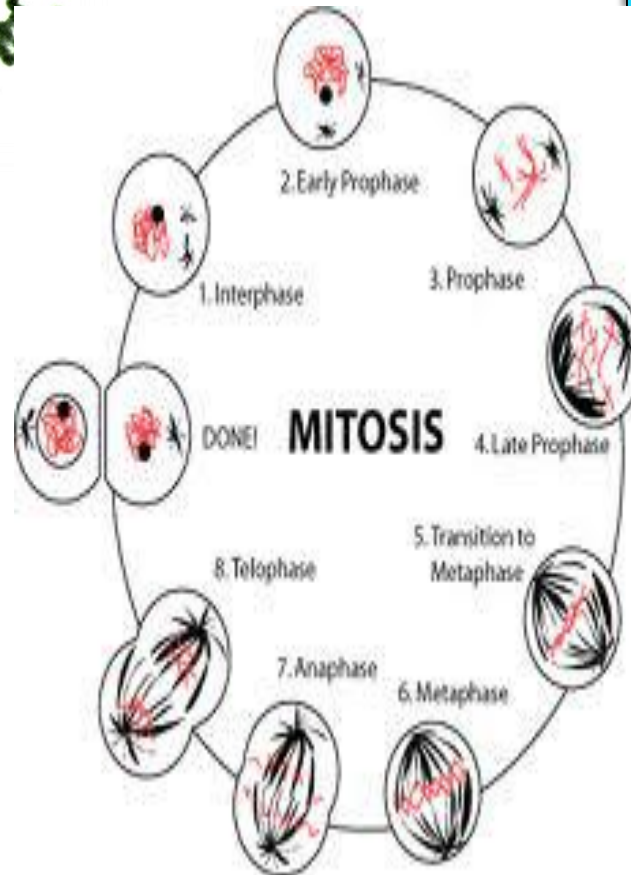
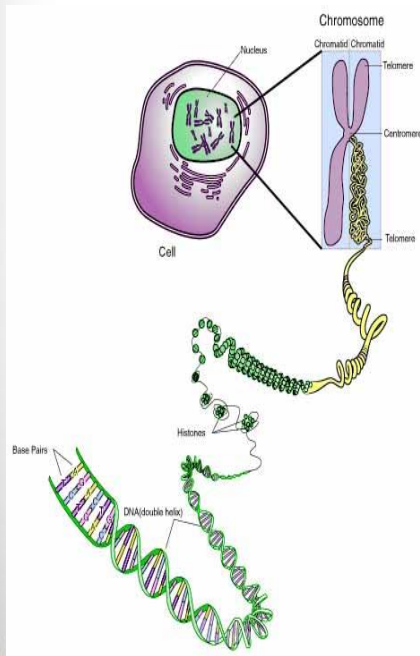
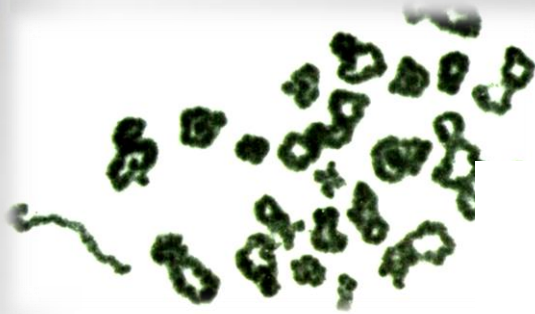
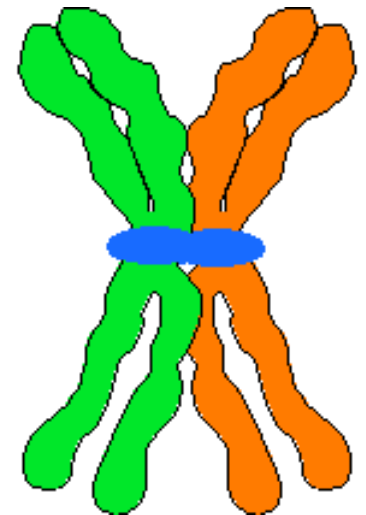


