

1 Fig. 6.1 shows a side view of the female reproductive system.

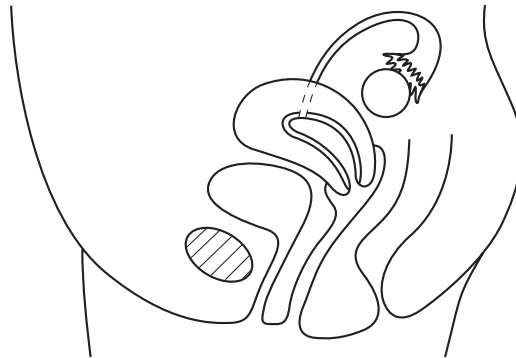


Fig. 6.1

(a) Using **label lines** and the **letters** given, label the following on Fig. 6.1.

S. where the penis is inserted during sexual intercourse

D. where a diaphragm (cap) would be placed to prevent pregnancy

M. where an ovum matures

F. where an ovum would be fertilised

E. where an embryo would become implanted

[5]

(b) Explain how

(i) the ovum passes down to the uterus,

.....
.....
..... [2]

(ii) the structure of a sperm enables it to reach the ovum,

.....
.....
..... [2]

(iii) a zygote has a diploid number of chromosomes,

.....
.....
..... [2]

(iv) the level of a hormone which prevents menstruation remains high during pregnancy, even after the corpus luteum has broken down.

.....
.....
..... [2]

[Total: 13]

2 Fig. 5.1 shows stages in the formation of a human fetus.

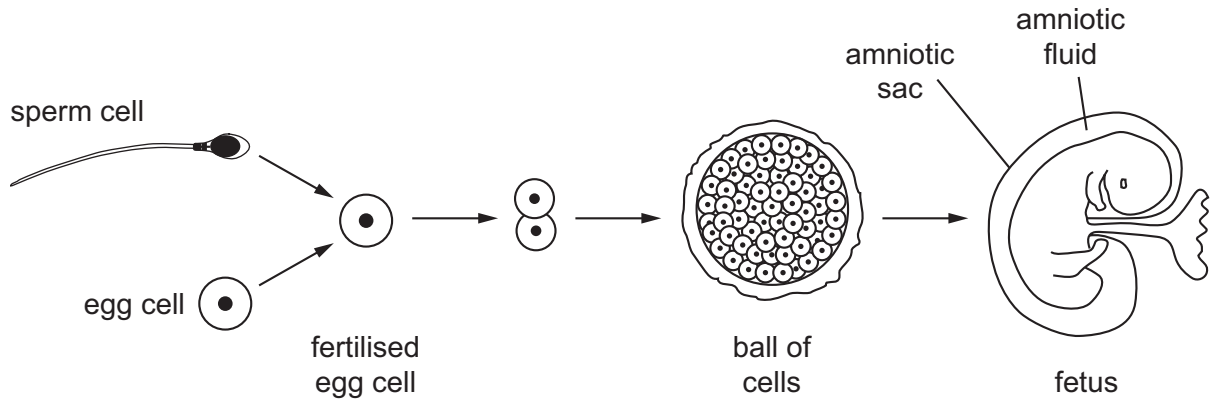


Fig. 5.1

(a) (i) Name the process of cell division that results in the formation of sperm cells.

..... [1]

(ii) State **one** way in which the sperm cell is different from cells in the developing fetus.

..... [1]

(iii) State the term used to describe the fertilised egg cell.

..... [1]

(iv) Explain what determines that a fertilised egg cell develops into a girl rather than a boy.

.....
 [1]

(b) State where each of the following is produced.

(i) the egg cell

(ii) the fertilised egg

(iii) the fetus [3]

(c) The fetus is surrounded by amniotic fluid and an amniotic sac.

State their functions.

amniotic fluid

.....

amniotic sac

..... [2]

(d) (i) Outline the role of the placenta in the development of the fetus.

.....

.....

.....

.....

..... [4]

(ii) Describe the role of the placenta in maintaining pregnancy.

.....

.....

