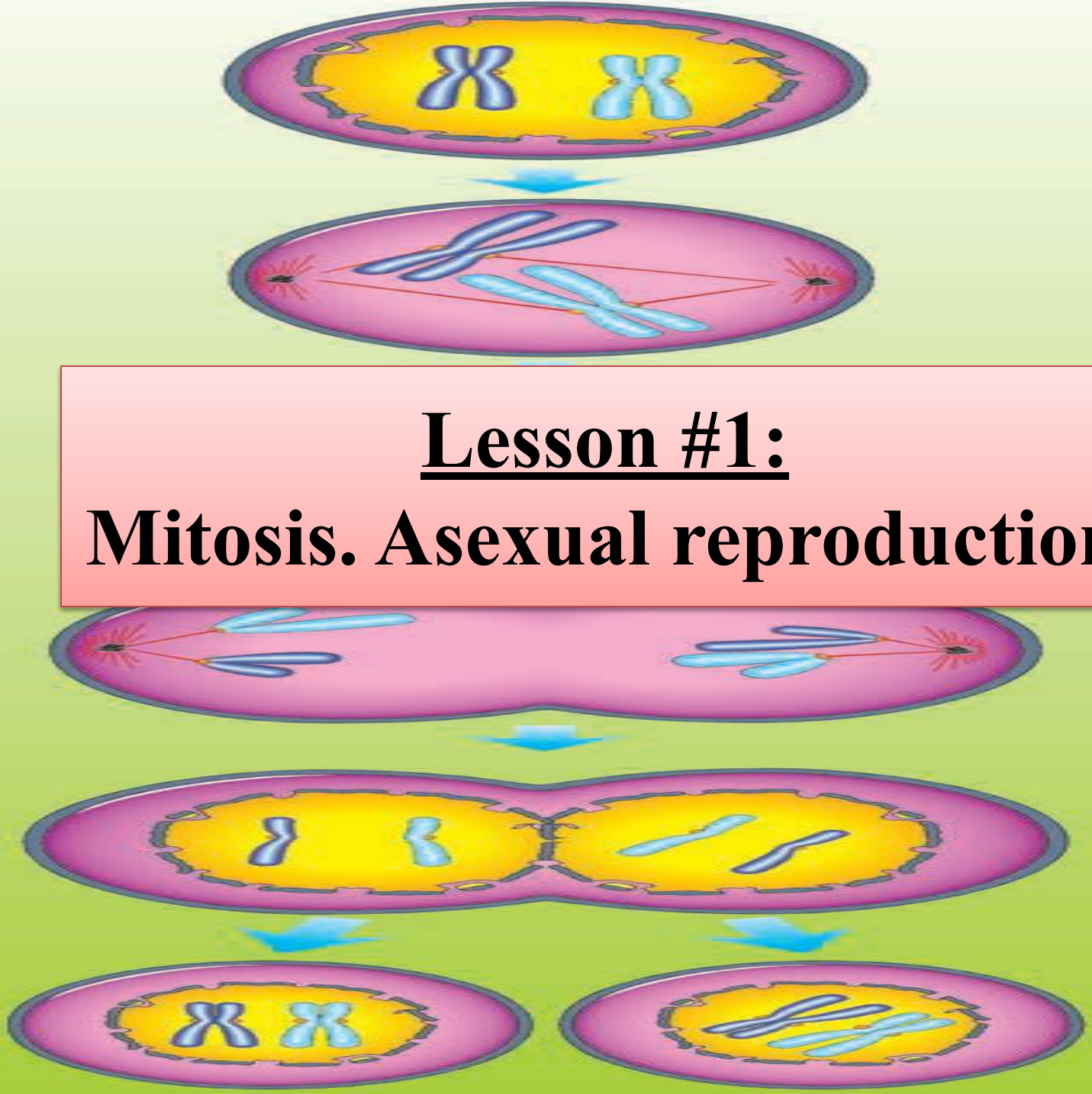
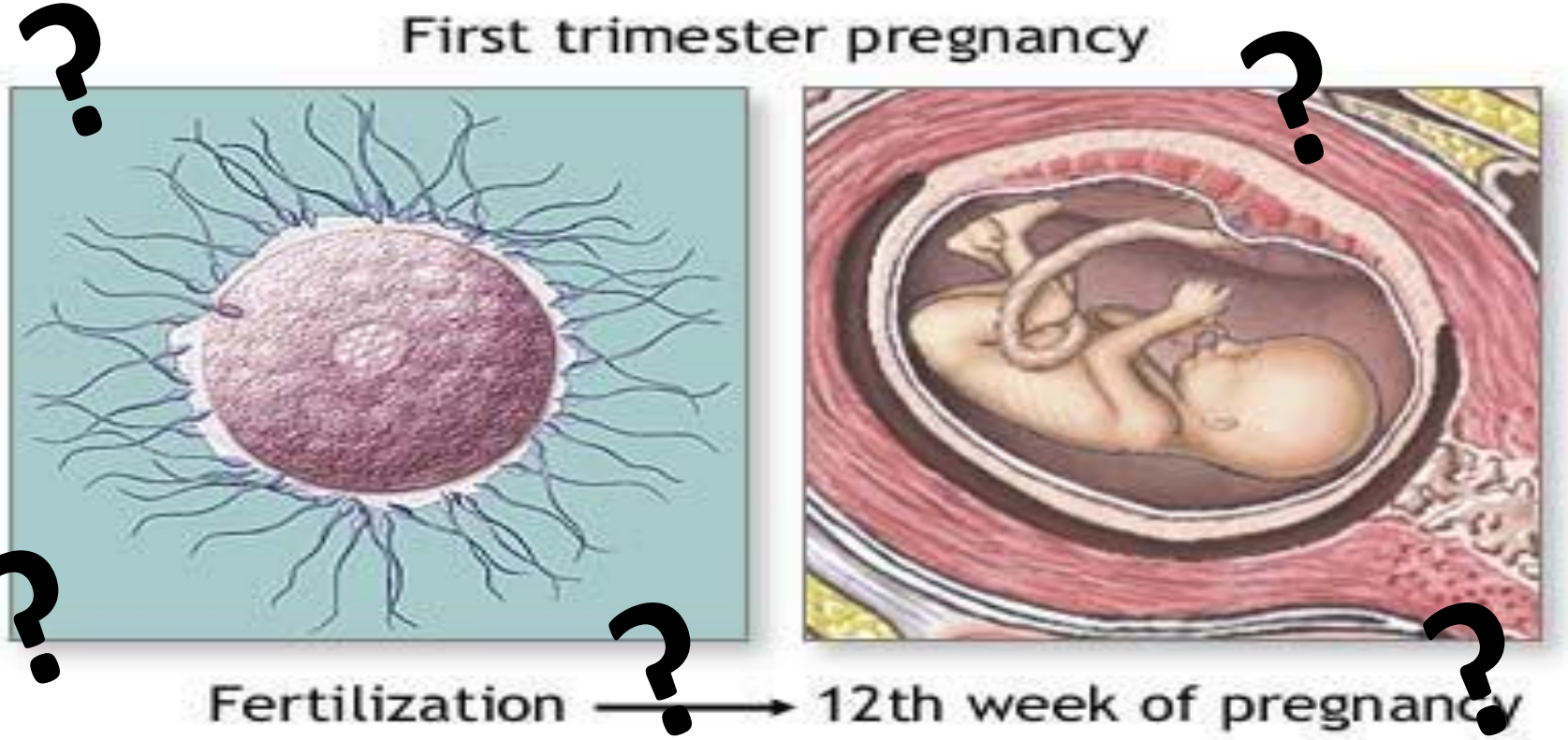


