

GCSE Biology

Worksheet: Plant defence responses

TIME 30 min	TOTAL 29 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Plant defence responses

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Plants have physical, chemical and mechanical adaptations that help to defend them against pathogens and herbivores.

0 1 . 1

What is a herbivore?

.....

.....

[1 mark]

0 1 . 2

Give the type of defence (physical, chemical or mechanical) shown by each of these adaptations:

- a tough, waxy cuticle on the leaves
- thorns on the stem
- leaves that droop when they are touched.

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.....

[3 marks]

0 1 . 3

Give **two** examples of chemical defences used by plants.

.....

.....

.....

.....

[2 marks]

0 2

Plants have physical, chemical and mechanical defences.

0 2 . 1

Give **two** physical defences that help plants to resist invasion by microorganisms.

.....

.....

.....

.....

[2 marks]

0 2 . 2

Some plants make poisons.

Suggest how making poisons helps these plants to survive.

[1 mark]

0 2 . 3

Which of these is a **mechanical** defence?

Tick (✓) **one** box.

Antibacterial chemicals

☐

Bark

☐

Thorns

☐

Waxy cuticle

☐

[1 mark]

0 3

A student investigated whether extracts from three plants kill bacteria. Paper discs soaked in each extract were placed on agar plates covered with bacteria. A disc soaked in water was also used. After incubation, the student measured the diameter of the clear zone around each disc.

Table 1 shows the results.

Table 1

Disc soaked in	Clear zone diameter in mm: repeat 1	Repeat 2	Repeat 3	Mean in mm
Mint extract	14	12	13	13
Garlic extract	21	19	23	X
Lettuce extract	0	0	0	0
Water	0	0	0	0

0 3 . 1

Calculate value X in Table 1.

.....

.....

.....

$X =$ mm

[1 mark]

0 3 . 2

Why did the student use a disc soaked in water?

.....

.....

[1 mark]

0 3 . 3

Which extract was the most effective at killing the bacteria?
Give a reason for your answer.

.....

.....

.....

.....

[2 marks]

0 3 . 4

Suggest why some plants produce antibacterial chemicals.

.....

.....

.....

.....

[2 marks]

0 4

Many plants, such as brambles and roses, have sharp thorns on their stems.

0 4 . 1

Explain how thorns help to defend these plants.

.....

.....

.....

.....

[2 marks]

0 4 . 2

Some animals, such as certain birds, can feed on these plants without being harmed by the thorns.

Suggest why thorns are still a useful defence for the plant overall.

[2 marks]

0 5

Many tree leaves contain bitter-tasting chemicals called tannins.

0 5 . 1

Suggest how tannins help to protect a tree from herbivores such as caterpillars.

[2 marks]

0 5 . 2

Some trees increase the amount of tannins in their leaves after herbivores have started feeding on them.

Suggest how this response could benefit the tree.

[2 marks]

0 6

Cacti are plants that grow in deserts. Many cacti have sharp spines instead of leaves, and a thick, tough outer layer.

0 6 . 1

Suggest how a cactus's spines help to defend it against herbivores.

.....

.....

.....

.....

[2 marks]

0 6 . 2

Suggest how the thick, tough outer layer of a cactus helps to defend it against pathogens.

.....

.....

.....

.....

[2 marks]

0 6 . 3

Suggest **one** disadvantage to a herbivore of trying to eat a cactus.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Biology · Worksheet: Plant defence responses · 29 marks

Question 1 (6 marks)

01.1 [1 mark]

- an animal that eats plants (1)
-

01.2 [3 marks]

- waxy cuticle: physical (1)
 - thorns: mechanical (1)
 - leaves that droop: mechanical (1)
-

01.3 [2 marks]

- poisons (that deter herbivores) (1)
 - antibacterial chemicals (that kill bacteria) (1)
-
-

Question 2 (4 marks)

02.1 [2 marks]

- cellulose cell walls (1)
- a tough, waxy cuticle on the leaves (1)
- layers of dead cells on the surface of stems / bark, which fall off (1)

Any 2 of the points above.

02.2 [1 mark]

- poisons deter herbivores / animals from eating the plant (1)
-

02.3 [1 mark]

Correct: Thorns

Question 3 (6 marks)

03.1 [1 mark]

Answer: 21 mm

- 21 (mm) (1)

03.2 [1 mark]

- as a control / to show that any effect is caused by the extract (not the disc or water) (1)

03.3 [2 marks]

- garlic (1)
- it had the largest (mean) clear zone (21 mm) (1)

03.4 [2 marks]

- to kill bacteria that could infect the plant (1)
- (so) the plant is less likely to become diseased / is more likely to survive and grow (1)

Question 4 (4 marks)

04.1 [2 marks]

- thorns can injure or cause pain to a herbivore that tries to eat the plant (1)
- herbivores are deterred, so are less likely to eat the plant (1)

04.2 [2 marks]

- thorns still deter many other herbivores, even if a few animals are unaffected (1)
- reducing the number of herbivores that feed on it means the plant loses less tissue overall (1)

Question 5 (4 marks)

05.1 [2 marks]

- the bitter taste deters herbivores from eating the leaves (1)
- fewer leaves are eaten, so the tree loses less of the tissue it needs for photosynthesis (1)

05.2 [2 marks]

- it makes the remaining, or new, leaves less attractive to the herbivores that are currently feeding (1)
 - it reduces further leaf loss / damage to the tree (1)
-

Question 6 (5 marks)

06.1 [2 marks]

- the spines can injure an animal that tries to eat the cactus (1)
 - herbivores are deterred from feeding on it (1)
-

06.2 [2 marks]

- it acts as a physical barrier (1)
 - it is more difficult for pathogens to enter the plant's tissues (1)
-

06.3 [1 mark]

- it could be injured by the spines, or waste time and energy without gaining much food (1)
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