# Cell Division (Mitosis)



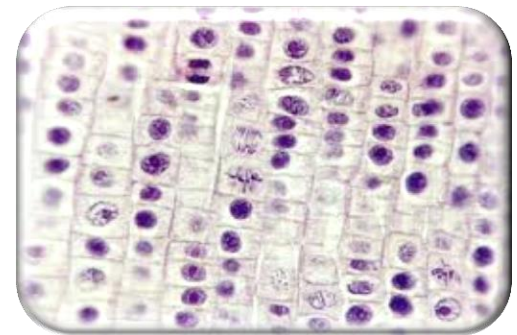
102 BOT



Lab 3

# Cell division is a fundamental process

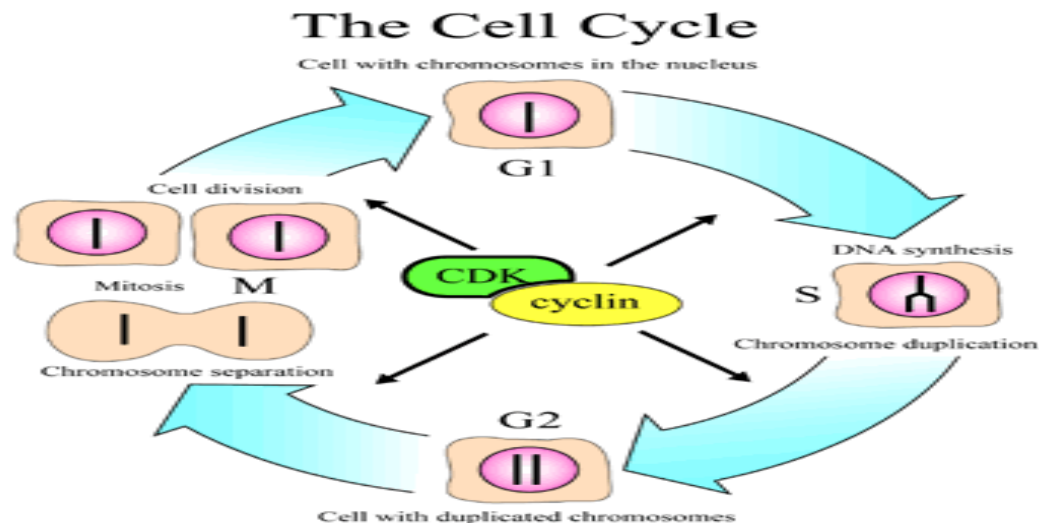
- All cells come from **pre-existing cells**
- New cells are produced for **growth** and to replace **damaged or old cells**
- It is required for growth in multicellular organisms
- It is necessary for reproduction in **unicellular** or **multicellular** organisms



- **Life cycle** requires **two** distinct types of cell division processes:

**mitosis and meiosis**

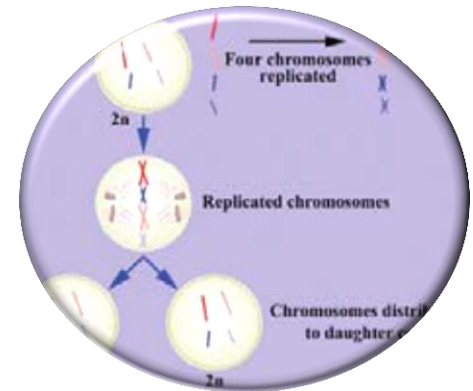
- **Cell division:** is the process that results in the multiplication of cells (one cell becomes two cells during an organism's life cycle)



