

APOLLO

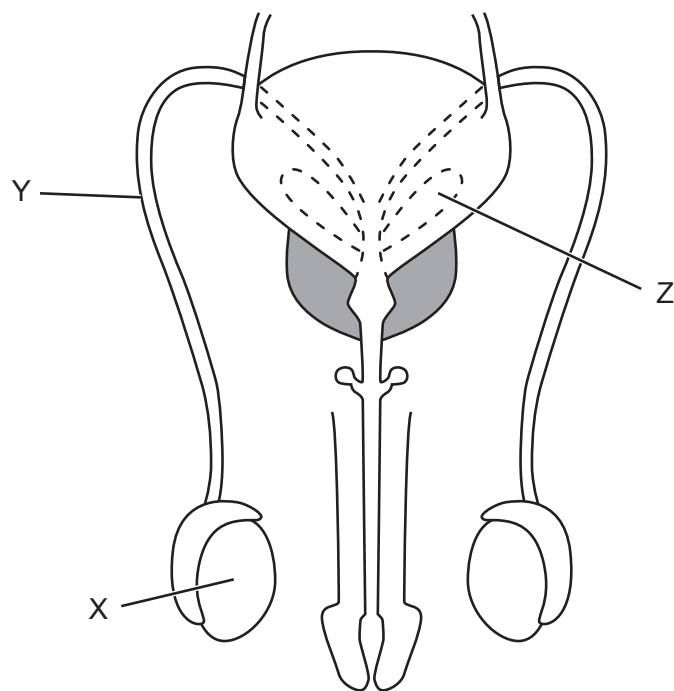
Reproduction SL

Biology

First assessment 2025

7 questions | questions

19. The diagram shows the male reproductive system in front view.



Which structures are indicated by the letters X, Y and Z?

	X	Y	Z
A.	testis	sperm duct	seminal vesicle
B.	epididymis	sperm duct	prostate gland
C.	testis	urethra	prostate gland
D.	epididymis	urethra	seminal vesicle

19. Cherry trees (*Prunus avium*) have two self-incompatibility alleles. What benefit do self-incompatibility alleles have?
- A. They decrease genetic variation.
 - B. They prevent inbreeding.
 - C. They decrease the chances of mutations taking place within the gametes.
 - D. They prevent the plant from releasing pollen at certain times of the year.

