**Learning outcomes:**

|  |  |  |  |
| --- | --- | --- | --- |
| **At the end of this section you should be able to …….** | | Y | N |
| Explain the terms “cell continuity” and “chromosome” | |  |  |
| Define “Haploid” and “Diploid” number | |  |  |
| Describe cell activities in the state of  non division (interphase) and division (mitosis) |  |  |
| Define cancer and give two possible causes. |  |  |
| Define “Mitosis” |  |  |
| Simple treatment of mitosis with the aid of diagrams. |  |  |
| **H.L. Detailed study of the stages of Mitosis with the aid of diagrams,** |  |  |
| Give the primary function of mitosis in single-celled and multicellular organisms |  |  |
| Definition of Meiosis |  |  |
| Functions of “meiosis” |  |  |

**Key words**

**Cell continuity, mitosis, meiosis, interphase, cell cycle, haploid, diploid, prophase, metaphase, anaphase, telophase**

**Cell Continuity Summary**

**Cell Continuity:** Cells arise from pre-existing cells.

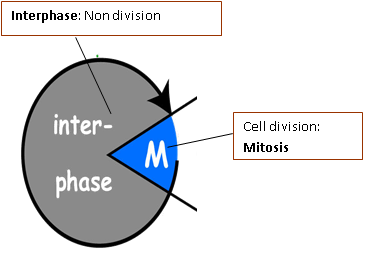
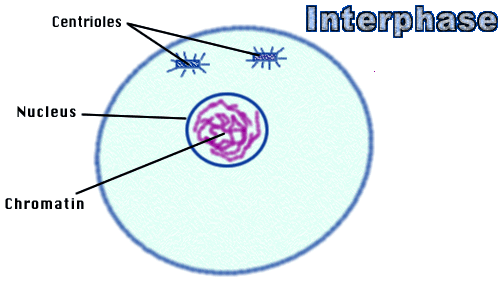
**Chromosome:** A thread-like structure found in the nuclei of dividing cells, composed of a super-coiled arrangement of DNA and protein.

**Haploid cell:** A cell which contains one of every chromosome type

**Diploid cell:** A cell which contains two of each type of chromosome

**Cell cycle:**

The cell cycle describes a cells state of **non-division (interphase)** and **division (mitosis).**



**Interphase:**

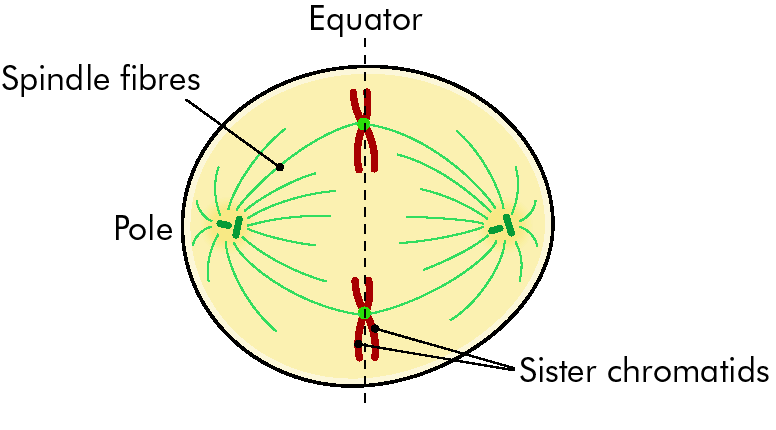
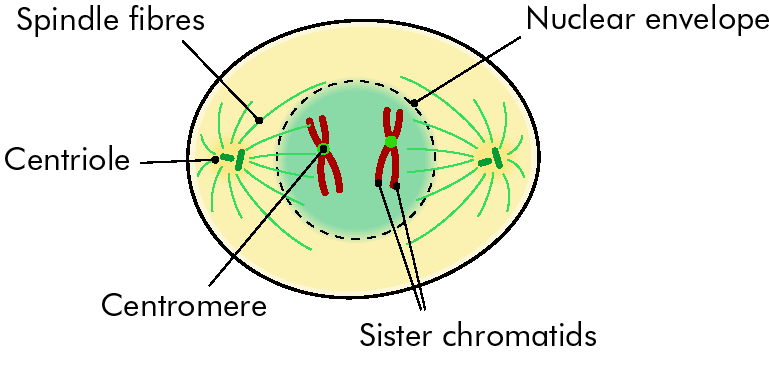
* Cell prepares for mitosis:
* DNA replicates

