

COMBINED SCIENCE

GCSE

F

Unit 6: Inheritance, Variation and Evolution

Foundation Tier

Time allowed: 50 minutes

Question	Mark	Total Marks Available
1		5
2		5
3		6
4		7
5		6
6		13
7		8
Total		50

Name _____

Date _____



0 1

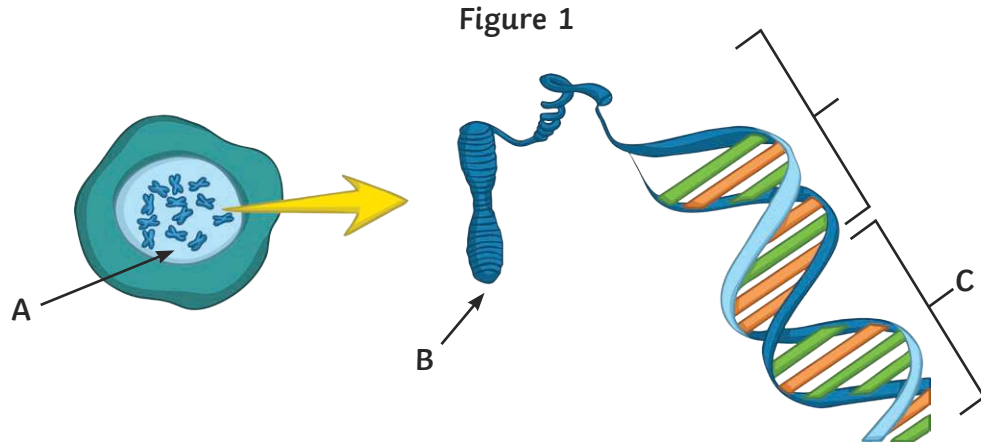
Figure 1 shows the genetic material found in an animal cell..

0 1

A Label **figure 1** using the keywords below.

[3 marks]

chromosome cytoplasm nucleus protein DNA gene



A - _____

B - _____

C - _____

0 1

B Define the term **genome**.

[1 mark]

0 1

A Give one reason it's important to study the human genome.

[1 mark]

0 2

Organisms can reproduce by either sexual or asexual reproduction. In sexual reproduction, gametes fuse during fertilisation.

0 2

A

What are the **male** gametes in...

[2 marks]

i. animals? _____

ii. flowering plants? _____

0 2

B

Tick one box on each row to show whether the statement is about sexual or asexual reproduction.

[3 marks]

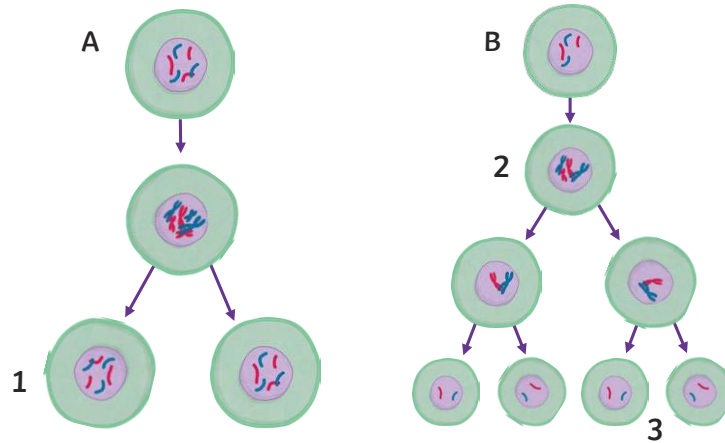
	Asexual Reproduction	Sexual Reproduction
There is no variation in the offspring.		
There is mixing of genetic information.		
Only mitosis is involved.		



0 3

Meiosis and mitosis are different types of cell division. A diagram of each is shown in figure 2.

Figure 2



0 3

A Name the type of cell division in each diagram.

[1 mark]

A - _____

B - _____

The diagrams **do not** show the correct number of chromosomes.

0 3

B State the number of chromosomes that would be found in each of the numbered cells.

[3 marks]

Cell 1: _____

Cell 2: _____

Cell 3: _____

The sex chromosomes determine the sex of a baby.

0 3

C Complete the punnet square below to show how the sex is determined.