# Mitosis and Meiosis

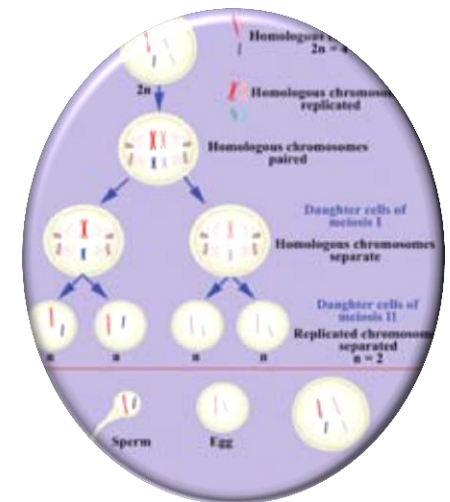
- **Mitosis:**

**-division of somatic (body) cells**



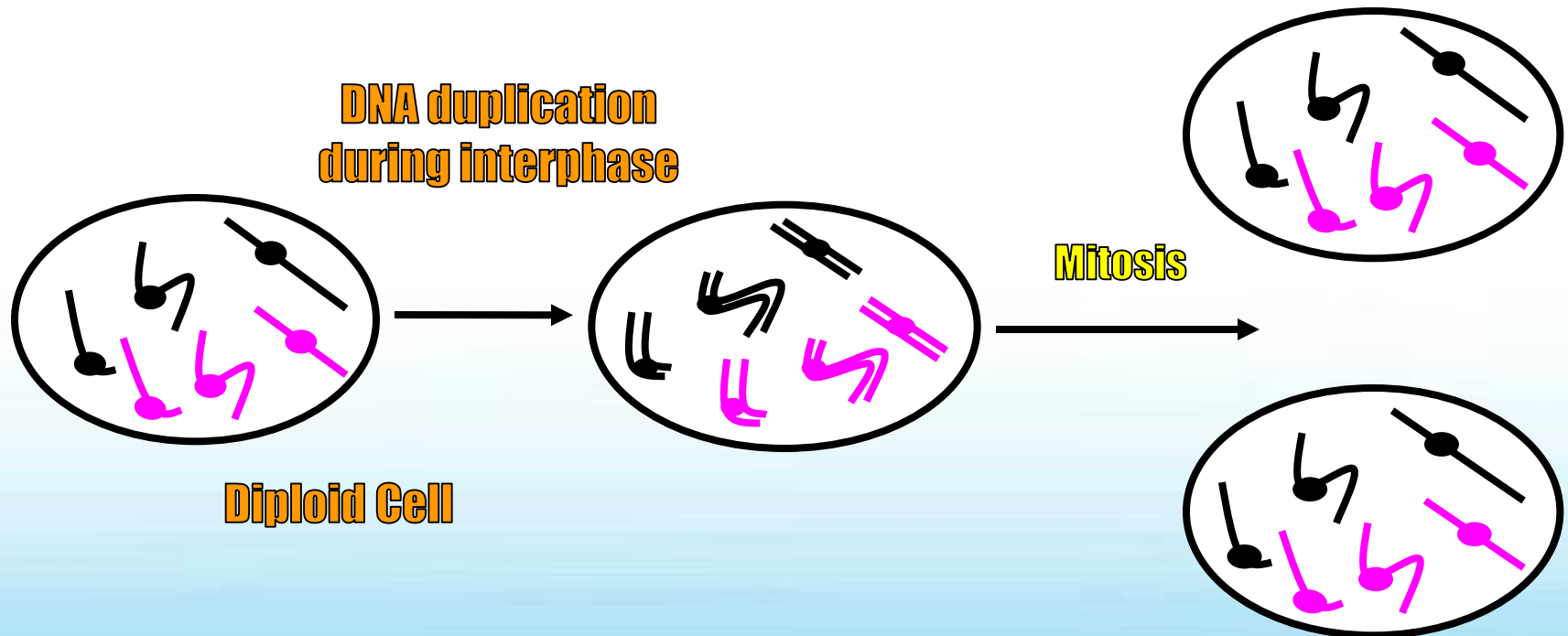
- **Meiosis**

**-division of gametes (sex cells)**



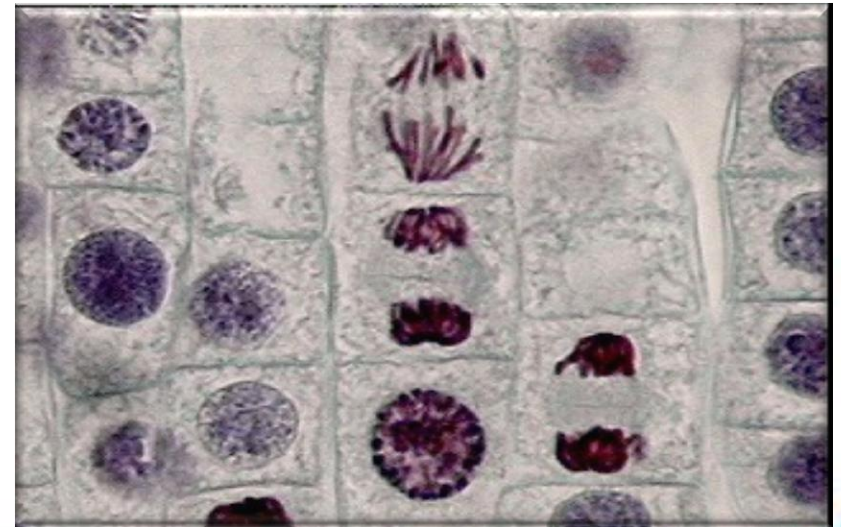
# Mitosis

- Some haploid & diploid cells divide by mitosis.
- Each new cell receives one copy of every chromosome that was present in the original cell.
- Produces 2 new cells that are both genetically identical to the original cell.



# Mitosis can be divided into stages

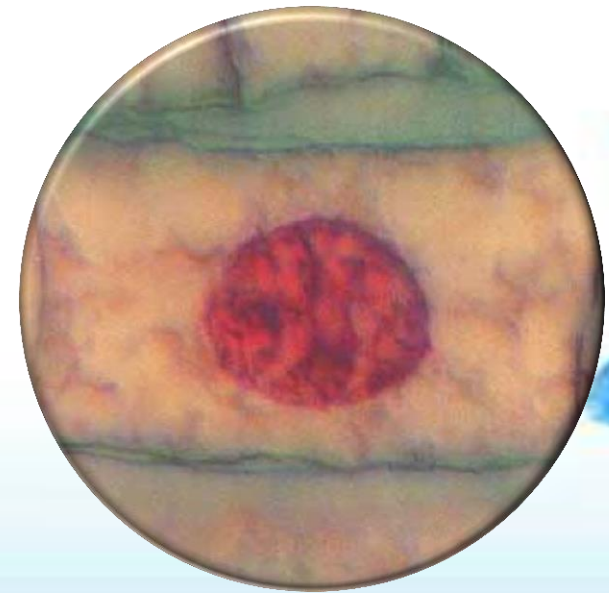
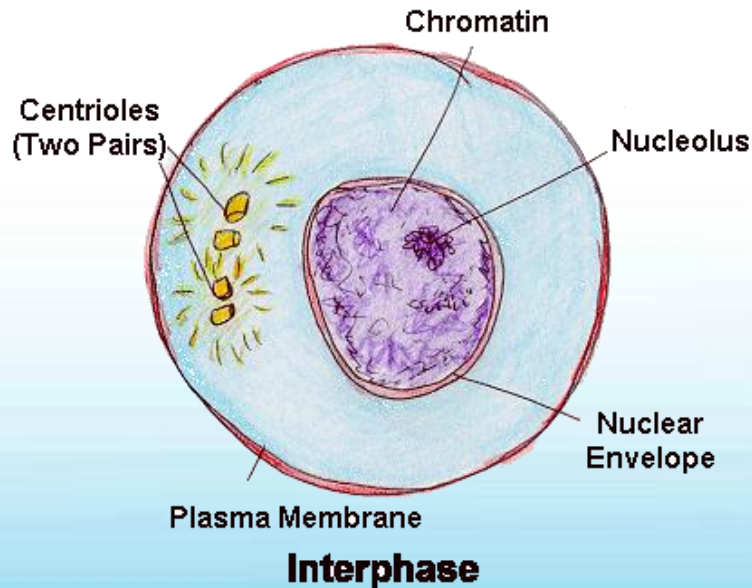
- **Interphase**
- **Prophase**
- **Metaphase**
- **Anaphase**
- **Telophase & Cytokinesis**