Lesson #1:
Mitosis. Asexual reproduction

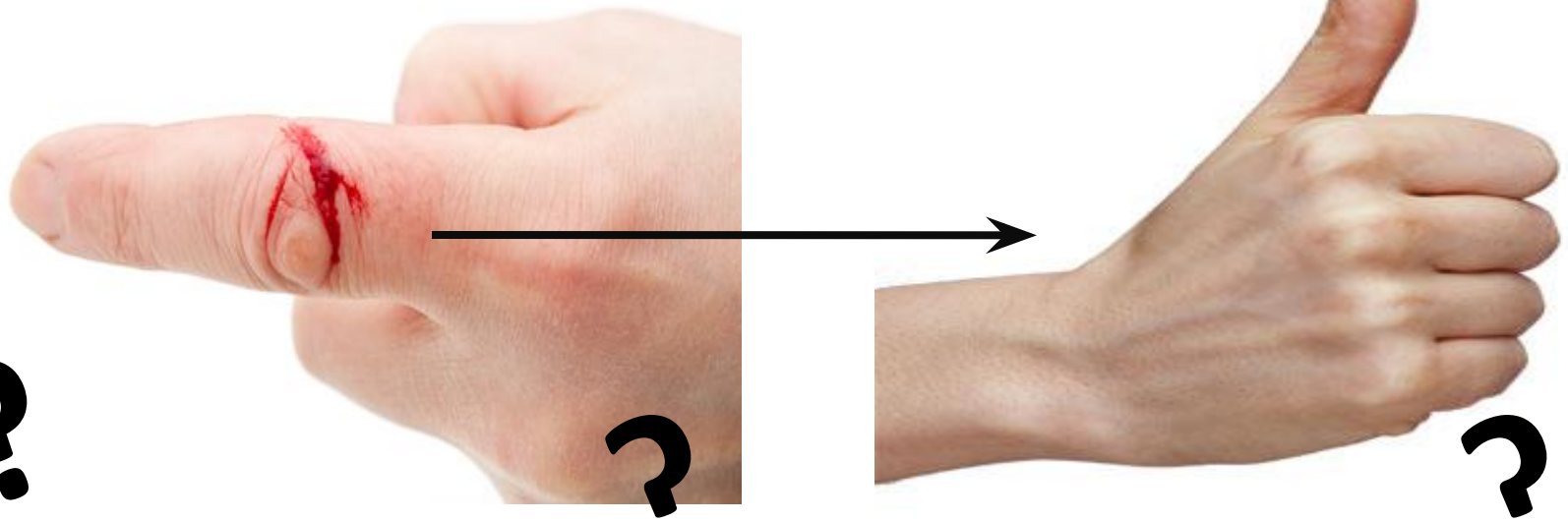
Questions