**Note:** Chromosomes not visible during interphase (chromatin)

**MITOSIS**

**Mitosis:** A form of cell division that produces **2** daughter cells, genetically identical to each other and to the parent cell

**Stages of Mitosis**



**Metaphase**

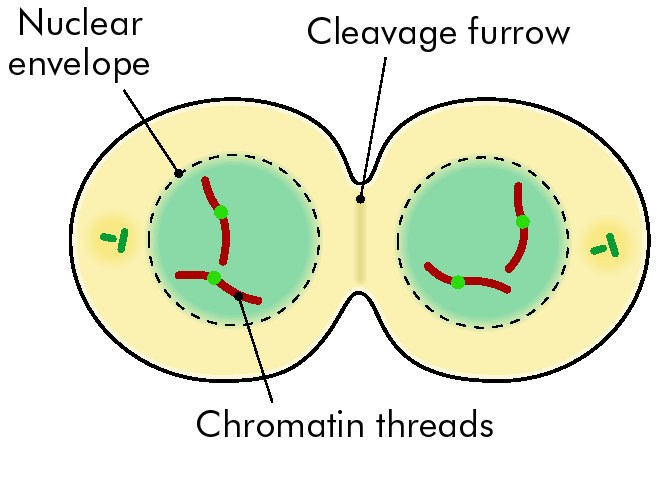
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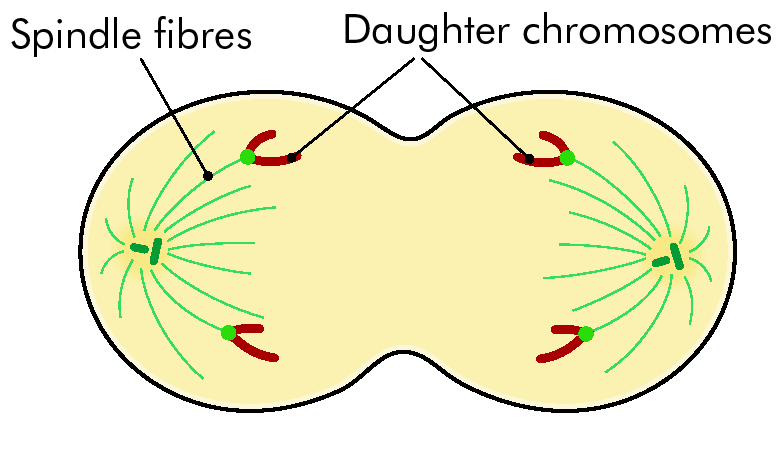
* Presence of a fully formed spindle apparatus
* Chromosome located at equator of cell.

**Prophase**

Recognised by

* The presence of condensed chromosomes,
* Disappearance of nuclear membrane
* Formation of spindle.





