

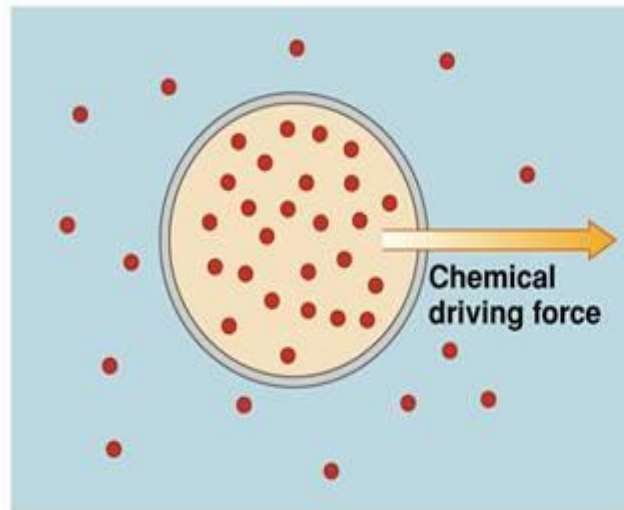
Section 1.3 – Cells from Cells

SNC2D

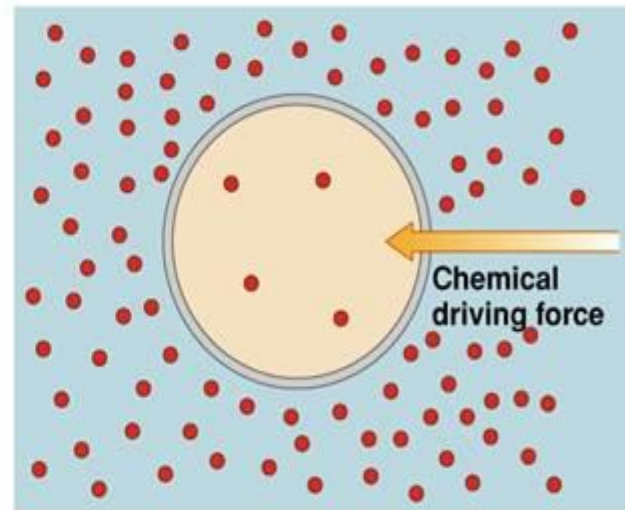
MRS. FRANKLIN

Diffusion of Solutes

In order to survive, *cells must constantly interact with their surrounding environment*. Thus, the appropriate solutes must enter and leave the cell.



(a)



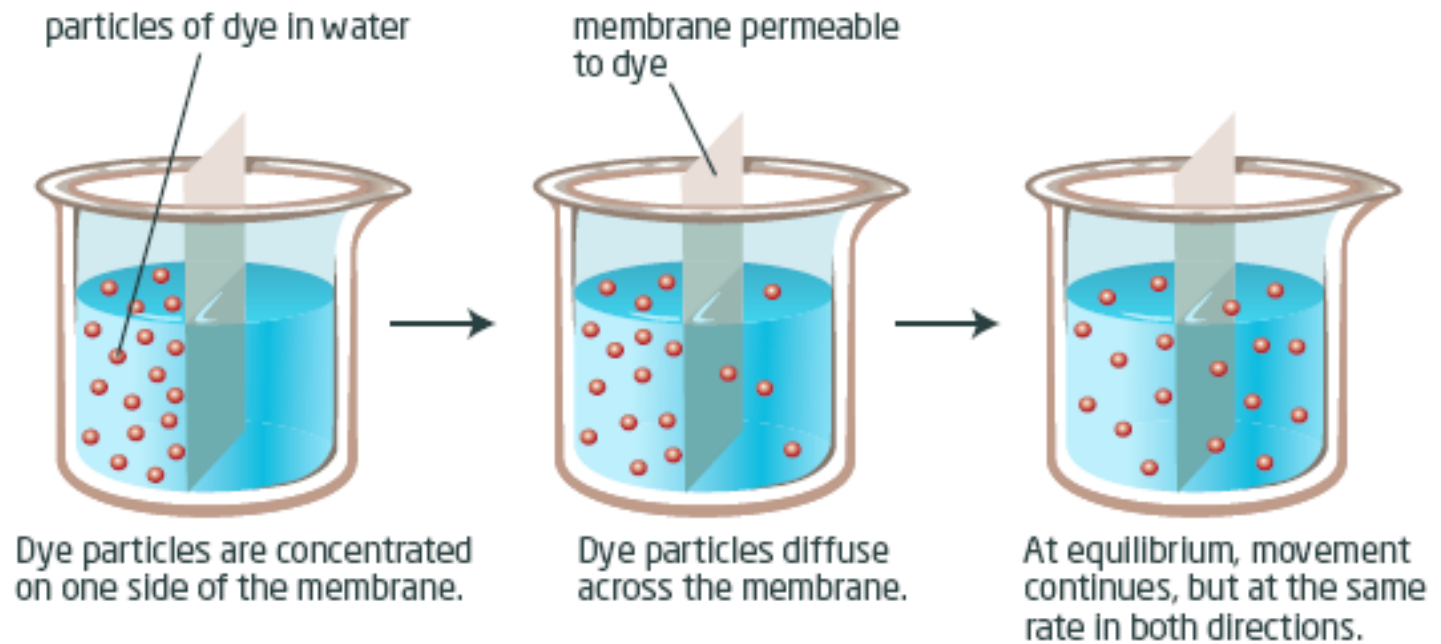
(b)