# Interphase

## The cell prepares for division

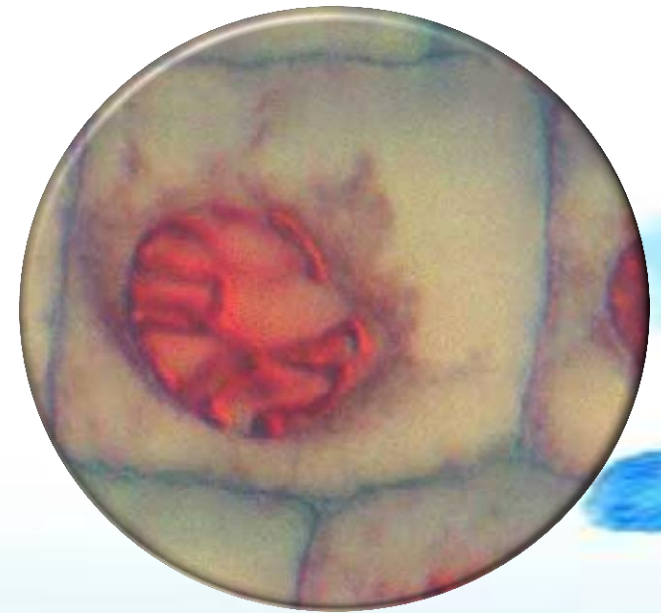
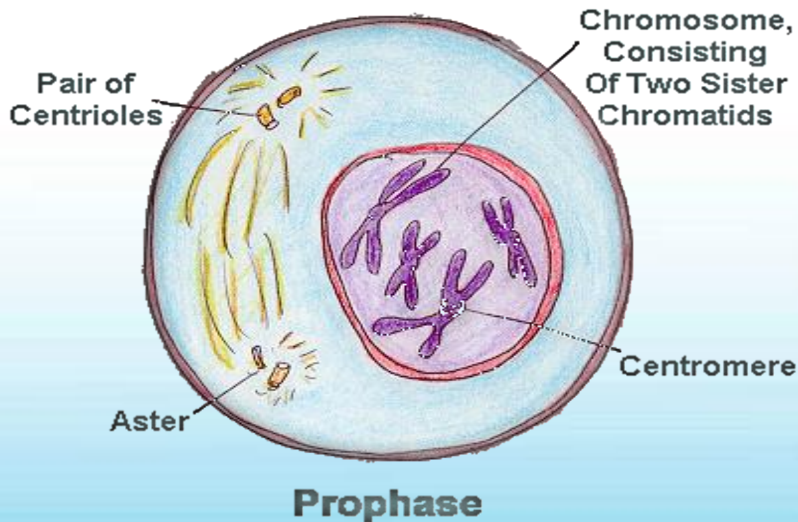
- DNA replicated
- Organelles replicated
- Chromosomes are not clearly discerned in the nucleus
- Cell increases in size



# Prophase

## The cell prepares for nuclear division

- Chromosomes thicken and shorten (become visible)
- Chromatids joined by a centromere
- Nucleolus disappears
- Nuclear membrane disintegrate
- The mitotic spindle begins to form

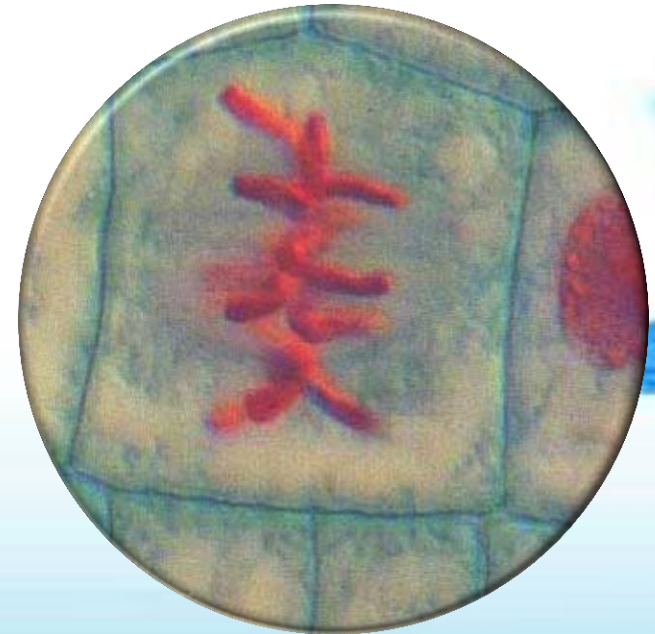
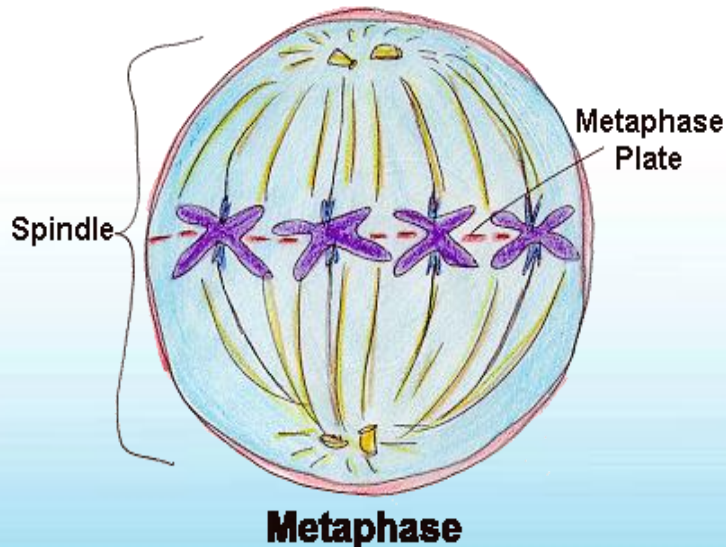