**Telophase**

Recognised by

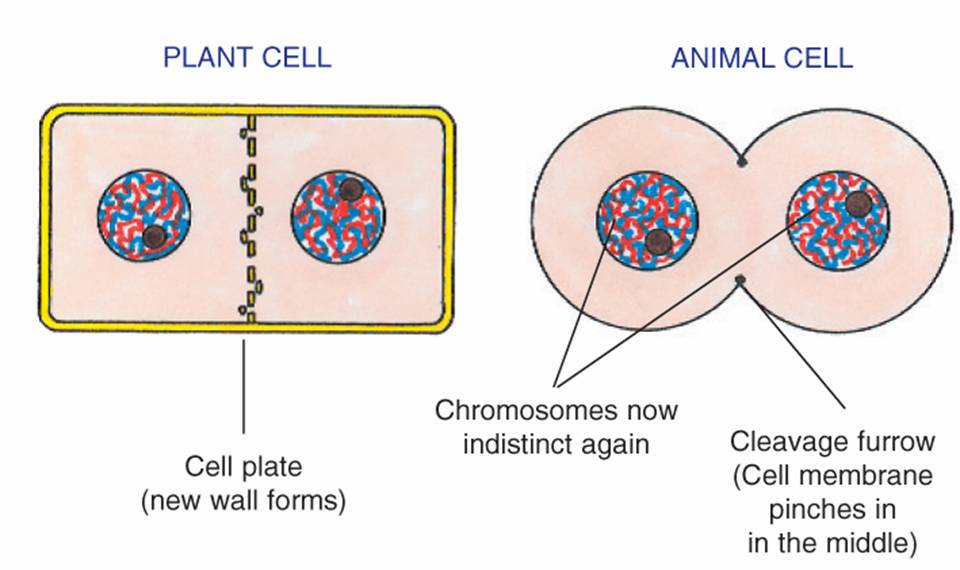
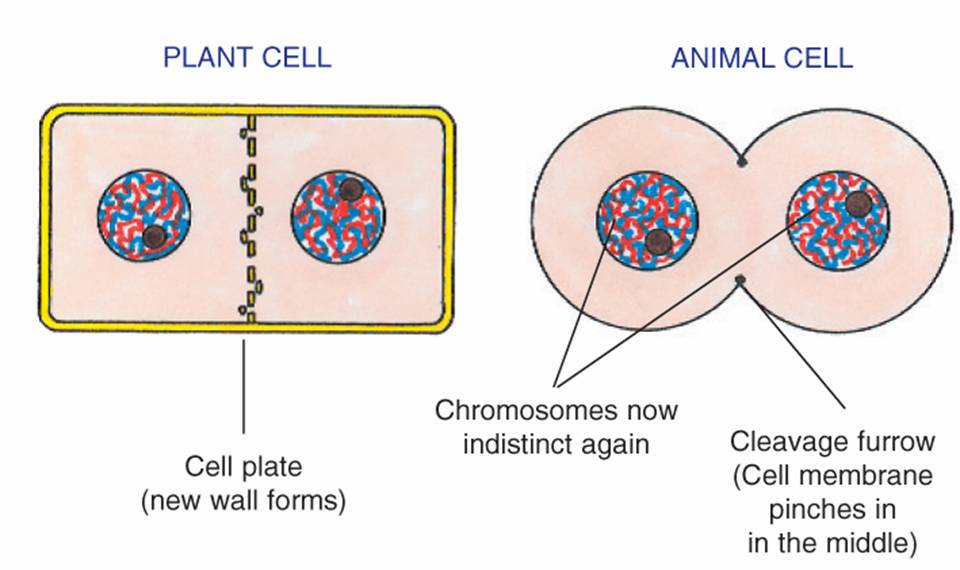
* Chromosomes are positioned within new nuclei.
* Cleavage furrow formation in animal cells (see below)
* Cell plate formation in plant cells. (see below)