Solutes will move from an area of _____ concentration to an area of _____ concentration.

Diffusion of Solutes

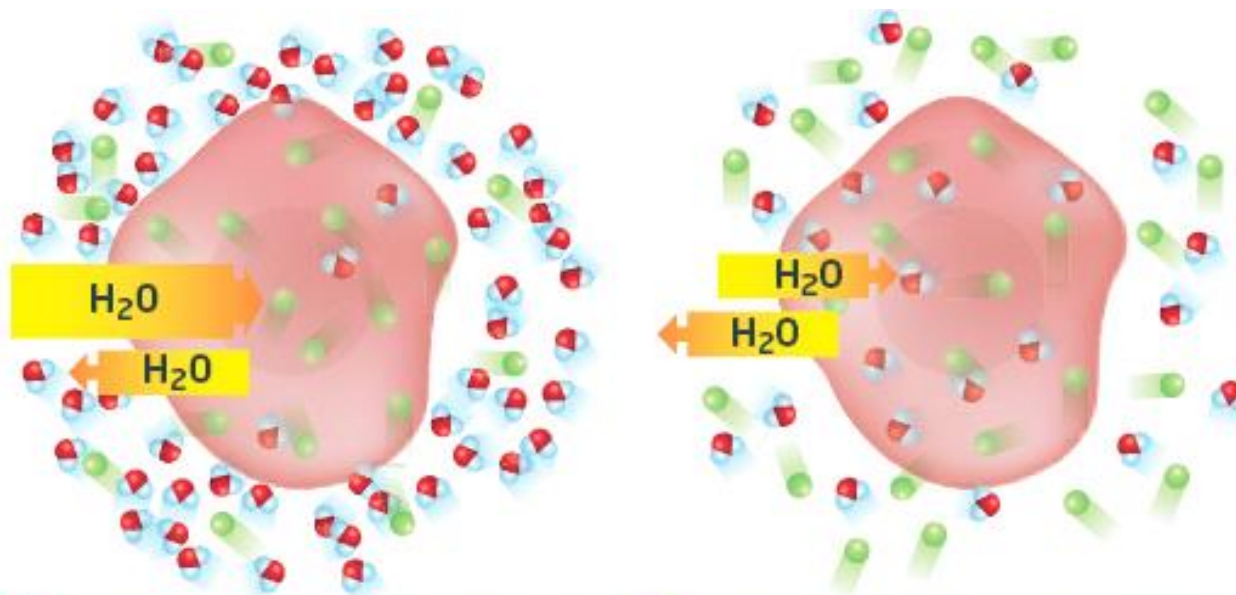
Diffusion:

The cell membrane is semi-permeable and only allows certain molecules to diffuse in and out of the cell.



Diffusion of Water

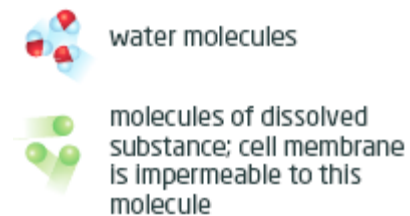
Osmosis:



A There is a greater concentration of the dissolved substance inside the cell than outside the cell.

B Water moves by osmosis into the cell until the concentration is the same outside and inside.