..... [2]

[Total: 15]

- 3 All the plants were removed in an area of ground next to a path. Four weeks later there were 113 groundsel plants growing there. The heights of the plants were measured, sorted into groups and recorded in Table 2.1.

Table 2.1

height / cm	frequency
0 - 3.9	8
4.0 - 7.9	28
8.0 - 11.9	27
12.0 - 15.9	21
16.0 - 19.9	9
20.0 - 23.9	9
24.0 - 27.9	5
28.0 - 31.9	4
32.0 - 35.9	1
36.0 - 39.9	1

The graph, Fig. 2.1, shows the spread of data but is incomplete.

- (a) Complete the graph by adding the missing column **and** labelling the axes.

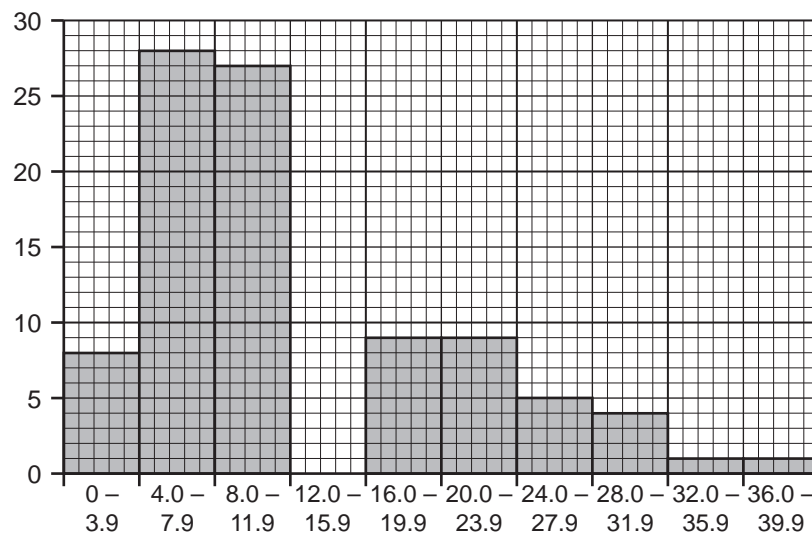


Fig. 2.1

[3]

- (b) (i) State the type of variation shown by the graph.

..... [1]

(ii) The plants were all growing in the same soil and germinated at the same time.

Suggest three reasons why the plants were **not** all the same height.

1.
2.
3. [3]

(c) Some of the plants had developed flowers that had features to attract insects.

(i) State two features a flower could have to attract insects.

1.
2. [2]

(ii) State the role insects have when visiting these flowers.

..... [1]

(d) Some of the flowers developed seeds although insects had not visited them.

Suggest how seed formation could occur in the flowers **not** visited by insects.

.....
.....
..... [2]

[Total: 12]