# Metaphase

The cell prepares chromosomes for division

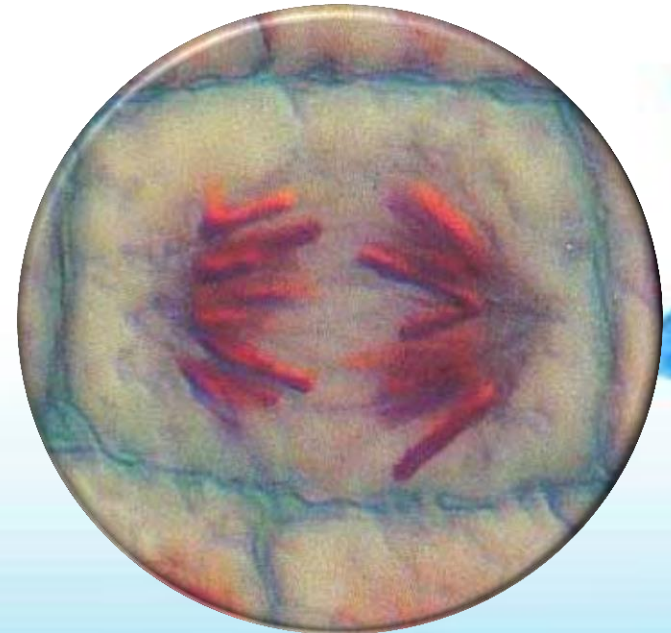
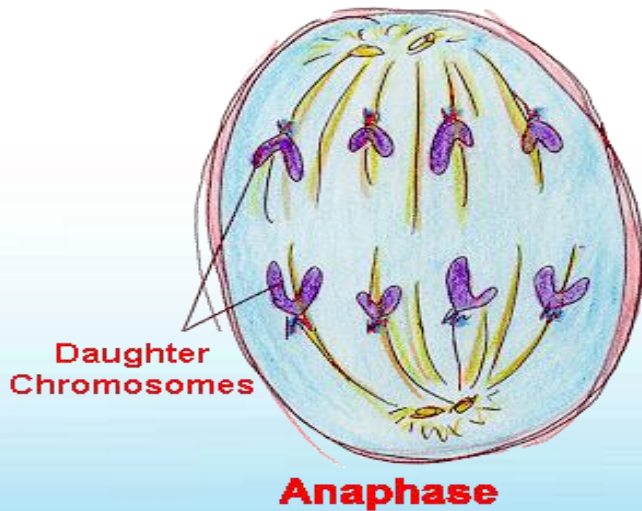
- Chromosomes line up at the center of the cell
- Spindle fibers attach from daughter cells to chromosomes at the centromere