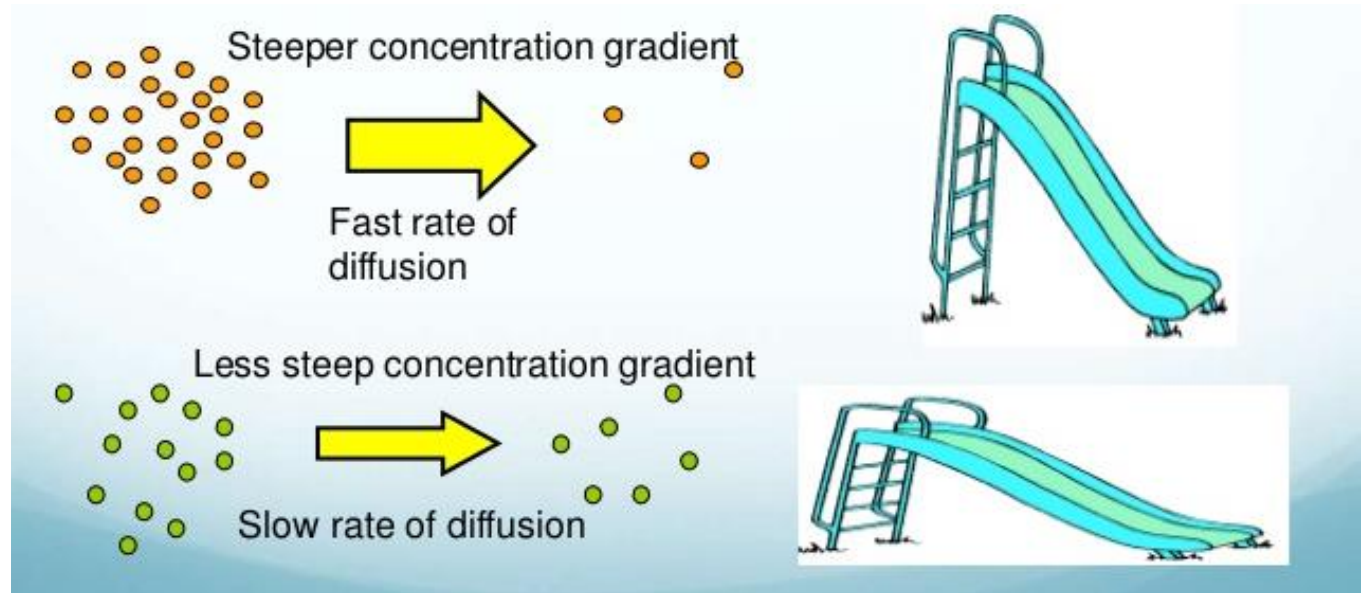
Selectively permeable membrane: a membrane through which not all materials can pass; some are kept in and some are kept out



Diffusion Rate

The rate at which water or solutes diffuse can depend on several of the factors listed below:

- Surface area of the cell
- Concentration gradient
- Temperature
- Size of the solutes

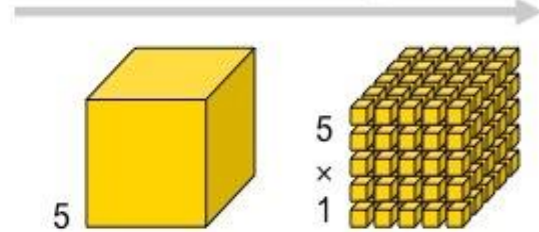


Cell Size



Why cells are small and organisms are made up of cells!

SA increases, volume stays constant



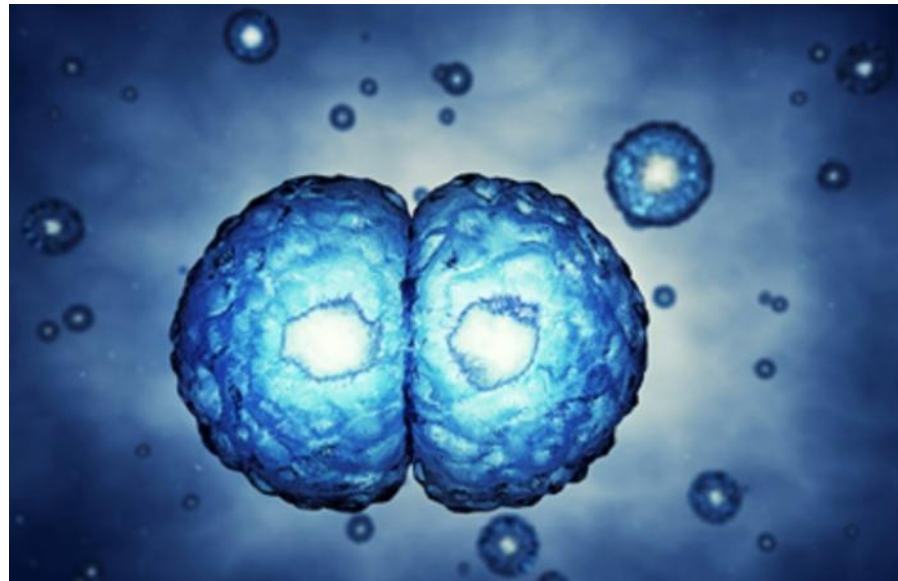
Total surface area (height × width × sides × number of boxes)	6	150	750
Total volume (height × width × length × number of boxes)	1	125	125
SA:Vol ratio (surface area ÷ volume)	6	1.2	6

The ratio of cell membrane surface area (SA) to cell volume (V) is a factor that limits cell size.