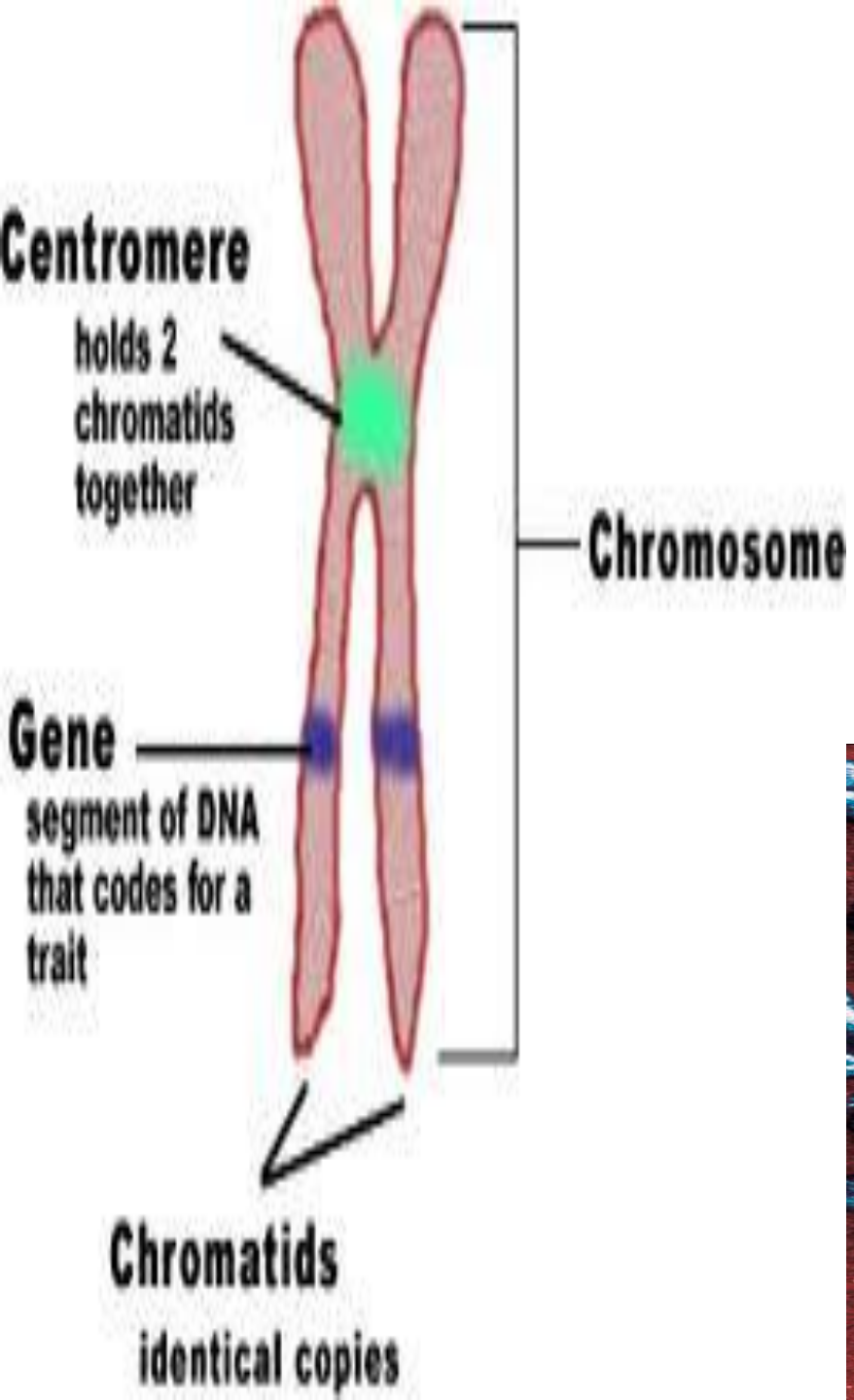
- How zygote develops into a baby?



Questions