4 Fig. 1.1 shows a common emerald dove, *Chalcophaps indica*.



Fig. 1.1

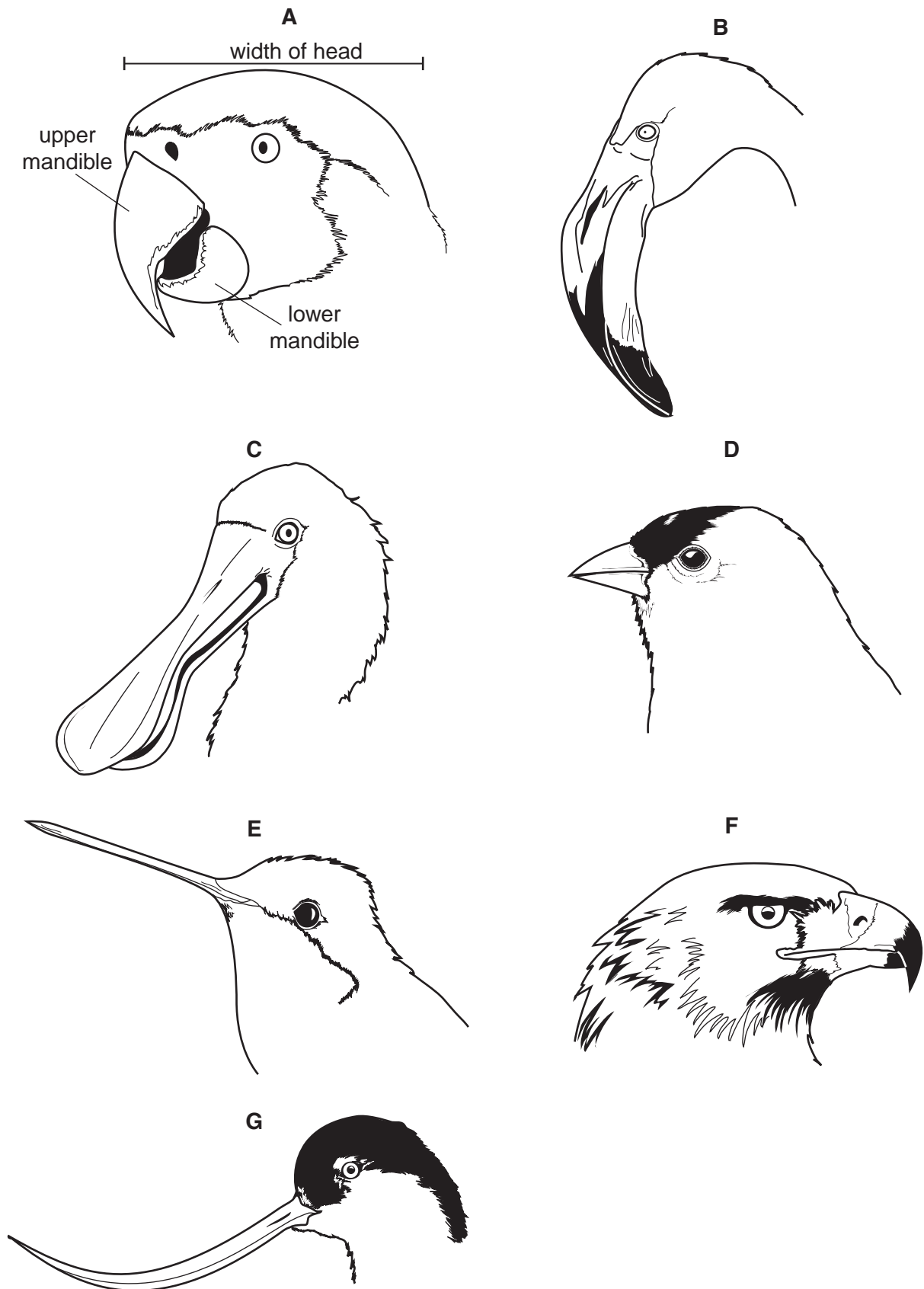
(a) Two distinguishing features of birds are beaks and wings.

State **one other** feature shown **only** by birds that is visible in Fig. 1.1.

.....[1]

(b) Birds show variation in the sizes and shapes of their beaks. A beak is composed of an upper mandible and a lower mandible.

Fig. 1.2 shows the heads of seven different species of bird.



not drawn to scale
Fig. 1.2

Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

key

1	(a)	beak is shorter than the width of the head	go to 2	
	(b)	beak is longer than the width of the head	go to 4	
2	(a)	upper mandible is same length as the lower mandible	<i>Spinus tristis</i>	
	(b)	upper mandible is longer than the lower mandible	go to 3	
3	(a)	lower mandible is about half the length of the upper mandible	<i>Ara ararauna</i>	A
	(b)	lower mandible is more than half the length of the upper mandible	<i>Aquila chrysaetos</i>	
4	(a)	both mandibles widen at the end of the beak	<i>Platalea regia</i>	
	(b)	both mandibles are a similar width along their whole length	go to 5	
5	(a)	beak is straight	<i>Trochilus polytmus</i>	
	(b)	beak is curved	go to 6	
6	(a)	beak curves upwards	<i>Recurvirostra americana</i>	
	(b)	beak curves downwards	<i>Phoenicopterus minor</i>	

[3]

(c) Fig. 1.3 shows the events that occur during sexual reproduction in birds. The numbers in brackets indicate the number of chromosomes in the nuclei of the cells of the common emerald dove.