** AS CELLS INCREASE IN SIZE, THE SA/V RATIO DECREASES*

Cell Size and Cell Division

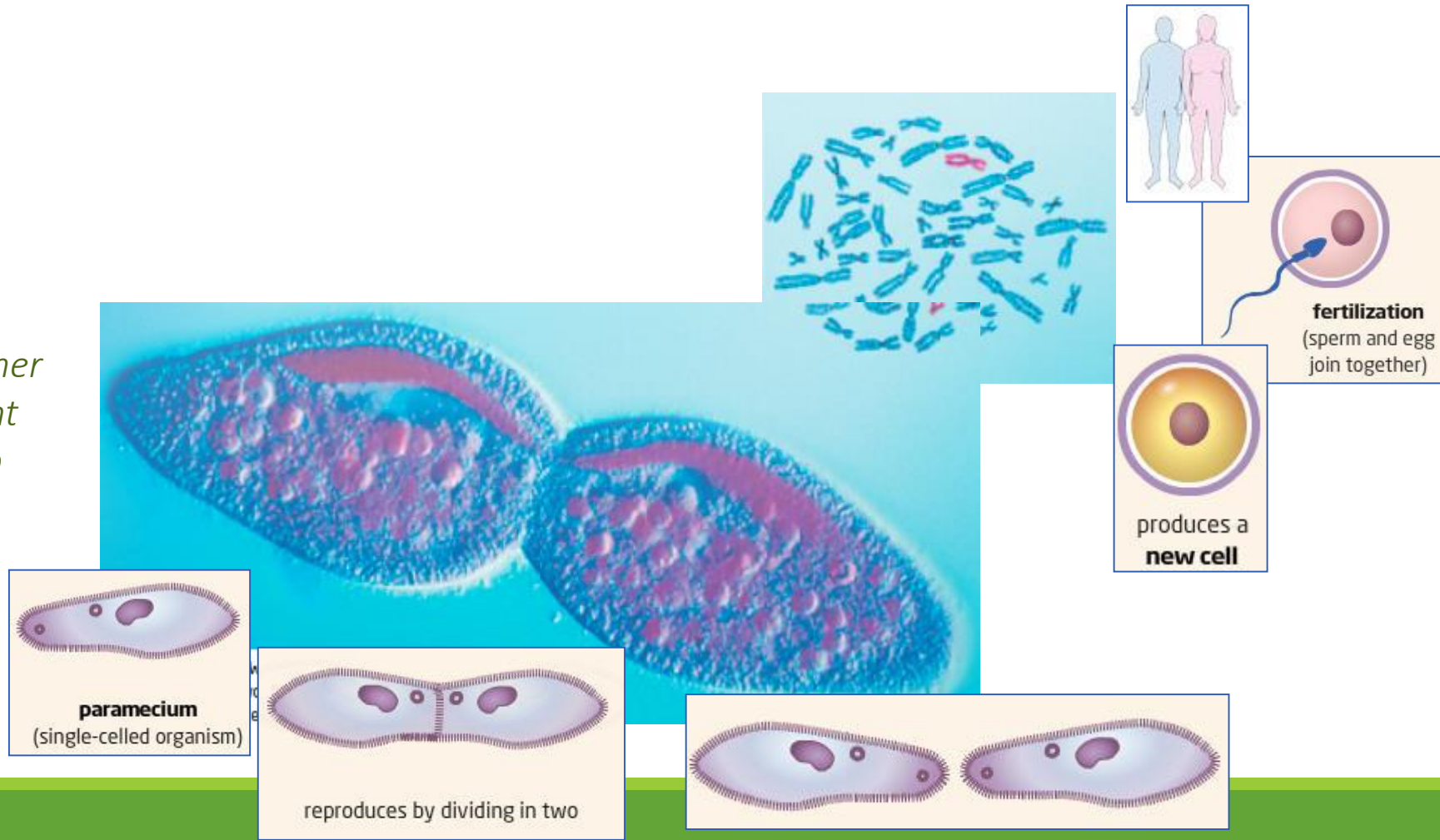
If the cell grows beyond a certain limit, not enough material will be able to cross the membrane fast enough to accommodate the increased volume. When this happens, the cell must divide into smaller cells with favorable surface area/volume ratios, or cease to function.



