AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.1.3

DNA and the genome

Past-paper questions

Tier	**Foundation**
Question groups	**4**
Available paper years	**2018–2022**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.6.1.3 DNA and the genome

Question 01

June 2018 | 8464/B/2F | Original Q2

0 2 The genetic material in cells is made of DNA.

0 2 . 1 Which **two** of the following describe the structure of DNA?

[2 marks]

Tick **two** boxes.

- A double helix ☐
- A monomer ☐
- A polymer ☐
- A protein ☐
- A single strand ☐

0 2 . 2 Complete the sentences.

Choose answers from the box.

[2 marks]

clone	**disorder**	**gene**
genome		**mutation**

A small section of DNA which codes for one protein is called a _____ .

All the genetic material of an organism is called its _____ .

0 2 . 3 Gametes (sex cells) contain half the amount of DNA compared to body cells.

Give the names of the **two** types of gametes in humans.

[1 mark]

_____ and _____

0 2 . 4 What is the process called when the gametes join?

[1 mark]

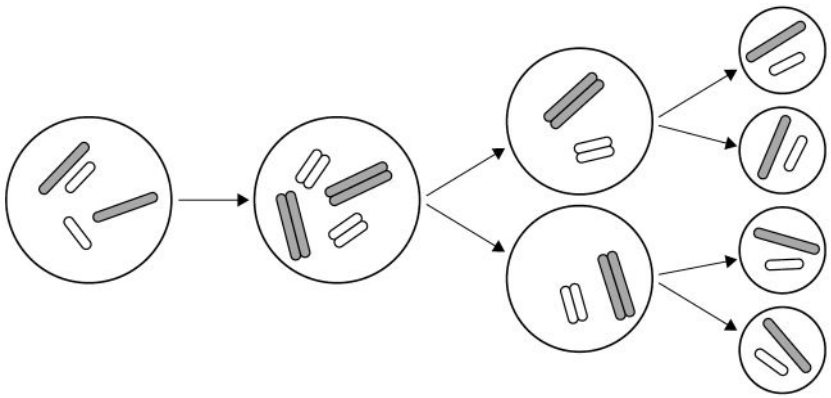
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4.6.1.3 DNA and the genome

Question 01 · continued

0 2 . 5 **Figure 1** shows cell division by meiosis to form gametes.

Figure 1



Which **two** features in **Figure 1** show that this cell division is meiosis and **not** mitosis?

[2 marks]

Tick **two** boxes.

The cell divides twice ☐

The chromosomes pull apart into the new cells ☐

The cytoplasm divides into new cells ☐

The DNA is copied ☐

The new cells have half the number of chromosomes ☐

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4.6.1.3 DNA and the genome

Question 02

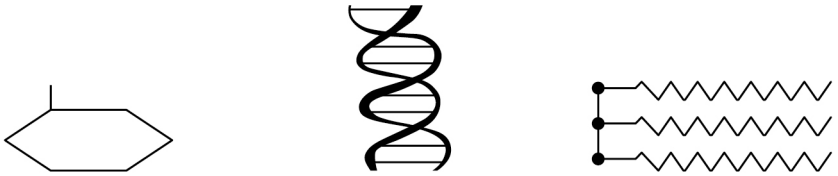
November 2020 | 8464/B/2F | Original Q6

0 6 This question is about DNA and genes.

0 6 . 1 Which diagram represents a DNA molecule?

[1 mark]

Tick (✓) **one** box.



☐ ☐ ☐

0 6 . 2 Describe the structure of a DNA molecule.

[1 mark]

_____

_____

0 6 . 3 A gene is a small section of DNA on a chromosome.

Complete the sentences.

[2 marks]

A gene codes for a particular sequence of _____ .

This sequence makes a specific _____ .

4.6.1.3 DNA and the genome

Question 02 · continued

0 6 . 4 What is meant by the term genome?

[1 mark]

0 6 . 5 The complete human genome is now known.

Which important scientific advance was made using knowledge of the human genome?

[1 mark]

Tick (✓) **one** box.

- Discovering antibiotic resistant bacteria ☐
- Finding more foods to eat from tropical forests ☐
- Tracing how aboriginal people spread across Australia ☐
- Working out when the last ice age ended ☐

Question 6 continues on the next page

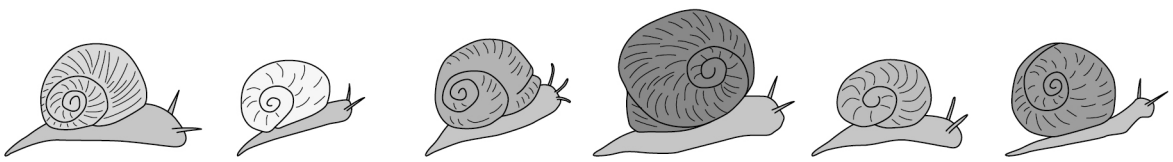
4.6.1.3 DNA and the genome

Question 02 · continued

A student found six different snails of one species in his garden.