Turn over

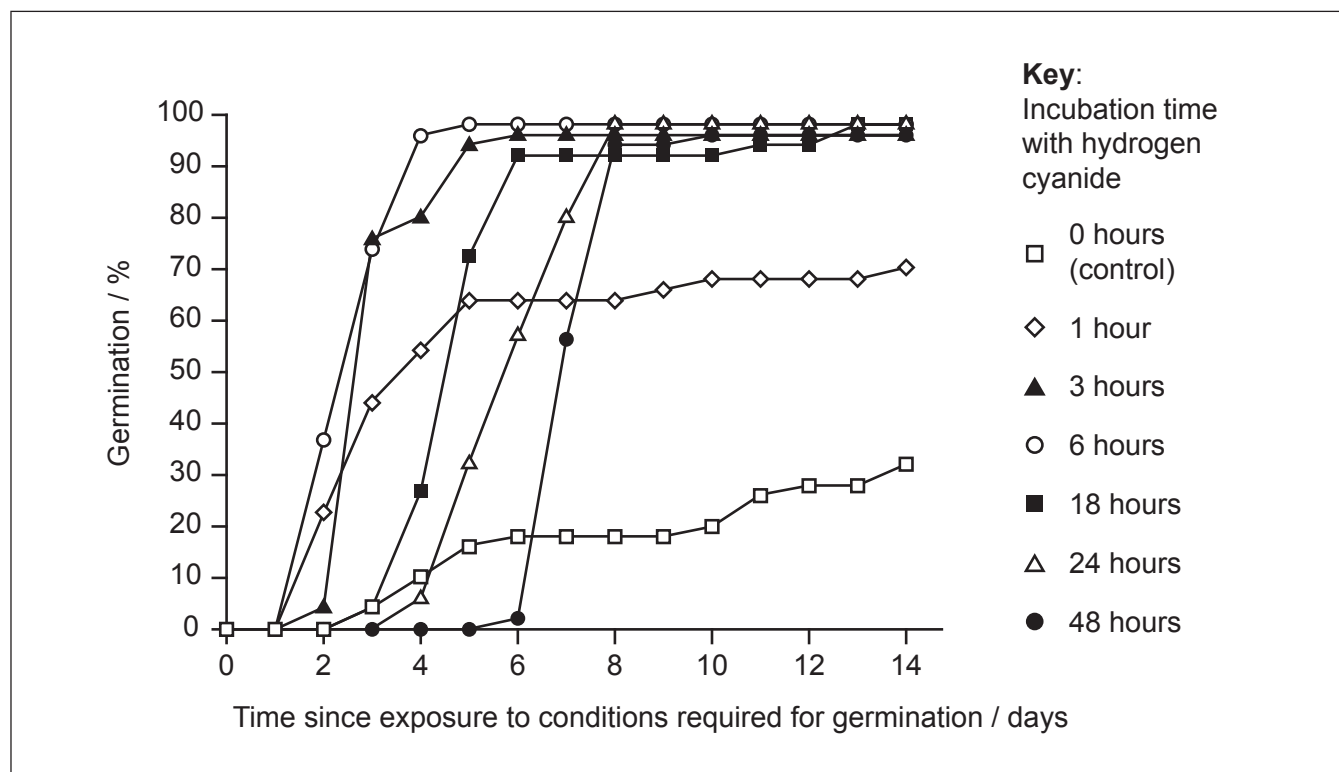
20. What happens during fertilization in humans?

- A. The nuclear membranes of sperm and egg break down.
- B. The sperm enters the egg.
- C. The chromosomes undergo joint meiosis.
- D. Mitochondria in the zygote come from sperm and egg.

Section A

Answer **all** questions. Answers must be written within the answer boxes provided.

1. Cyanide, a chemical found in all living organisms, is known to stimulate seed germination in many plant species. Cyanide is also known to be an inhibitor of cellular respiration. Freshly harvested sunflower (*Helianthus annuus*) seeds were incubated with hydrogen cyanide for different periods of time and then exposed to the conditions required for germination. The graph shows the percentage of seeds that had germinated over fourteen days.



- (a) State the percentage of seeds that had germinated after 10 days with no hydrogen cyanide incubation time.

[1]

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- (b) Sketch a line on the graph to show what the results for seeds incubated for 60 hours in hydrogen cyanide might look like.

[2]

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(Question 1 continued)

- (c) Compare and contrast the results for seeds incubated for 18 hours with those for the control seeds over the period of the experiment. [2]

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- (d) Cyanide is also known to inhibit respiration. Suggest how this is shown in the graph. [1]

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- (e) Evaluate the hypothesis that 6 hours incubation with hydrogen cyanide is the optimum time for seed germination. [2]