Cell Reproduction

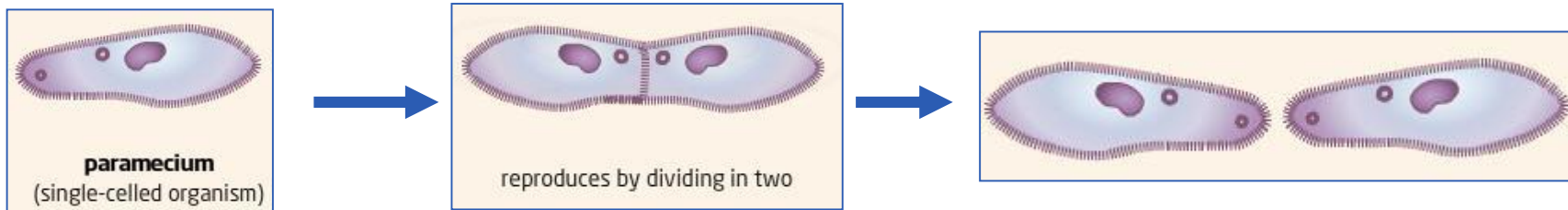
Cell Reproduction –

Cells can be produced either *asexually* (from one parent cell) or *sexually* (from two parent cells).

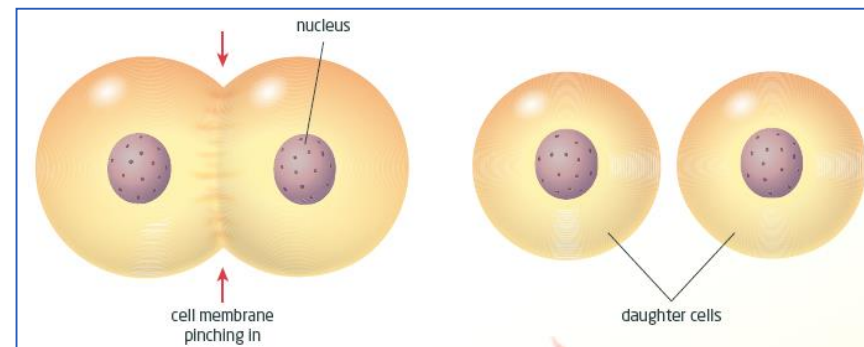


Cell Division

Most _____ organisms reproduce by splitting in two (**binary fission**), producing two new cells, called *daughter cells*.



