less competition for food or decrease as less space (ice) to lay eggs or predators more likely to eat them	there is no mark for increase / decrease alone. The mark is for an appropriate reason linked to increase / decrease if increase / decrease not ringed the mark may be awarded if it is clear in the explanation which is intended	1	AO3 1.4.2a/b
6(c)	Living organisms show long-term changes.		1	AO3 1.4.2d