

SCIENCE 9
UNIT 4:REPRODUCTION
WORKSHEET 2: The Cell and Heredity



Cell : The basic unit of living matter in all organisms

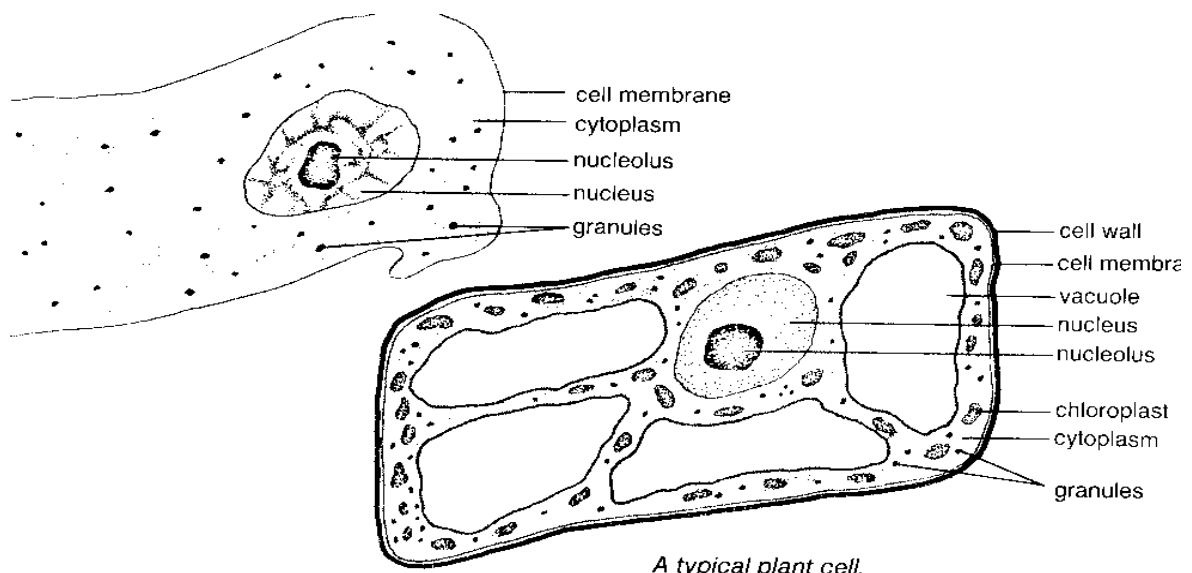
LIVING THINGS THAT ARE MADE OF CELLS



The cell is the most important basic “**unit of life**”. There are millions of different types of cells and cell shapes. There are some micro-organisms that are one celled. Meanwhile plants and animals consist of many cells. We will be focusing on plant and animal cell structures.

PLANT AND ANIMAL CELLS

A typical animal cell



A typical plant cell.

CELL STRUCTURES AND FUNCTION

1) Structures Common In Plants And Animals:

Nucleus: is the “control centre” of the cell. It organizes and directs all functions of the cell and is vital in the production of new cells. Within the nucleus are the chromosomes containing the genes that are responsible for all inherited characteristics. Under a microscope, the nucleus looks like a dark blob.

Cytoplasm: jelly like material surrounding the nucleus and where many processes occur. The cytoplasm receives materials from the cell membrane and expels waste materials back through the cell membrane.

Cell membrane: regulates the passage of certain substances inside and outside the cell. It separates one cell from another. Basically, it holds the cell together.

Vacuoles: is a space within the cell that is empty of cytoplasm. It is used as a storage place for food for a cell.

2) Structures Common Only In Plants:

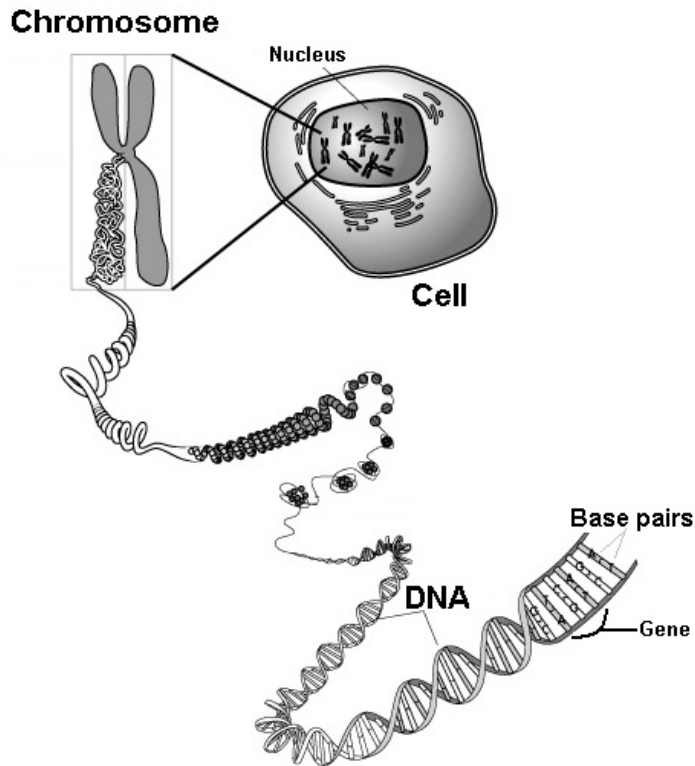
Cell wall: A structure of a non-living material surrounding the cell membrane of plants.

