

Name:

Edexcel Style

Combined Science GCSE

Genetics Test

(Levels 4–9)

Date:

Time allowed: 50mins

Question	Links to Student Progress Sheet	Score	Total marks Available
1	3.3		7
2	3.4, 3.5		8
3	3.6		6
4	3.13, 3.12		6
5	3.14, 3.16		8
6	3.15		6
7	3.20a, b, 3.22,		5
8	3.21		4
Total			50

Score	Estimated Grade
47 – 50	9
40 – 46	8
33 – 39	7
28 – 32	6
24 – 27	5
20 – 23	4
0 – 19	U

Please be aware that these grade boundaries are Twinkl's own, and may not be in-line with Edexcel's own.

Area for Improvement:

1. (a) Meiosis is a type of cell division.

Read the statements below, and tick (✓) three which are correct for meiosis.

(3)

- ☐ **A** Meiosis produces four genetically identical daughter cells.
- ☐ **B** Meiosis produces four genetically different daughter cells.
- ☐ **C** Meiosis produces body cells.
- ☐ **D** Meiosis produces gametes.
- ☐ **E** Meiosis produces haploid daughter cells.
- ☐ **F** Meiosis produces diploid daughter cells.

(b) Meiosis is a type of cell division which produces sperm and egg cells in humans.

Compare an egg cell to a body cell, in terms of chromosomes.

(4)

(Total for Question 1 = 7 marks)

2. (a) Complete the sentence by putting a tick (✓) in the box next to your answer.

(1)

In humans, DNA is found...

- ☐ **A** in the cytoplasm of all cells.
- ☐ **B** in the nucleus of brain cells only.
- ☐ **C** in the nucleus of gametes only.
- ☐ **D** in the nucleus of all cells.

(b) Complete the sentence by putting a tick (✓) in the box next to your answer.

(1)

A genome is...

- ☐ **A** the whole DNA of a single cell.
- ☐ **B** the whole DNA of a single organism.
- ☐ **C** the whole DNA of a population of a species.
- ☐ **D** the whole DNA of all living things on Earth.

(c) The diagram below shows a DNA molecule.



Describe the structure of DNA.

(4)

(d) What is a gene?

(2)

(Total for Question 2 = 8 marks)

3. Describe a method for extracting DNA from fruit.

(6)

[illegible]

(Total for Question 3 = 6 marks)

4. (a) Peter's mother has blonde hair. His father has brown hair. Peter and his sister have brown hair.

Explain why Peter and his sister have a different hair colour to their mother.

(2)

- (b) Match the words to the correct definitions by drawing a straight line to connect the matching pairs.

(4)

dominant

Both alleles for a gene are the same.

recessive

Both alleles for a gene are different.

homozygous

Only one copy of the allele is needed to be expressed.

heterozygous

Two copies of the allele is needed to be expressed.

(Total for Question 4 = 6 marks)

5. (a) Complete the genetic cross diagram below.

(2)

B = black hair

b = brown hair

		Parent 1 ♂	
		B	B
Parent 2 ♀	B		
	b		

(b) Use the genetic cross diagram from part (a) to answer the following questions.

(3)

(i) What is the phenotype of parent 1?

(ii) What is the phenotype of parent 2?

(iii) Which parent has a homozygous dominant genotype?

(c) The parents have three children. Explain why none of the children will have brown hair.

(2)

(d) Use the genetic cross diagram from part (a) to answer the following question.

What is the probability of the offspring having a heterozygous genotype?

(1)

(Total for Question 5 = 8 marks)

6. (a) Meeta and Ranjit are expecting their first baby.

Meeta says "I think the baby is going to be a girl."

Draw a genetic cross diagram to show how the sex of an offspring is determined.

Label the phenotypes of the offspring.

(4)

- (b) Meeta and Ranjit have had an ultrasound scan of their baby and the sonographer has identified the sex of the baby as female.

Ranjit is convinced that if they have another baby it will be guaranteed to be a boy.

Explain why he is wrong.

(2)

(Total for Question 6 = 6 marks)

7. (a) Complete the table below by writing the causes of variation from the box below into the correct column of the table.

(2)

lifestyle climate mutation sexual reproduction

Genetic causes	Environmental causes

- (b) The photograph below shows a litter of puppies.



Photo courtesy of Ritmó (@flickr.com) - granted under creative commons licence - attribution

Complete the sentence by putting a tick (✓) in the box next to your answer.

(1)

The variation in the puppies fur colour and markings is caused by...

- ☐ **A** mutation.
- ☐ **B** natural selection.
- ☐ **C** sexual reproduction.
- ☐ **D** asexual reproduction.

- (c) Describe two ways the puppies show variation which are not a result of their genes.

(2)

1. _____
2. _____

(Total for Question 7 = 5 marks)

8. The Human Genome Project was completed in 2001 and sequenced all the base pairs in the human DNA molecule.

Describe two ways the Human Genome Project can be used for medicine.

(4)

(Total for Question 8 = 4 marks)

TOTAL FOR PAPER = 50 MARKS