# Anaphase

## The chromosomes divide

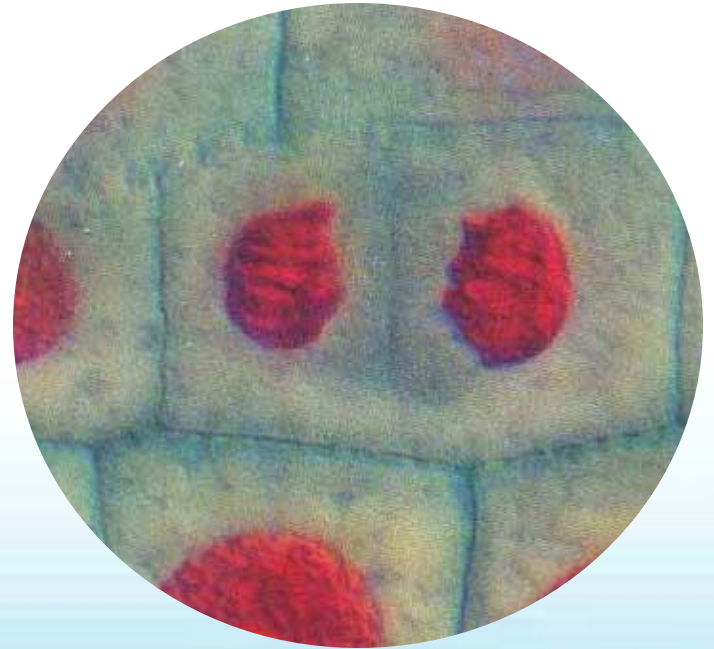
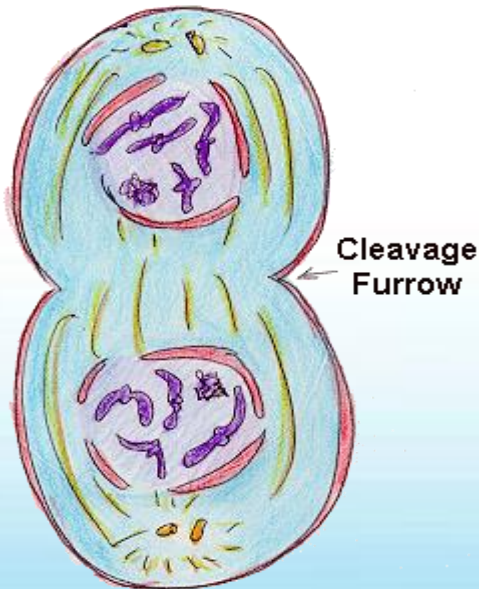
- The spindle fibres begin to contract
- This starts to pull the sister chromatids apart
- Spindle fibres contract pulling chromatids to the opposite poles of the cell



# Telophase

## The cytoplasm divides

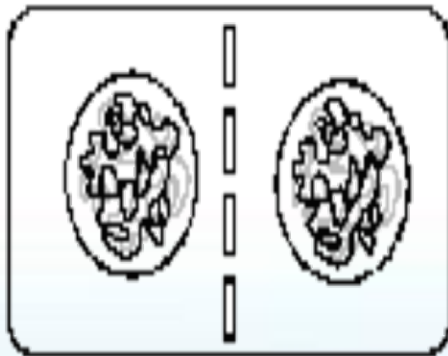
- In telophase the cell actually divides.
- The nuclear envelope re-forms around the two sets of chromatids.
- Nucleolus reappears



**Telophase and Cytokinesis**

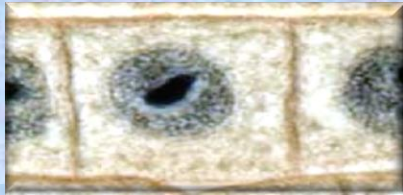
# Cytokinesis

- In plant cells, Cell membrane moves inward to create two daughter cells – each with its own nucleus with identical chromosomes.



# Plant Mitosis -- Review

Interphase



Prophase



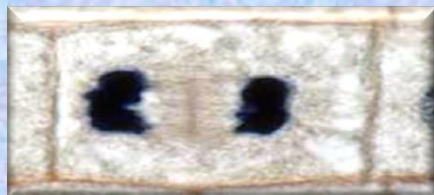
Metaphase



Anaphase



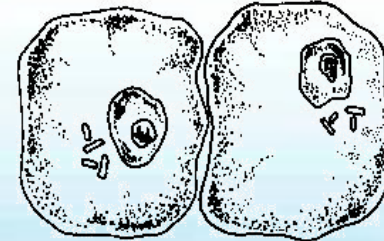
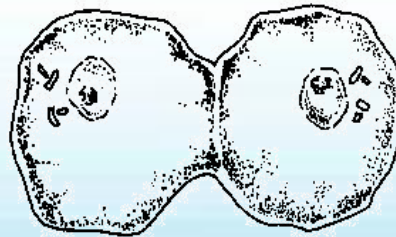
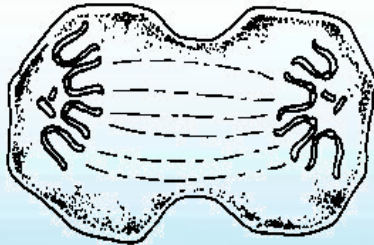
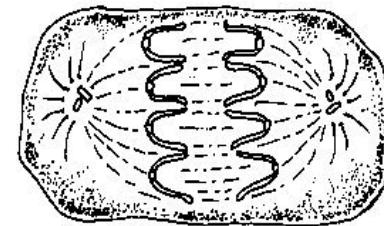
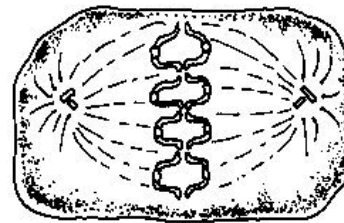
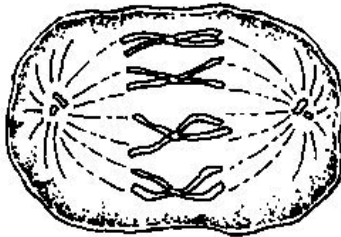
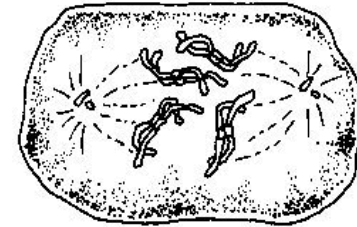
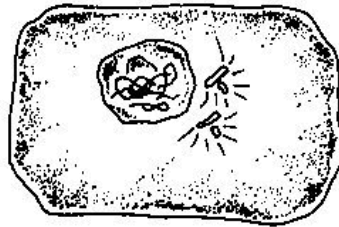
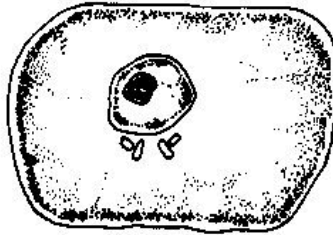
Telophase