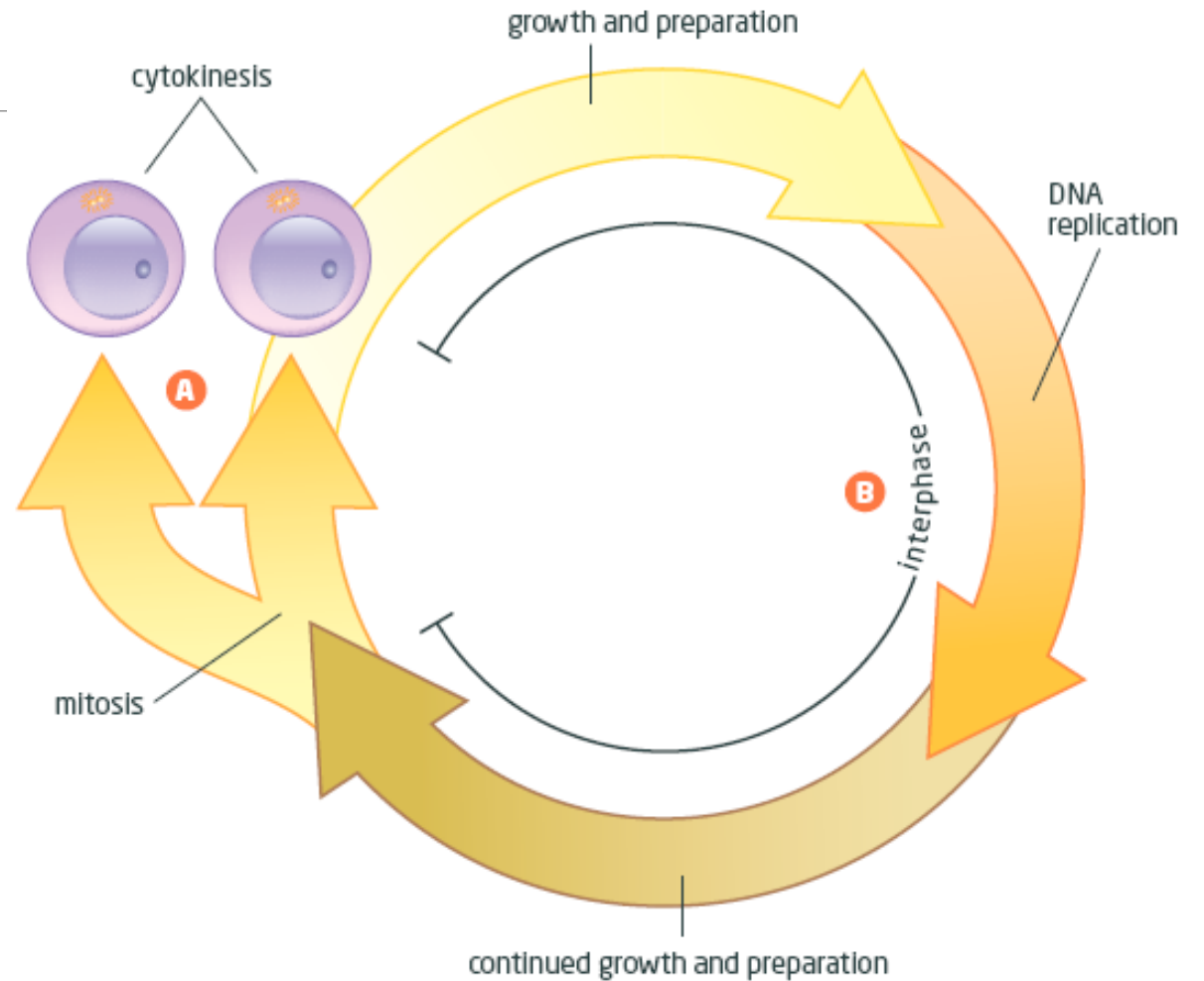
*In multicellular organisms (such as humans), all **body cells** (cells produced for growth and repair / replacement) are also produced through this process*



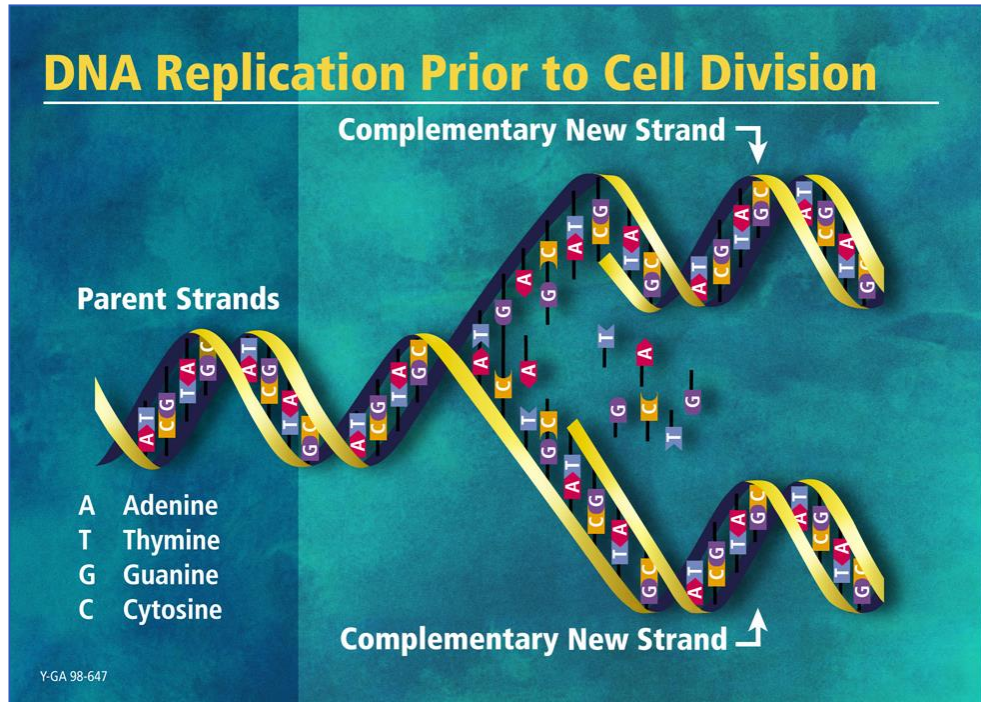
Cell Division

All cells go through the cell cycle which contains **3 main stages**:

- 1) Interphase:
- 2) Mitosis:
- 3) Cytokinesis:

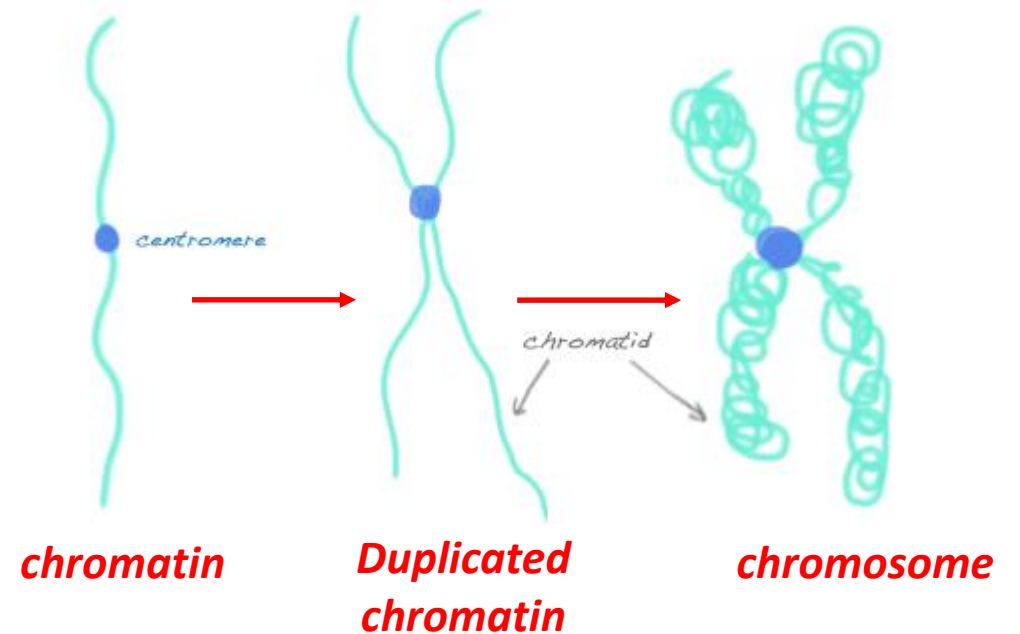


1) Interphase – DNA Replication

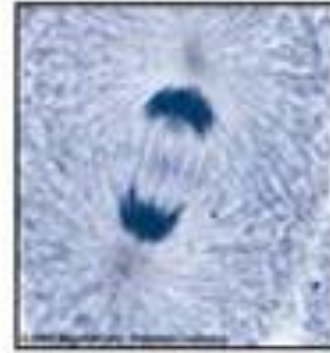
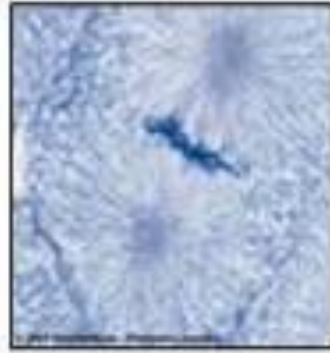


The two DNA strand will separate and proteins will bind and create two identical copies.

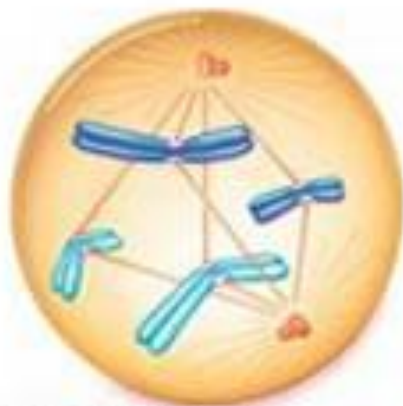
During the cell cycle the replicated DNA condenses to become chromosomes. Since it is replicated it will form sister chromatids.