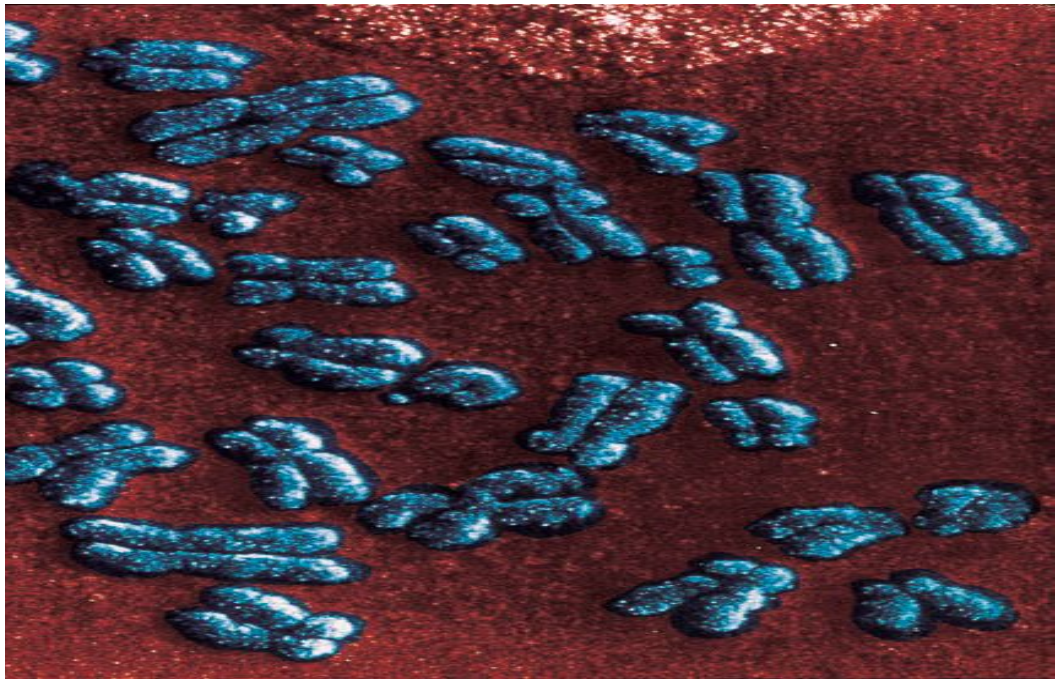
- Why damaged skin is repaired after some time?





