

## 9A Inheritance and Variation

### Assessment for learning...year 9 (level 3-6)

Answer all questions:

Total marks	27
Time allowed	25 mins.

#### Question 1:

Gareth was writing to a pen-friend. This is how he described himself:

I am a boy.

I weigh 600 N.

I am 16 years old.

I speak French.

I have brown eyes.

I have a scar on my chin.

I am 1.8 m tall.

(a) From the list, choose **two** features which he must have inherited and which will **not** have been affected by his environment.

1. ....

2. ....

2 marks

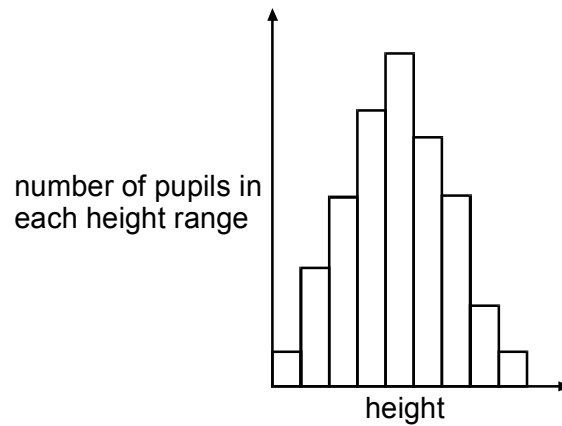
(b) From the list, choose **two** features which will have been affected by both inherited and environmental factors.

1. ....

2. ....

2 marks

(c) Gareth measured the heights of the 16-year-old pupils at his school. He recorded the distribution in a bar chart.



He also collected data about the features in the list below.

Which **two** features would show a similarly shaped distribution to Gareth's bar chart?

Tick the **two** correct boxes.

Ability to roll the tongue.

Presence of ear lobes.

Mass of the pupil.

Circumference of the head.

Sex of the pupil.

2 marks

Maximum 6 marks

**Question 2:**

Suzie keeps five chickens in her garden. During the night they are locked in a shed. The table shows details of Suzie's chickens.

<b>name of chicken</b>	<b>sex</b>	<b>number of eggs laid last year</b>
Molly	female	160
Emily	female	190
Skinny	female	150
Lucy	female	200
Elvis	male	–

(a) Suzie wants each of her hens to lay as many eggs as possible.

She changes their food and water to give them the best recommended balanced diet.

Suggest **two** other ways she could change the hens' living conditions to encourage them to lay more eggs.

- 1 .....
- .....
- 2 .....
- .....

2 marks

(b) Suzie plans a selective breeding programme to get chickens which lay high numbers of eggs each year.

(i) Which hen should she choose as a mate for Elvis at the beginning of her breeding programme?

.....

1 mark

(ii) How should Suzie choose hens from the offspring to continue her breeding programme?

.....

.....

1 mark

(c) All Suzie's chickens belong to a breed called Rhode Island Red. Their living conditions do **not** affect the colour of the pigment in their feathers. What **does** determine the colour of the pigment in their feathers?

.....

1 mark

(d) A hen's egg contains all the food and water the developing embryo needs until it hatches. The eggshell has very many tiny holes making it porous. Why must the eggshell be porous?

.....

1 mark

Maximum 6 marks

**Question 3:**

Ben and Jason are identical twins. Ben plays football during break time. Jason has a broken leg. He sits quietly in the classroom.

(a) Tick the boxes by **three** sentences which can **only** describe Ben and **not** Jason.

- He is sweating a lot.
- He has brown hair.
- His heart is beating faster than usual.
- He has blue eyes.
- He is **not** sweating a lot.
- He is breathing slowly.
- His heart is beating slowly.
- He is breathing very quickly.

3 marks

(b) Which **two** sentences in the list above could describe **both** Ben and Jason during that break time?

1. ....

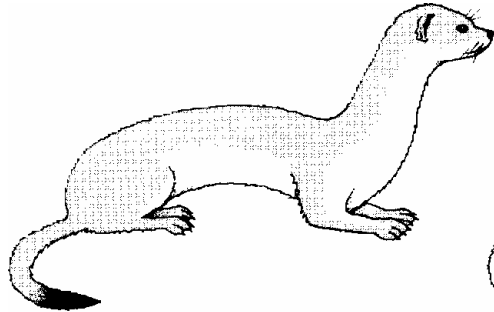
2. ....

2 marks

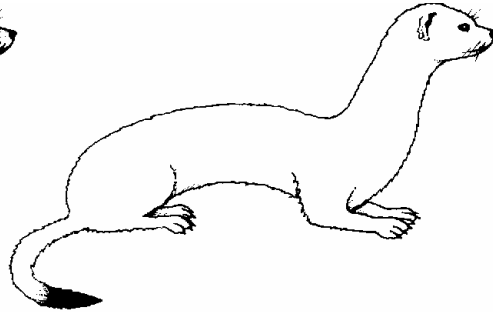
Maximum 5 marks

**Question 4:**

(a) The drawings below show a stoat in summer and in winter.



stoat in summer



stoat in winter

In winter the ground is often covered by snow or frost. During this part of the year a stoat's fur is white. Suggest **two** ways its white coat helps a stoat to survive in the winter.