Interphase



# Overview of Mitosis



# Meiosis

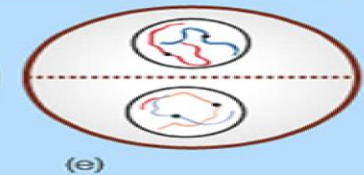
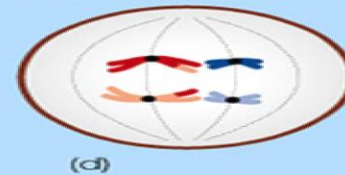
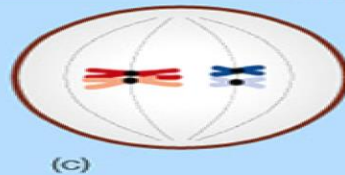
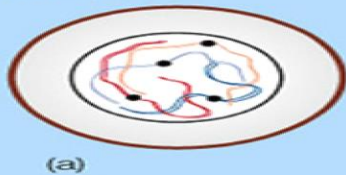
**Meiosis is the type of cell division by which germ cells (eggs and sperm) are produced.**

**One parent cell produces four daughter cells.**

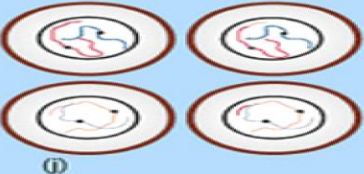
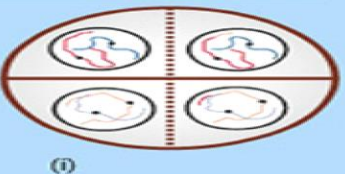
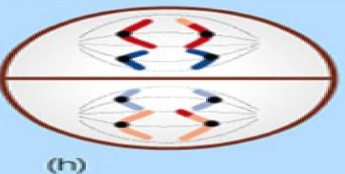
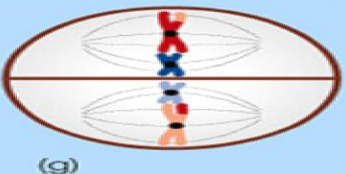
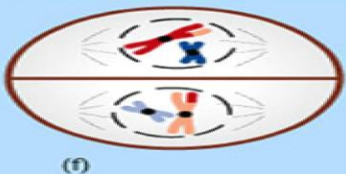
**Daughter cells have half the number of chromosomes found in the original parent cell**

