

Variation and human reproduction

Task 1

Variation can be inherited from your parents. For example, your natural hair colour is a characteristic that is inherited from your parents.

Variation can also arise from environmental conditions. For example, if you dye your hair, then it is environmental variation.

In many cases, variation is caused by both inherited and environmental factors. For example, your height is affected by how tall your parents are but also by your diet.

Snapdragons are a type of plant. Read the information below and answer the questions that follow.

- Snapdragon flowers can be red, white, or pink.
- Some tall varieties can grow to between 30 and 90 cm in height.
- Dwarf varieties grow to between 6 and 15 cm in height.
- The more light the plants receive, the taller they will grow.
- If plants are kept in the dark, the leaves will turn yellow.

1 State which characteristic is caused by inheritance only.

2 The difference in height between tall and dwarf varieties is inherited. Explain how you know this from the information given.

3 State whether the variation in height within the tall plants is inherited or caused by the environment.

4 Summarise the information above in the table.

Inherited characteristic	Environmental characteristic	Both environmental and inherited characteristic

Task 2

Continuous variation is variation in which characteristics change gradually and can have any numerical value.

Discontinuous variation is variation in which characteristics can only be grouped into categories.

Remember that inherited characteristics normally show discontinuous variation. Characteristics caused by both inherited and environmental factors normally show continuous variation.

1 The table below displays data on flower colour.

Set 1

Number of red flowers	Number of white flowers	Number of pink flowers
56	45	120

a State whether flower colour is continuous or discontinuous variation.

b State which sort of graph you should use to display this sort of variation.

c State what you should plot on each axis.

x-axis: _____

y-axis: _____

d Choose a scale and draw your axes on the graph paper, then plot the graph.

2 The table below displays data on plant height.

Plant no.	Height (cm)	Plant no.	Height (cm)	Plant no.	Height (cm)
1	6	8	10	15	10
2	8	9	12	16	9
3	11	10	13	17	11
4	12	11	11	18	10
5	6	12	8	19	14
6	15	13	7	20	9
7	11	14	7	21	9

a State whether plant height is continuous or discontinuous variation.

b State which sort of graph you should use to display this sort of variation.

c Use the table below to process the data before drawing your graph.

Height (cm)	Number of plants

d State what you should plot on each axis.

x-axis: _____

y-axis: _____

e Choose a scale and draw your axes on the graph paper, then plot the graph.

3 a What is the range of heights in these plants? The range is the largest value minus the smallest value.

b Are these plants tall or dwarf?

Explain your answer.

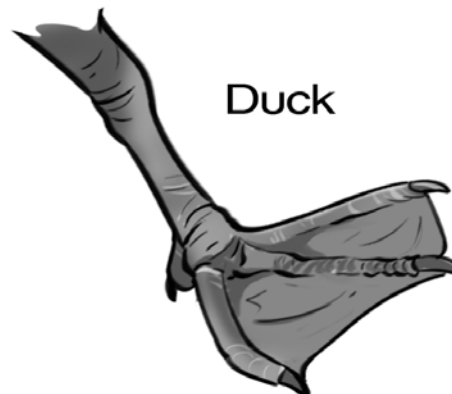
4 A gardener has dwarf and tall plants in his garden. He decides to plant some shrubs between the snapdragons. The shrubs grow up to 25 cm tall.

Which snapdragon plants will grow best in these conditions?

Explain your answer.

Task 3

The diagrams show the feet of two birds, an eagle and a duck.



Eagles are birds of prey that catch other birds or small mammals.

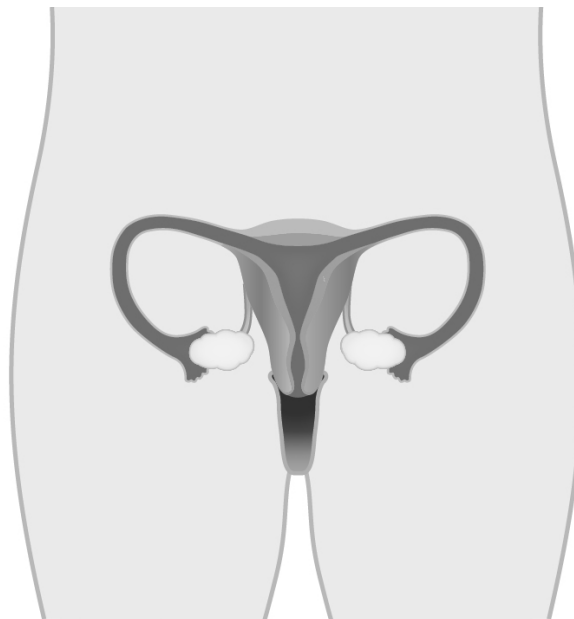
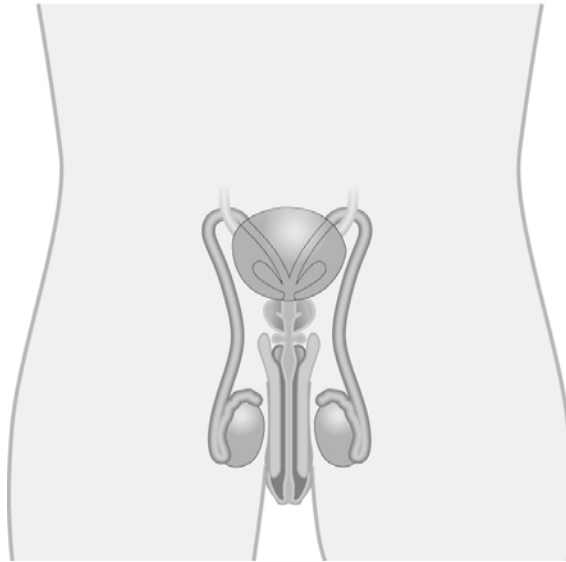
1 Explain how the feet of an eagle are adapted to catching its food.

Ducks can live on land but also spend a lot of time feeding in ponds and rivers.

2 Explain how the feet of the duck are adapted for life in the water.

Task 4

1 Label the diagrams of the male and female reproductive systems.



2 Write the letters for each statement in the correct place on the diagram.

S: The place where sperm are made.

E: The place where eggs are made.

F: The place where a fertilised egg settles.

B: The place where a baby develops.

Task 5

Here is a list of substances. Write each substance in the correct column of the table.

alcohol	carbon dioxide	drugs	nutrients	oxygen	waste
Carried from mother to baby	Carried from baby to mother	Avoid during pregnancy			

1 Explain why the baby needs the substances you have written in the first column.

2 Explain why a pregnant woman should avoid the substances you have written in the last column?

Task 6

A woman's menstrual cycle lasts about 28 days. The cycle will stop when the egg is fertilised by a sperm. Look at the drawing of a menstrual cycle below and then answer the questions.

- 1 On the diagram, draw a line around the days to show when menstruation (a period) occurs.
- 2 On the diagram, label the most likely day for ovulation (an egg is released).