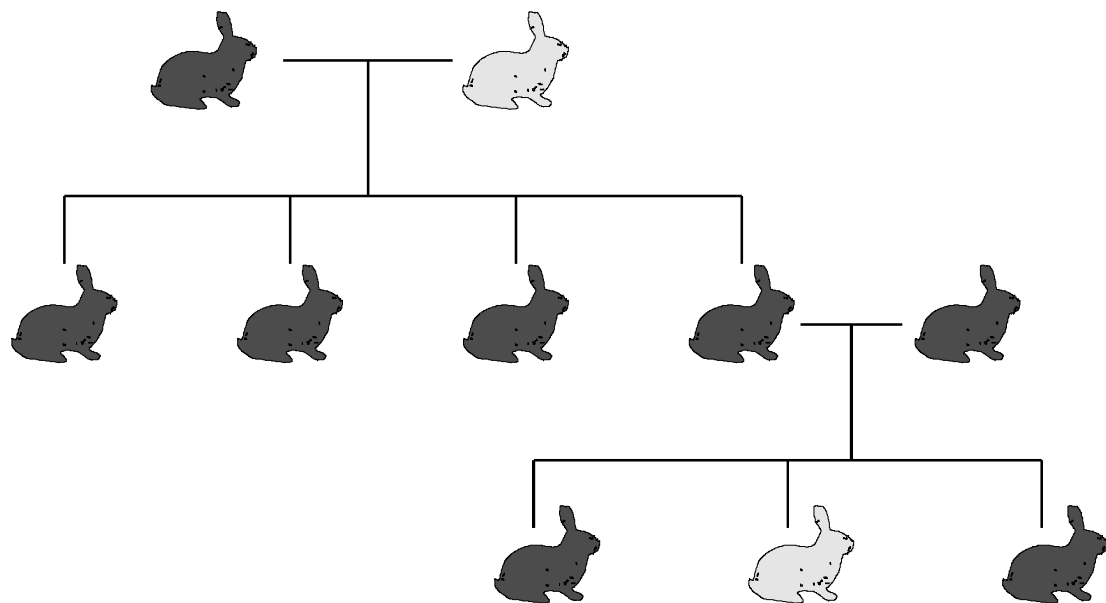
.....

.....

.....

2 marks

(b) The diagram shows the family tree for a family of rabbits.



Use words from the list below to complete the sentences.

**Adapt cytoplasm genes grow inherit**

**letters membrane mutate nuclei**

Rabbits have the same fur colour all year round.

Young rabbits ..... fur colour from their parents. Information about fur colour is passed on from one generation to the next in the form of ..... in the ..... of an egg and sperm.

3 marks

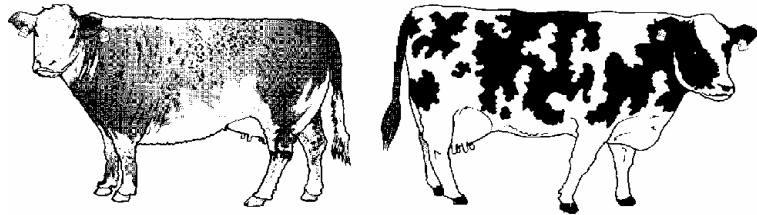
Maximum 5 marks

**Question 5:**

Herefords and Friesians are two breeds of cattle.

Herefords produce high quality meat. Friesians produce lots of milk.

The drawings below show a Hereford cow and a Friesian cow.



Hereford cow Friesian cow

(a) (i) The two breeds of cattle are different in appearance from each other.

What causes the variation between the two breeds of cattle?

.....  
.....

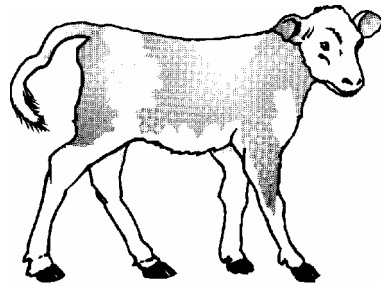
1 mark

(ii) Suggest **two** environmental factors which can affect the amount of meat or milk cattle produce.

1. ....  
.....
2. ....  
.....

2 marks

(b) The drawing shows a calf produced by mating a Hereford bull with a Friesian cow. Cattle bred in this way will produce both high quality meat and a high milk yield.



(i) What term is used to describe this deliberate mating of two different breeds of animals to produce offspring with particular characteristics?

.....

1 mark

(ii) Farmers want their cattle to produce high quality meat and a high milk yield. Suggest **one other** characteristic which farmers might want their cattle to have.

.....

.....

1 mark

Maximum 5 marks