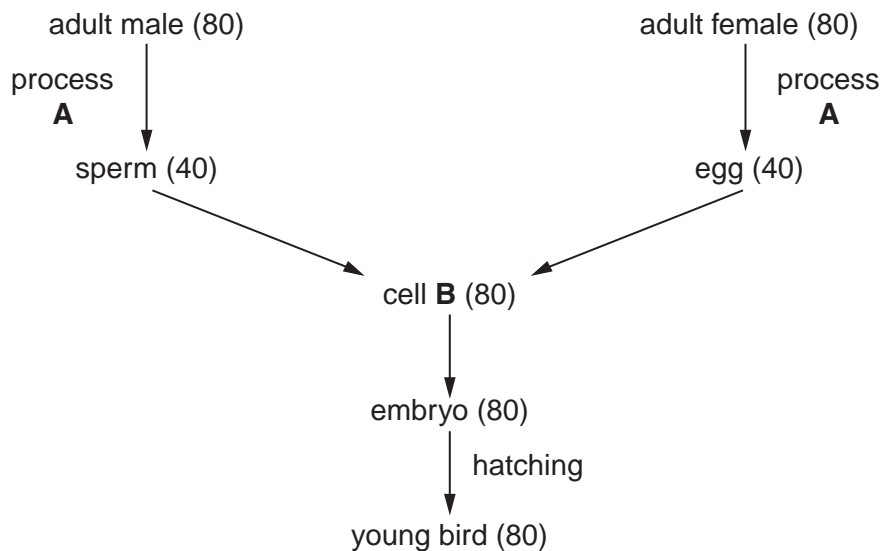


Fig. 1.3

(i) Name process **A** and cell **B**.

A

B

[2]

(ii) State why cell **B** is described as a diploid cell.

.....[1]

(iii) The embryo of the bird develops from cell **B**.

State what is meant by the term *development*.

.....

.....

.....[1]

(iv) Sexual reproduction usually leads to variation.

Explain why variation is an advantage for a species such as the common emerald dove.

.....

.....

.....

.....

.....

.....[2]

[Total: 10]

5 (a) Define the term *genetic engineering*.

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.....

.....

.....

.....[2]

(b) Fig. 6.1 is a flow diagram that shows how insulin can be produced using genetic engineering.

