

DNA Genome

GCSE Biology · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Describe the relationship between DNA, genes, chromosomes and the genome. (4 marks)

Step 1 · DNA

A polymer made of two strands forming a double helix; it carries genetic material.

Step 2 · Chromosomes

DNA is packed into structures called chromosomes in the nucleus.

Step 3 · Gene

A small section of DNA on a chromosome that codes for a particular sequence of amino acids, to make a specific protein.

Step 4 · Genome

The entire genetic material of an organism.

Answer: Genome → chromosomes → DNA → genes (code for proteins)

Check: The human genome has been fully studied (the Human Genome Project).

2. Now try one with the steps

A DNA sample is 30% adenine (A). Calculate the percentage of thymine, cytosine and guanine. (3 marks)

Step 1 · Pairing

Step 2 · Remaining

Step 3 · C = G

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is a genome? [1]

2. Describe the structure of DNA. [2]

3. What is a gene? [2]
-
-
4. Give two reasons why understanding the human genome is important. [2]
-
-
5. Name the four bases in DNA. [1]
-
-
6. Write the complementary sequence to: A T T G C A [1]
-
-
7. What are the three parts of a DNA nucleotide? [2]
-
-
8. A DNA sample is 22% guanine. What percentage is adenine? [2]
-
-
9. How many amino acids are coded for by a sequence of 96 bases? [1]
-
-
10. Explain why the order of bases is important. [2]
-
-
11. Explain why mRNA is needed in protein synthesis. [2]
-
-
12. Describe the role of carrier molecules in protein synthesis. [2]
-
-
13. Explain how a mutation in a non-coding region of DNA could affect a person. [2]
-
-

14. Explain why most mutations have no effect on the phenotype.

[2]

4. Before you hand it in

"A gene is bigger than a chromosome."

A chromosome is one long DNA molecule carrying hundreds or thousands of genes.

Pairing A with G

A pairs with T; C pairs with G. Remember 'Apple Tree, Car Garage'.

"Each base codes for an amino acid."

A sequence of THREE bases codes for one amino acid.

"All mutations are harmful."

Most mutations do not alter the protein; a few are harmful and very rarely one is beneficial.