**Anaphase**

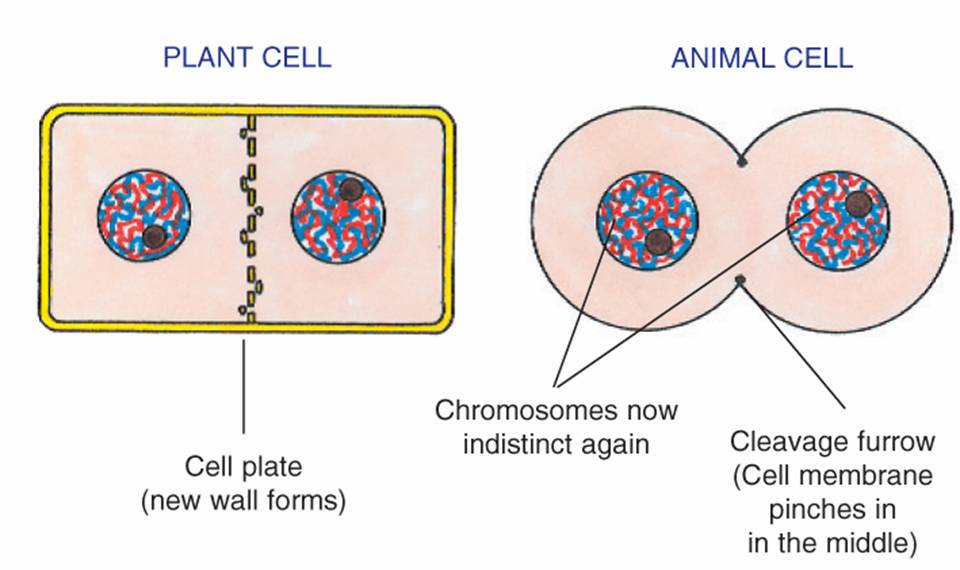
Recognised by

* Centromeres split,
* Chromosomes pulled back to each end of the cell

**Cleavage furrow formation in animal cells,**



**Cell plate formation in plant cells.**



Cell plate

(new wall forms)

**Function of Mitosis:**

In single-celled organisms: **asexual reproduction.**

In multicellular organisms: **growth and repair.**

**Cancer**

**Cancer:** Uncontrolled growth of cells.

**2 possible causes**

**1. Carcinogens** e.g. tobacco smoke, u.v. light, arsenic

**2. Viruses**

Hepatitis C virus can cause liver cancer

**3. Genetic predisposition**

e.g. possession of certain genes increases the risk of certain cancers e.g. BRCA increases risk of breast cancer

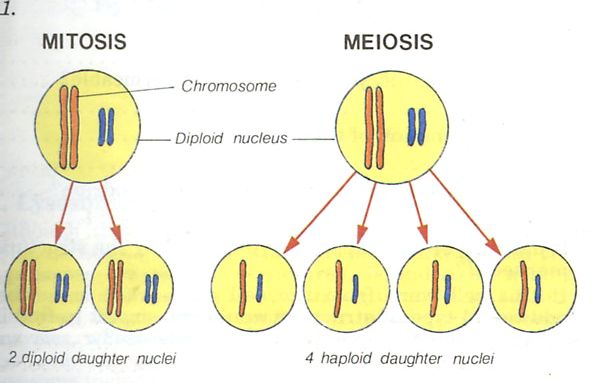
**Meiosis**

**Meiosis:** A form of cell division that produces

**4** genetically different daughter cells,

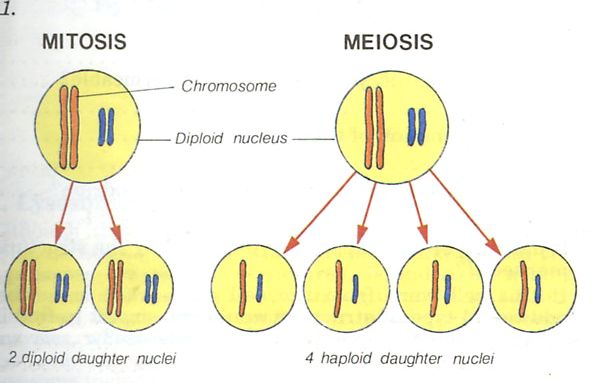
each of which has **half the number** of chromosomes

of the parent cell



**Function of Meiosis:**

**Sexual reproduction:** (formation of haploid sex cells (gametes)



**Comparison of Mitosis and Meiosis**