Chloroplast: a structure found in green plants that contain chlorophyll necessary for photosynthesis.

FUNCTION OF THE NUCLEUS:

- It is the control center
- It responsible for heredity The type of cell
- Its function
- Its growth
- When it will divide (reproduce)

WITHIN THE NUCLEUS:



What is a chromosome?

- A threadlike structure in the nucleus of the cell that carries hereditary information
- Each chromosome is made of DNA (Deoxyribonucleic Acid).
- Most humans have 23 pairs of chromosomes including one pair that determines gender

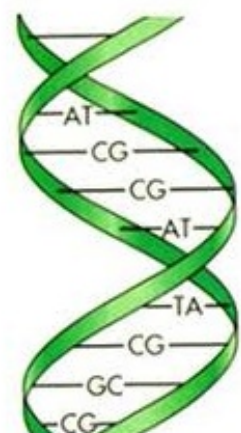
What is |Deoxyribonucleic Acid (DNA)

- Found in the nucleus.
- A long, double-stranded molecule
- Forms a helix structure (a twisted ladder).
- Contains ALL the instructions necessary for ALL life on earth
- The sides of the DNA ladder are made of sugar and phosphate.
- The steps are made up of four nitrogen bases.

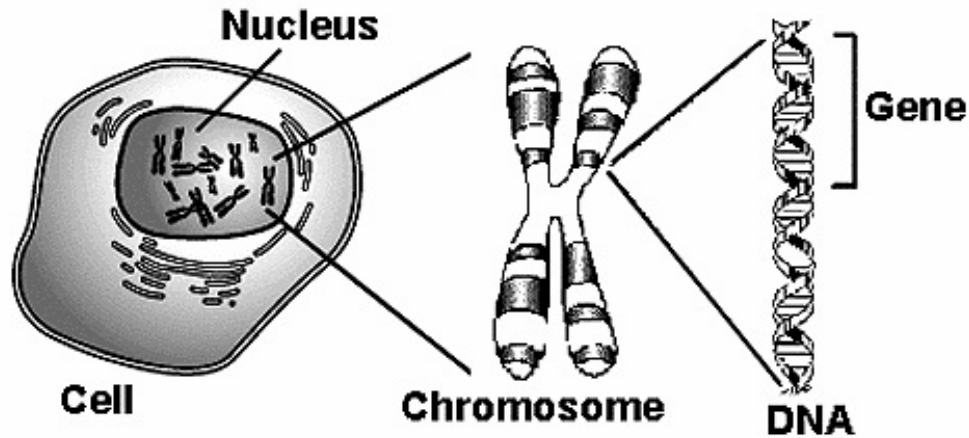
1. adenine (A)
2. guanine (G)
3. cytosine (C)
4. thymine (T)

- Chargaff's Rule: The bases in a DNA molecule always join in a specific way:

A always joins with T
G always joins with C



What is a gene?




- Gene is simply a small portion of the DNA
- Genes can vary in length from hundreds to thousands of bases.
- The arrangement of bases will determine the protein produced.
- Each chromosome contains thousands of genes
- And this tiny little portion means something about the way you look. Maybe it is the gene for blue eyes or brown hair, your height, or maybe the way you smile.