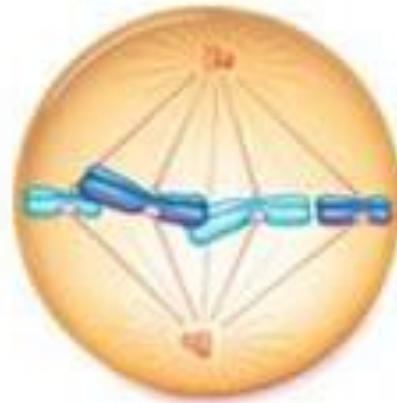
2) Mitosis



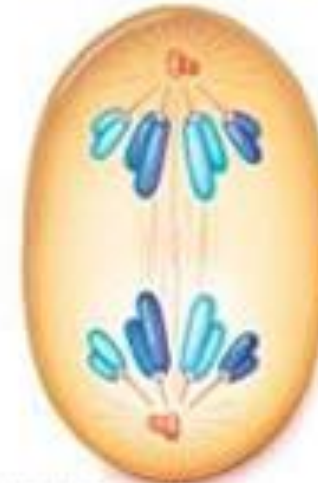
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**Prophase:
Chromosomes Condense**

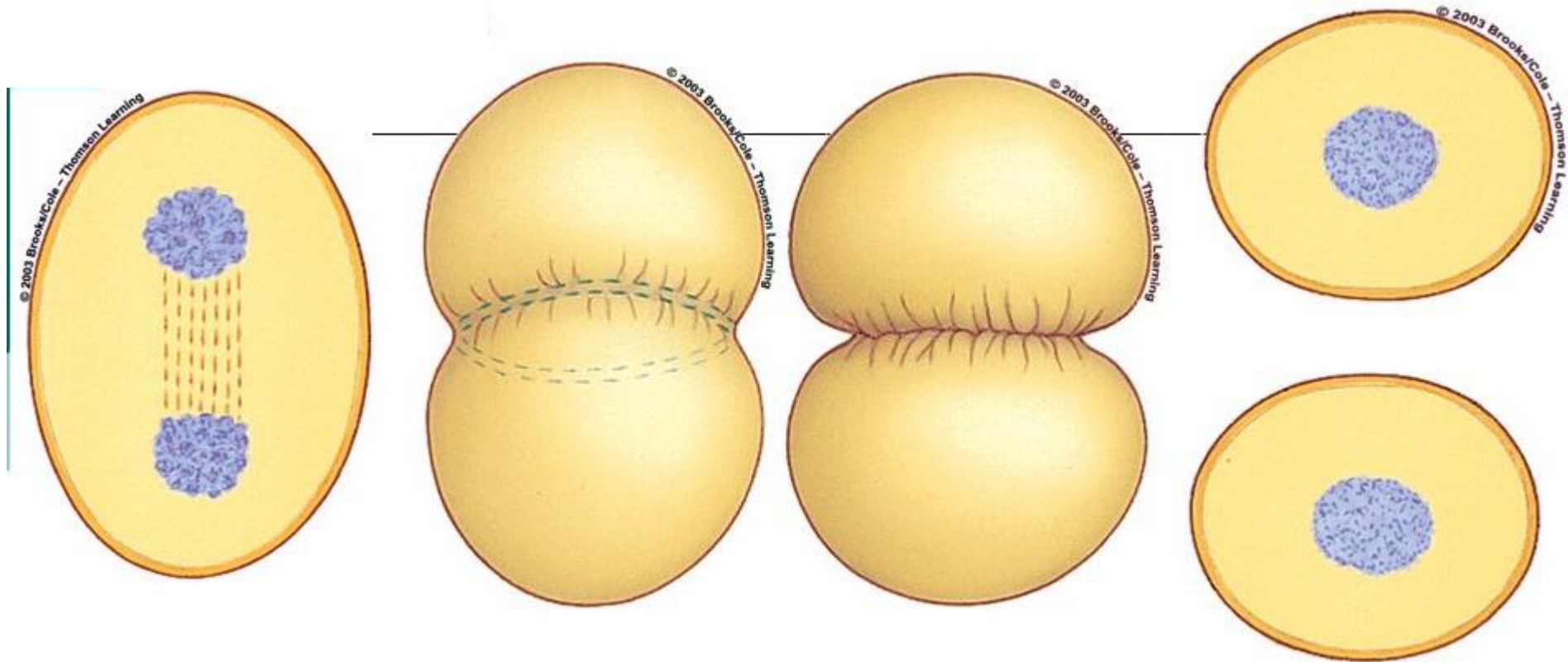
**Prometaphase:
Chromosomes Attach**

**Metaphase:
Chromosomes align**

**Anaphase:
Chromosomes separate**

**Telophase:
Chromosomes relax**

3) Cytokinesis



Mitosis is over, and the spindle is now disassembling.

Band of microfilaments at the former spindle equator contracts.

The contractions continue and cut the cell in two.

Homework

- Complete the stages of mitosis worksheet given in class. You may use your textbook to complete it (pg. 34 – 35)