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# Clinical Genetics and Cytogenomics



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UWL

Level 6

Cells are the basic units of life, and they rely on a complex system to manage genetic information. This involves storing it within DNA, which serves as the blueprint for all biological processes. Understanding how DNA functions and organizes into chromosomes is essential for grasping the fundamentals of genetics and the mechanics of cell division.

The Importance of Genetic Information:

- Storage of Genetic Information
- Replication and Inheritance
- Role of Genes in Protein Synthesis

**Click and read the following webpage and then answers the questions:**

<https://learn.genetics.utah.edu/content/basics/chromosomes/>

**Part A: Multiple Choice (Choose the best answer)**

**Q1.** How many genes are in the human genome (approximately)?

- a) 3 billion
- b) 21,000
- c) 23 pairs
- d) 90%

**Q2.** Genes make up about what percentage of the human genome?

- a) 90%
- b) 50%
- c) 10%
- d) 3%

**Q3.** The first 22 pairs of human chromosomes are called:

- a) Histones
- b) Autosomes
- c) Non-coding DNA
- d) Sex chromosomes

**Q4.** Which species determines sex by **temperature** rather than chromosomes?

- a) Humans
- b) Birds
- c) Turtles
- d) Platypus

**Q5.** What proteins wrap around DNA to regulate gene activity?

- a) Enzymes
- b) Histones

- c) Ribosomes
- d) Polymerases

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**Part B: Short Answer**

**Q6.** Explain why genes can be “mapped” to a specific location on chromosomes.

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**Q7.** Describe one difference between bacterial DNA and human DNA.

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**Q8.** What is the role of non-coding DNA in humans? Provide at least two examples.

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**Part D: Fill-in-the-Blank**

**Q9.** Humans have \_\_\_\_\_ pairs of chromosomes.

**Q10.** The portion of DNA that provides instructions to make RNA or proteins is called a \_\_\_\_\_.

**Q11.** Genes make up only about \_\_\_\_% of the human genome.

**Q12.** DNA is wrapped around proteins called \_\_\_\_, which help regulate gene activity.

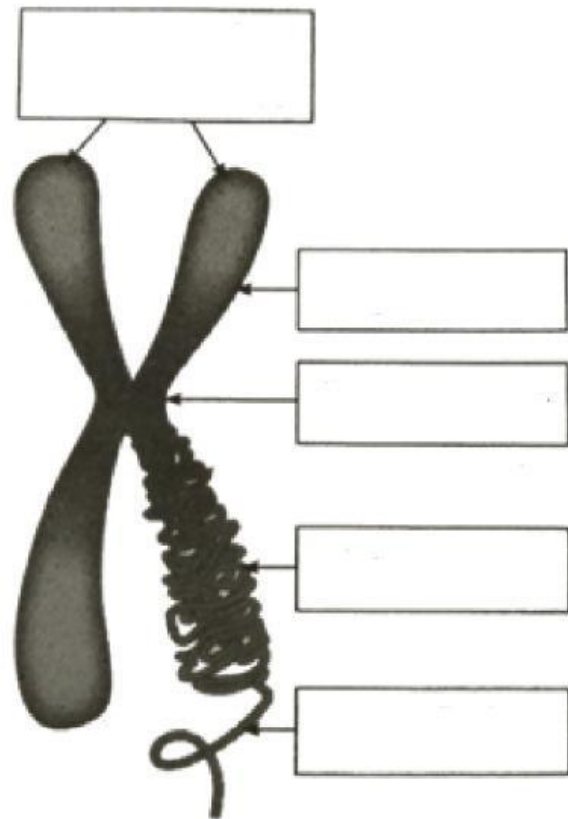
**Q13.** The first 22 pairs of chromosomes are called \_\_\_\_, while the 23rd pair determines \_\_\_\_\_.

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### Part E: Diagram Labelling

**Q14.** Label the parts of a chromosome:

- Short arm (p arm)
- Long arm (q arm)
- Centromere
- Arms of chromosomes
- DNA



**Organization of chromosome**