PART A: MULTIPLE CHOICE

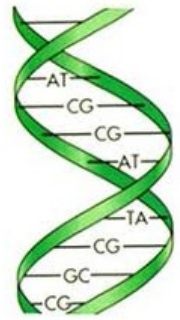
[20 marks]

1. What makes a plant cell different from an animal cell?
(A) Cell Membrane
(B) Cell Wall
(C) Cytoplasm
(D) Nucleus
2. Which of the following is the “control center” of the cell?
(A) Nucleus
(B) Chloroplast
(C) Cell membrane
(D) Cell wall
3. What is the name of the structure found in green plants that contain chlorophyll necessary for photosynthesis.
(A) Nucleus
(B) Chloroplast
(C) Cell membrane
(D) Cell wall
4. What is the name of the part of the cell that regulates the passage of certain substances inside and outside the cell. It separates one cell from another. Basically, it is what holds the cell together.
(A) Cytoplasm
(B) Chloroplast
(C) Cell membrane
(D) Cell wall
5. Which of the following cell structures is responsible for heredity?
(A) Cytoplasm
(B) Cell Membrane
(C) Nucleus
(D) Vacuoles

6. Which of the following refers to a threadlike structure in the nucleus of the cell that carries hereditary information?
- (A) Cell
 - (B) Chromosome
 - (C) DNA
 - (D) Gene
7. Which of the following have a X like structure?
- (A) Cell
 - (B) Chromosome
 - (C) DNA
 - (D) Gene
8. What is shown in the diagram to the right?
- (A) Cell
 - (B) Chromosome
 - (C) DNA
 - (D) Gene
- 
9. How many chromosomes do a human have?
- (A) 2
 - (B) 8
 - (C) 23
 - (D) 46
10. How many pairs of chromosomes determine your gender?
- (A) 1
 - (B) 2
 - (C) 23
 - (D) 46
11. What does DNA stand for?
- (A) Deoxyribonucleic Acid
 - (B) Dioxyribonucleic Acid
 - (C) Diatomicnucleic Acid
 - (D) Deoxyribonew Acid
12. What is the structure of DNA?
- (A) Cell structure
 - (B) Straight line
 - (C) Hexagon structure
 - (D) helix structure
13. How many nitrogen bases make up the steps of DNA?
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4

14. What is shown in the diagram to the right?

- (A) Cell
- (B) Chromosome
- (C) DNA
- (D) Gene



15. Which of the following is not a nitrogen base found in DNA

- (A) Adenine (A)
- (B) Guanine (G)
- (C) Cytosine (C)
- (D) Thyme (T)

16. Which Rule determines how bases attach in DNA?

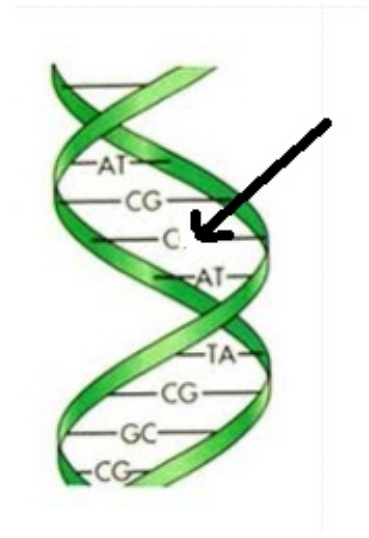
- (A) Bishop's Rule
- (B) Chargaff's Rule
- (C) Darwin's Rule
- (D) Fifield's Rule

17. What would one side of the DNA molecule read if the other side was A T C C G G A ?

- (A) C A G G C C A
- (B) T A G G C C T
- (C) A T C C G G A
- (D) G C A A T T C

18. What nitrogen base is missing in the picture to the right?

- (A) Adenine (A)
- (B) Guanine (G)
- (C) Cytosine (C)
- (D) Thymine (T)



19. What is found on a chromosome?

- (A) Cell
- (B) Nucleus
- (C) DNA
- (D) Gene

20. Which of the following arranged correctly in order of smallest to largest?

- (A) Nucleus → Chromosome → DNA → Gene
- (B) Nucleus → Chromosome → Gene → DNA
- (C) Gene → Chromosome → Nucleus → DNA
- (D) Gene → DNA → Chromosome → Nucleus

PART B: MATCHING

[7 marks]

1. _____ It is defined as a tiny, living building block which makes up all living things.
2. _____ The jelly like material surrounding the nucleus and where many process occur.
3. _____ It is the “control centre” of the cell. It organizes and directs all functions of the cell and is vital in the production of new cells. Under a microscope, the nucleus looks like a dark blob.
4. _____ It is a space within the cell that is empty of cytoplasm. It is used a storage place for food for a cell.
5. _____ A structure of a non-living material surrounding the cell membrane of plants.
6. _____ It regulates the passage of certain substances inside and outside the cell. It separates one cell form another. Basically, it holds the cell together.
7. _____ The structure found in green plants that contain chlorophyll necessary for photosynthesis.

- A) Cell membrane
- B) Chloroplast
- C) Nucleus:
- D) Cell wall:
- E) Cytoplasm
- F) Vacuoles:
- G) Cell

PART C: LABELLING

[6 marks]

Label the diagram below