[2 marks]

		mum	
		X	
dad			

0 4

Variation can be influenced by the environment or by an organism's genes.

0 4

A

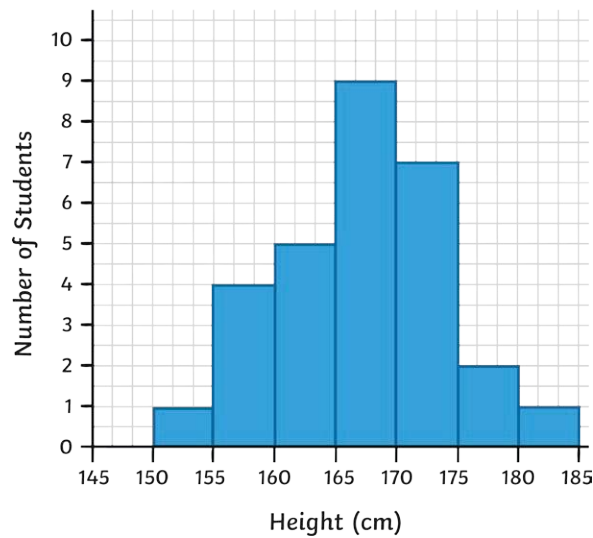
Draw one line from each characteristic to show whether it is influenced by the environment, genes, or both.

[3 marks]

language spoken	environment
weight	genes
natural eye colour	both

A teacher measured the height of each student in their class. They drew a graph of the results, which is shown in **figure 3**.

Figure 3



0 4

B

What is the modal height in the class? _____

[1 mark]

0 4

C

What is the range of heights in the class? _____

[1 mark]

0 4

D

Why did the teacher choose this type of graph to present their data?

[2 marks]



0 5

Huntington's disease is caused by a dominant allele. It usually develops between the ages of 30 and 50 after many people have already had children.

0 5

A

What is an allele?

[1 mark]

0 5

B

What does dominant mean?

[1 mark]

Jacob's dad has just been diagnosed with Huntington's disease, he is a heterozygote. His mum does not carry the Huntington's allele.

0 5

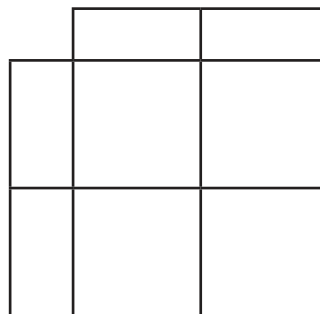
C

Complete the punnet square to show the chance that Jacob has inherited Huntington's.

Use the letter H to represent the dominant allele and the letter h to represent the recessive allele.

Identify the offspring who would inherit Huntington's disease.

[3 marks]



0 5

D

What is the probability that Jacob has inherited Huntington's disease? _____

[1 mark]



0 6

Anteaters have very long and sticky tongues that they use to eat termites and ants. Since ants and termites are so small, they have to eat thousands of them every day to get enough food.



0 6

A

Explain how the anteater evolved to be a specialised ant and termite eater.

[6 marks]

The anteater's binomial name is *Myrmecophaga tridactyla*.

0 6

B

Tick the correct box to show where this name comes from.

[1 mark]

- domain and kingdom
- kingdom and genus
- genus and species
- kingdom and species



0 6

C

What is a fossil?

[2 marks]

0 6

D

What can we learn from fossils?

[1 mark]

In the past, scientists' understanding of the evolution of organisms was based on their morphology.

0 6

E

Give two developments in biology that have given scientists more information about the evolutionary relationships between organisms.

[2 marks]

1. _____

2. _____

0 6

F

These developments led Carl Woese to develop a new classification system. What change did he make to the previous Linnean system?

[1 mark]



0 7

Rice crops have to be sprayed with pesticides three or four times a season to control pests. One of the pests that can cause problems for rice farmers is the rice borer.

The bacteria *Bacillus thuringiensis* has a gene which provides resistance to a variety of pests, including the rice borer.

BT rice has been genetically modified to express this gene.

0 7

A

What is genetic engineering?

[3 marks]

0 7

B

Evaluate the use of genetic engineering to modify rice plants.

[5 marks]