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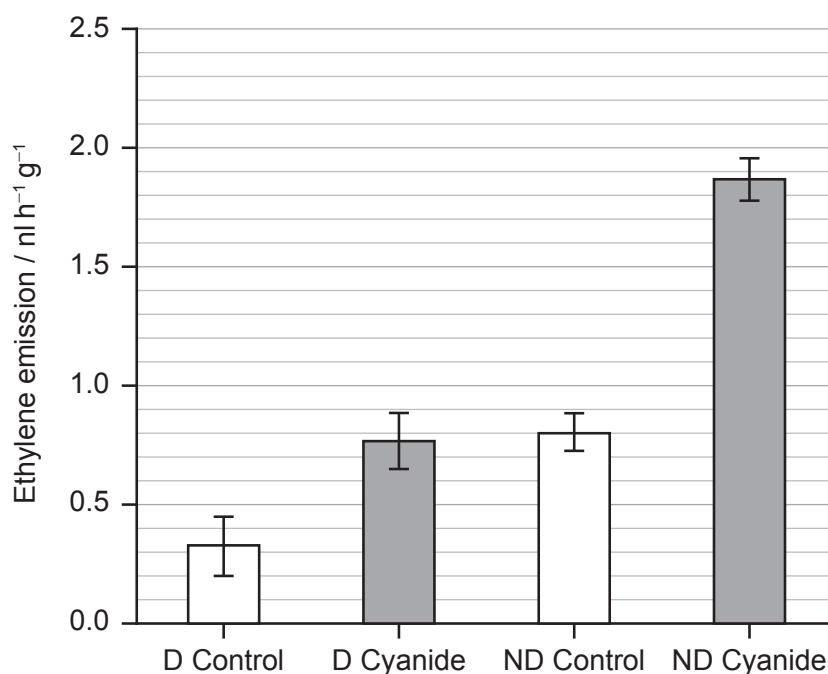
(Question 1 continued)

Ethylene is a chemical that promotes germination in sunflower seeds. Cyanide is known to activate ethylene production.

Four groups of sunflower seed embryos were treated as follows:

- D Control: dormant (not yet able to germinate) seed embryos not incubated with cyanide
- D Cyanide: dormant (not yet able to germinate) seed embryos incubated with cyanide for 3 hours
- ND Control: non-dormant (able to germinate) seed embryos not incubated with cyanide
- ND Cyanide: non-dormant (able to germinate) seed embryos incubated with cyanide for 3 hours

The graph shows the mean volume of ethylene emission by the four groups of seed embryos measured over a period of 5 hours at 20°C.



- (f) State the mean increase in ethylene emission in the dormant sunflower seed embryos due to the presence of cyanide.

[1]

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(Question 1 continued)

- (g) Calculate the percentage change in the ethylene emission in the non-dormant sunflower seed embryos due to the presence of cyanide. [1]

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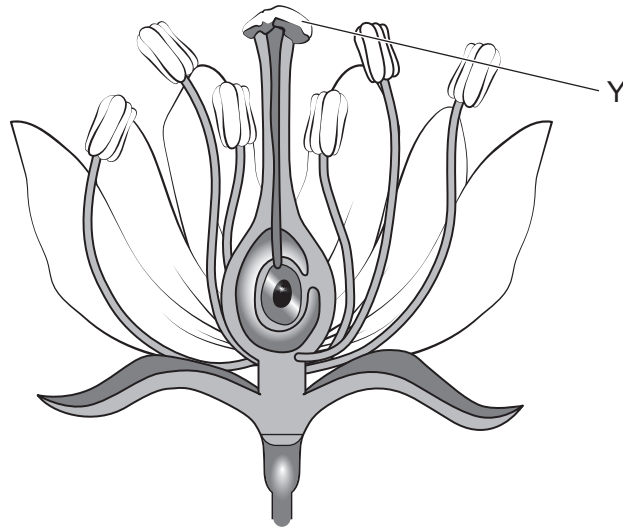
- (h) Compare and contrast the effects of cyanide incubation on mean ethylene production for dormant (D) and non-dormant (ND) seed embryos. [2]

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Turn over

19. A cross-section of a flower is shown.



What is structure Y?

- A. Anther
- B. Nectary
- C. Style
- D. Stigma

Turn over

- 19.** Flowering plants can use either self-pollination or cross-pollination when they carry out sexual reproduction. Which plants are most likely to cross-pollinate?
- A. Plants that are hermaphrodites
 - B. Plants whose anthers and stigmas mature at the same time
 - C. Plants with flowers that have much longer stamens than stigmas
 - D. Plants that are either male or female

- 22.** The first day of the menstrual cycle is when menstruation begins. What occurs around day 15 of the cycle?
- A. Formation of a corpus luteum
 - B. The placenta starts to secrete progesterone
 - C. The end of menstruation
 - D. Blood progesterone concentration reaches its maximum