Year 9 Inheritance and DNA Worksheet

Year 9 · KS3 Biology · DNA, genes, inheritance and variation

Name: ..... **Class:** ..... **Date:** ..... **Score: / 55**

Section A: DNA, genes and chromosomes [19 marks]

nucleus | chromosome | gene | DNA | allele | gamete

1 Use words from the box to complete each sentence.

(a) The ..... is the part of the cell that contains the chromosomes. **[1]**

(b) A short section of DNA that codes for a characteristic is called a ..... . **[1]**

(c) Genes are found on thread-like structures called ..... . **[1]**

(d) The chemical that carries the genetic code is ..... . **[1]**

(e) A different version of the same gene is called an ..... . **[1]**

(f) A sperm cell or an egg cell is called a ..... . **[1]**

2 Complete the table with the number of chromosomes in each human cell. **[4]**

Type of cell	Number of chromosomes
Skin cell	
Sperm cell	
Egg cell	
Fertilised egg (zygote)	

3 The structure of DNA is a double helix. **[3]**

.....

.....

4 Decide if each feature is inherited, caused by the environment, or both. **[6]**

Feature	Inherited, environmental or both?
Natural eye colour	
A scar from an accident	
Height	
Blood group	
Speaking French	
Body mass	

Section B: Patterns of inheritance [23 marks]

5 Write the correct word for each definition. Choose from: genotype, phenotype, dominant, recessive, homozygous, heterozygous. **[6]**

Definition	Word
The alleles an organism has for a gene	
The characteristic an organism shows	
An allele that shows even when only one copy is present	
An allele that only shows when two copies are present	
Having two identical alleles for a gene	
Having two different alleles for a gene	

6 In pea plants, tall (T) is dominant to dwarf (t). Two heterozygous tall plants are crossed.

(a) Write the genotype of a heterozygous tall plant. **[1]**

.....

(b) Complete the Punnett square. **[4]**

	T	t
T		
t		

(c) State the ratio of tall to dwarf offspring. **[1]**

.....

(d) State the probability that an offspring is dwarf. **[1]**

.....

(e) The cross produces 80 offspring. How many are expected to be dwarf? **[1]**

.....

7 Sex is determined by sex chromosomes. Females are XX and males are XY.

(a) Complete the Punnett square for a cross between a female (XX) and a male (XY). **[4]**

	X	Y
X		
X		

(b) What is the chance that a baby is a girl? **[1]**

8 Cystic fibrosis is caused by a recessive allele (f). Two parents without cystic fibrosis have a child with the condition. **[4]**

Section C: Variation and natural selection [6 marks]

9 Give two causes of genetic variation in a species. **[2]**

10 Before the industrial revolution most peppered moths were light coloured. When soot darkened the trees, dark moths became more common. Use the idea of natural selection to explain why. **[4]**

Section D: Data and application [7 marks]

12 A student crosses two tall pea plants and gets 62 tall and 18 dwarf offspring.

(a) Calculate the ratio of tall to dwarf, in the form n : 1, to one decimal place. **[2]**

(b) What does this suggest about the genotypes of the two parents? Explain. **[1]**

(c) Suggest why the ratio is not exactly 3 : 1. **[1]**

(d) How could the student make the results closer to 3 : 1? **[1]**

13 Challenge: some parents have embryos screened for genetic disorders. Give one advantage and one disadvantage of doing this. **[2]**