## II. MEIOSIS

### Meiosis I



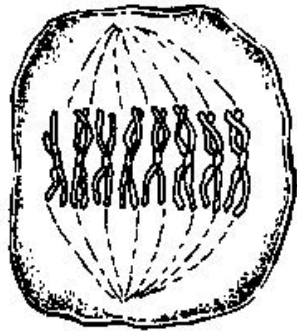
### Meiosis II



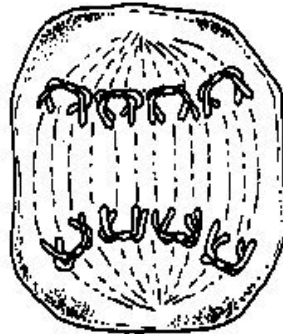
# Overview of Meiosis



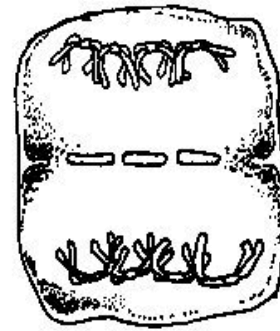
*Prophase 1*



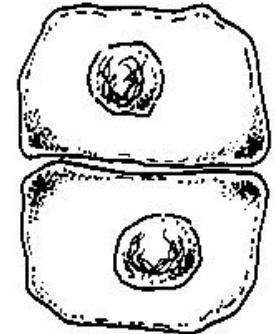
*Metaphase 1*



*Anaphase 1*



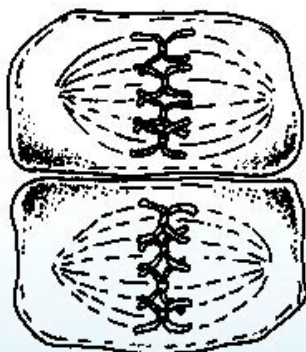
*Telophase 1 (early)*



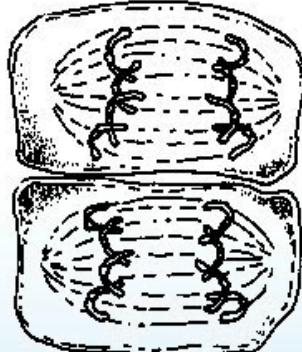
*Telophase 1 (late)*



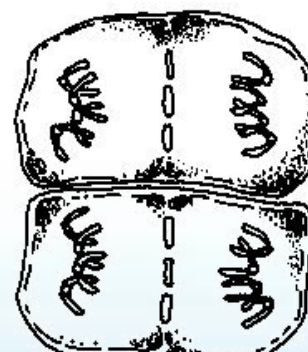
*Prophase 2*



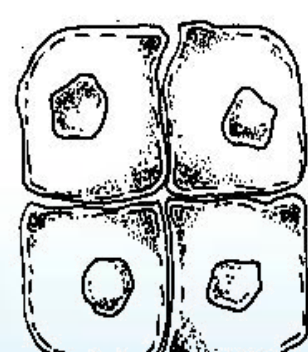
*Metaphase 2*



*Anaphase 2*



*Telophase 2 (early)*



*Telophase 2 (late)*



# Differences in Mitosis & Meiosis

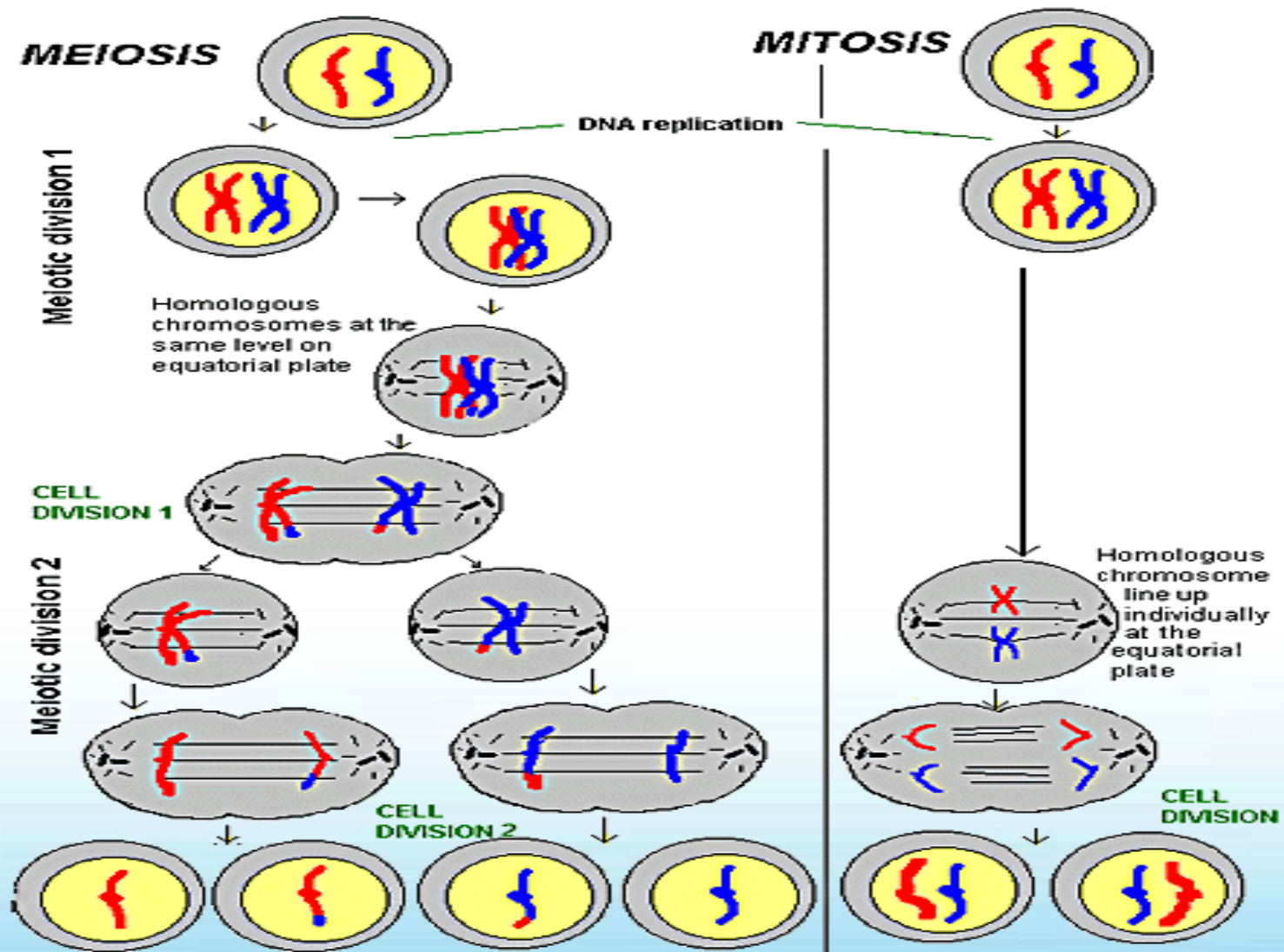
- **Mitosis**

- **Asexual**
- **Cell divides once**
- **Two daughter cells**
- **Genetic information is identical**

- **Meiosis**

- **Sexual**
- **Cell divides twice**
- **Four haploid daughter cells**
- **Genetic information is different**

# Comparison of Mitosis & Meiosis



# Munirah Al-Dossari

