

**0 4**

In the mid-19th century, a scientist studied inheritance in pea plants.

The scientist's work was the beginning of our modern understanding of genetics.

**0 4 . 1**

What is the name of this scientist?

**[1 mark]**

Tick **one** box.

Alfred Russel Wallace

Charles Darwin

Gregor Mendel

Jean-Baptiste Lamarck

**0 4 . 2**

In the mid-20th century, other scientists identified the chemical substance that makes up genetic material.

What is the name of the chemical substance that makes up genetic material?

**[1 mark]**

Tick **one** box.

Carbohydrate

DNA

Lipid

Protein



**0 4 . 3** A gene often has two alleles.

One allele is dominant and the other allele is recessive.

When is a recessive allele expressed as a characteristic?

**[1 mark]**

Tick **one** box.

When the dominant allele is not present

When the recessive allele is inherited from the female parent

When the recessive allele is inherited from the male parent

When the recessive allele is present on only one of the chromosomes

**Question 4 continues on the next page**

**Turn over ►**

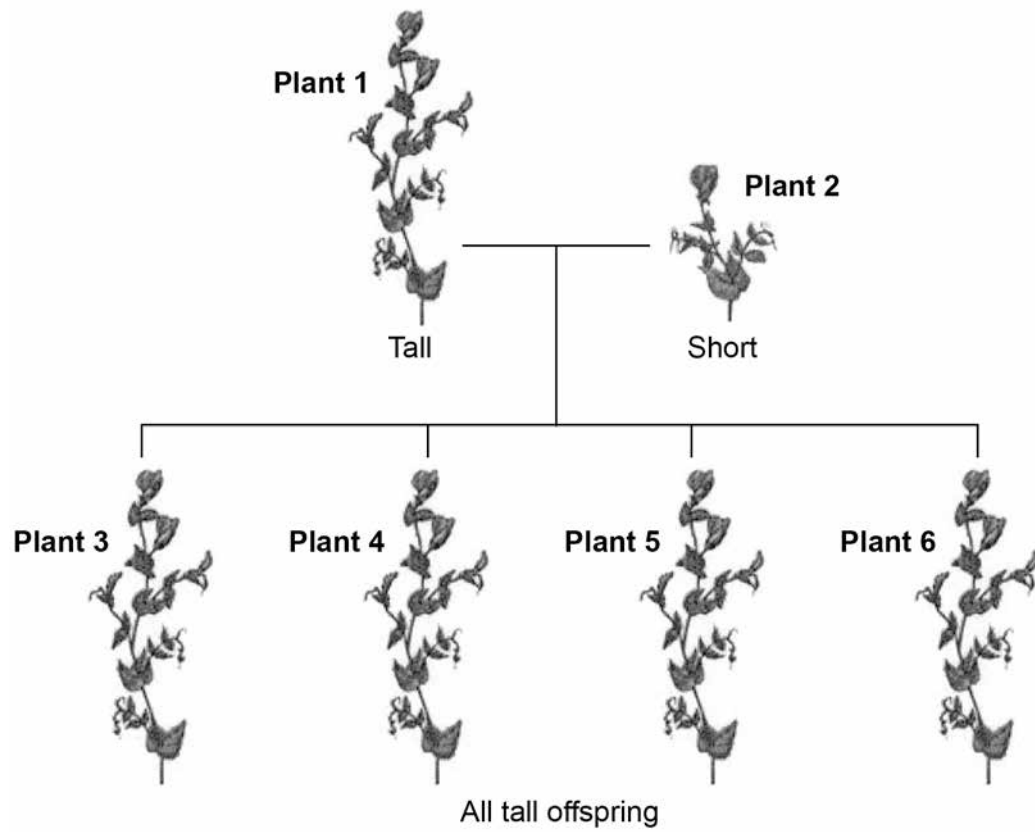


A scientist investigated the inheritance of height in pea plants.

The scientist crossed tall pea plants with short pea plants.

**Figure 4** shows the scientist's results.

**Figure 4**



In Questions **04.4** and **04.5**, use the following symbols to represent alleles:

**T** = the dominant allele for tall.

**t** = the recessive allele for short.

**0 4 . 4** In **Figure 4**, the genotype of plant **1** is **TT**.

Give the genotype of plant **2**.

[1 mark]

\_\_\_\_\_

**0 4 . 5** The scientist crossed plant **3** with plant **4**.

Complete **Figure 5** to show the offspring produced from this cross.

[2 marks]

**Figure 5**

		Male gametes	
		T	t
Female gametes	T	TT	
	t		

**0 4 . 6** Draw a circle around **one** of the homozygous offspring in **Figure 5**.

[1 mark]

**0 4 . 7** What is the ratio of tall plants : short plants in the offspring in **Figure 5**?

[1 mark]

Ratio of tall plants : short plants = \_\_\_\_\_ :



Question	Answers	Extra information	Mark	AO / Spec. Ref.									
04.1	Gregor Mendel		1	AO1 4.6.3.3									
04.2	DNA		1	AO1 4.6.3.3									
04.3	when the dominant allele is not present		1	AO1 4.6.1.6									
04.4	tt	allow homozygous recessive	1	AO2 4.6.1.6									
04.5	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>T</td> <td>t</td> </tr> <tr> <td>T</td> <td>TT</td> <td>Tt</td> </tr> <tr> <td>t</td> <td>Tt</td> <td>tt</td> </tr> </table>		T	t	T	TT	Tt	t	Tt	tt	all 3 correct = <b>2</b> marks 2 correct = <b>1</b> mark 0 or 1 correct = <b>0</b> marks  allow tT for Tt	2	AO2 4.6.1.6
	T	t											
T	TT	Tt											
t	Tt	tt											
04.6	circle drawn around either TT or tt on Figure 5	allow circles drawn round both	1	AO2 4.6.1.6									
04.7	correct ratio from question 04.5 eg 3 : 1	allow multiples of stated ratio allow 3 : 1 if no answer to question 04.5	1	AO3 4.6.1.6									
<b>Total</b>			<b>8</b>										