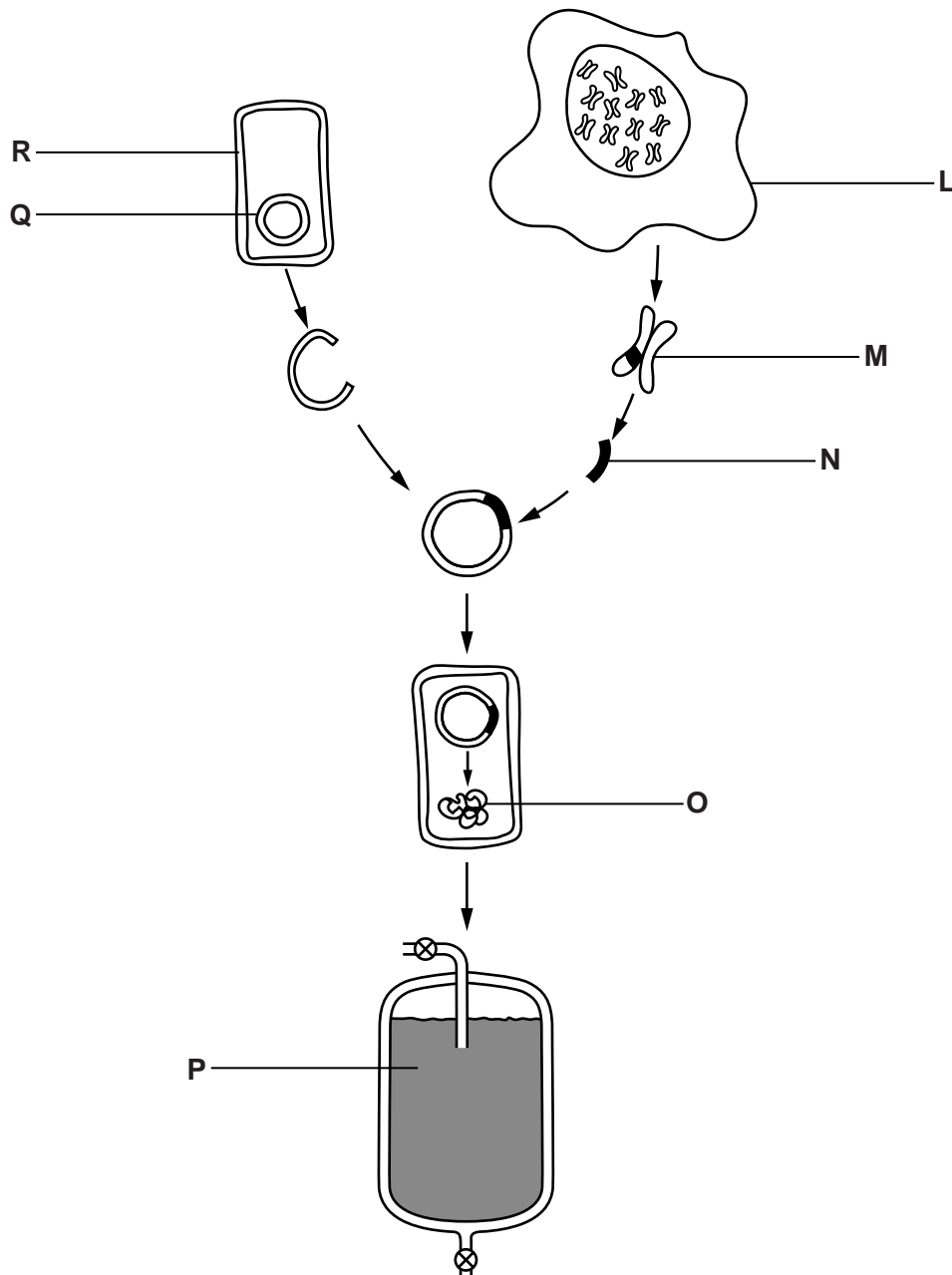


Fig. 6.1

Table 6.1 shows stages in the production of insulin by genetic engineering.

Complete Table 6.1. The first row has been done for you.

Table 6.1

letter from Fig. 6.1	name	description
M	chromosomes	threads of DNA found in the nucleus
		section of DNA removed from human cell
	plasmid	
		type of cell that is genetically engineered
		specific chain of amino acids coded by the section of DNA removed from the human cell
	fermenter	

[5]

(c) The genetically engineered cells in Fig. 6.1 reproduce asexually.

Explain the advantages of asexual reproduction for insulin production by genetic engineering.

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.....[3]

[Total: 10]

6 (a) Define the term *self-pollination*.

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..... [2]

Snapdragon plants have flowers with three colours: red, pink and white.