Figure 7 shows the snails.

Figure 7



0 6 . 6 All the snails are different.

What scientific term describes differences in characteristics between individuals of a species?

[1 mark]

0 6 . 7 A change in DNA has caused snail **P** to be very different from the other five snails.

Suggest why there might be an increasing number of snails similar to snail **P** in each future generation.

[2 marks]

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4.6.1.3 DNA and the genome

Question 03

November 2021 | 8464/B/2F | Original Q1

0 1 A human body cell contains 46 chromosomes.

0 1 . 1 How many chromosomes does a human sperm cell contain?

[1 mark]

Tick (✓) **one** box.

22 ☐ 23 ☐ 46 ☐

0 1 . 2 Draw **one** line from each word to the meaning of that word.

[3 marks]

Word	Meaning
Gene	A small section of DNA which codes for a protein
Genome	All the genetic material of an organism
Nucleus	A structure which contains chromosomes
	A small ring of DNA in the cytoplasm

4.6.1.3 DNA and the genome

Question 03 · continued

Some plants contain a harmful chemical called PTC.

Some people can taste PTC.

0 1 . 3 Suggest **one** advantage of being able to taste PTC.

[1 mark]

Only people with a dominant allele **T** can taste PTC.

People with **only** the allele **t** cannot taste PTC.

0 1 . 4 A person has the genotype **Tt**.

What word describes the person's genotype?

[1 mark]

Tick (✓) **one** box.

- Heterozygous ☐
- Phenotype ☐
- Recessive ☐

0 1 . 5 Give the genotype of a person who **cannot** taste PTC.

[1 mark]

4.6.1.3 DNA and the genome

Question 03 · continued

0 1 . 6 A woman and a man plan to have a child.

The woman and the man both have the genotype **Tt**.

Complete **Figure 1** to show the possible genotypes of the child.

[2 marks]

Figure 1

		Woman	
		T	**t**
Man	**T**	**T T**	
	t		

0 1 . 7 What is the chance of the child being able to taste PTC?

Use **Figure 1**.

[1 mark]

Tick (✓) **one** box.

25% ☐ 50% ☐ 75% ☐ 100% ☐

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4.6.1.3 DNA and the genome

Question 04

June 2022 | 8464/B/2F | Original Q1

0 1 This question is about genetics.

0 1 . 1 Crop plants are genetically modified (GM) for useful characteristics.

Which useful characteristic are crops genetically modified for?

[1 mark]

Tick (✓) **one** box.

Fewer roots ☐

Larger yields ☐

Smaller fruits ☐

0 1 . 2 What is **one** concern about GM crops?

[1 mark]

Tick (✓) **one** box.

GM crops will add to global warming. ☐

GM crops will cause air pollution. ☐

GM crops will harm wildlife. ☐

GM crops will produce too much food. ☐

Some inherited disorders are caused by a faulty piece of DNA.

0 1 . 3 What is the name of a piece of DNA that codes for a characteristic?

[1 mark]

_____

4.6.1.3 DNA and the genome

Question 04 · continued

0 1 . 4 DNA contains a code for making substances in the cell.

What type of substance is made using the DNA code?

[1 mark]

Tick (✓) **one** box.

- Fat ☐
- Protein ☐
- Starch ☐
- Sugar ☐

Cystic fibrosis (CF) is an inherited disorder.

The allele for having CF is recessive (**h**).

The allele for **not** having CF is dominant (**H**).

0 1 . 5 What is a recessive allele?

[1 mark]

Tick (✓) **one** box.

- An allele that is always expressed. ☐
- An allele that is expressed if only one copy is present. ☐
- An allele that is only expressed if two copies are present. ☐

Question 1 continues on the next page

Question 04 · continued

A man and a woman do **not** have CF. The man has the alleles **Hh**.

0 1 . 6 What word describes the alleles of the man?

[1 mark]

Tick (✓) **one** box.

- Heterozygous ☐
- Homozygous ☐
- Phenotype ☐

0 1 . 7 The man and the woman want to have a child.

Complete **Figure 1** to show the possible genotypes of the child.

Draw a ring around the genotype of a child who will have CF.

[3 marks]

Figure 1

		Woman	
		H	**h**
Man	**H**		
	h		hh

4.6.1.3 DNA and the genome

Question 04 · continued

0 1 . 8 What is the chance that a child of the man and the woman will have CF?

[1 mark]

Tick (✓) **one** box.

25% ☐ 50% ☐ 75% ☐ 100% ☐

0 1 . 9 The woman is pregnant.

The woman can have embryo screening to find out if the child will have CF.

Suggest **one** reason why the woman might **not** want to have embryo screening.

[1 mark]

_____

_____

_____

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