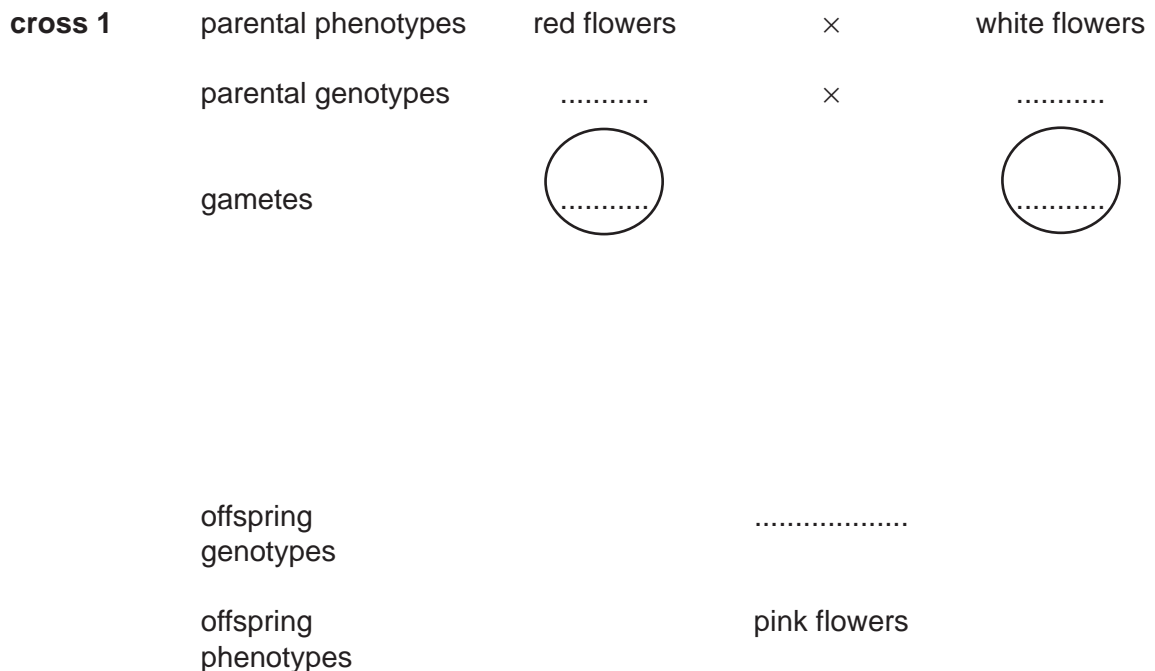
Some students investigated the inheritance of flower colour in snapdragons.

In **cross 1** they cross-pollinated plants that were homozygous for red flowers with plants that were homozygous for white flowers. They collected and planted the seeds from cross 1. All of the resulting plants had pink flowers.

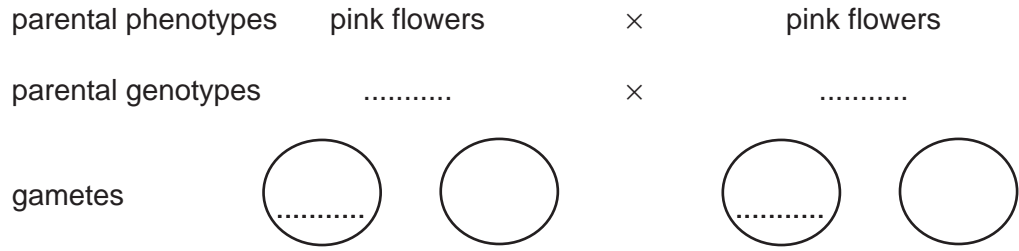
In **cross 2** they self-pollinated all the pink-flowered plants and found that in the next generation there were red-flowered plants, white-flowered plants and pink-flowered plants.

(b) Complete the genetic diagrams to show how flower colour is inherited in snapdragon plants.

Use the symbol I^R for the allele for red flowers and I^W for the allele for white flowers.



cross 2

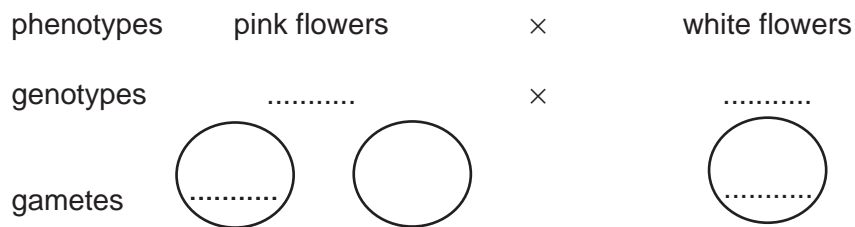


offspring genotypes

ratio of offspring phenotypes [4]

(c) Another student cross-pollinated pink-flowered plants with white-flowered plants.

Complete the genetic diagram to show the results that the student would expect.



offspring genotypes

ratio of offspring phenotypes [3]

(d) Explain the advantages of sexual reproduction to a species of flowering plant, such as the snapdragon.

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[4]

[Total: 13]