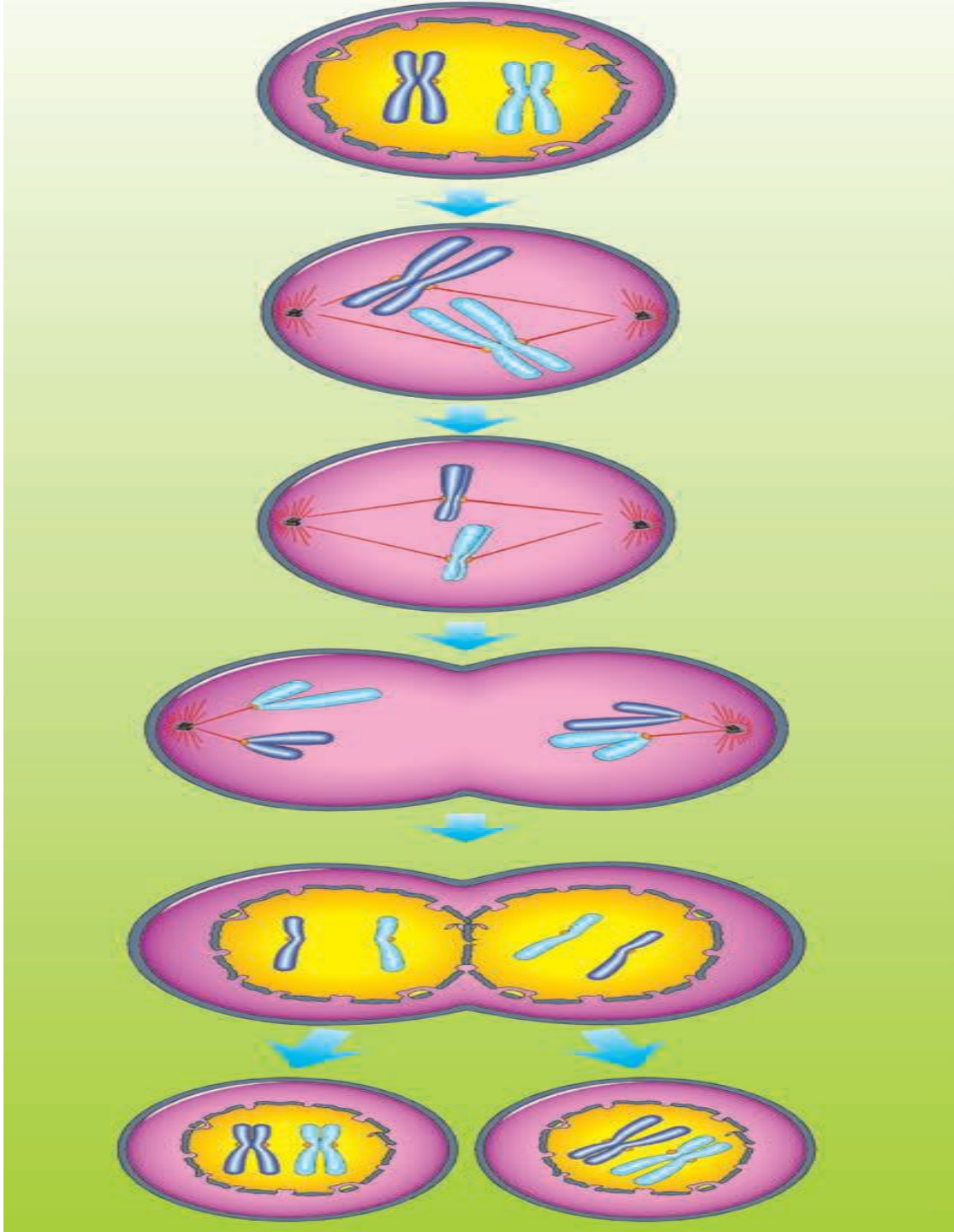
Chromosome

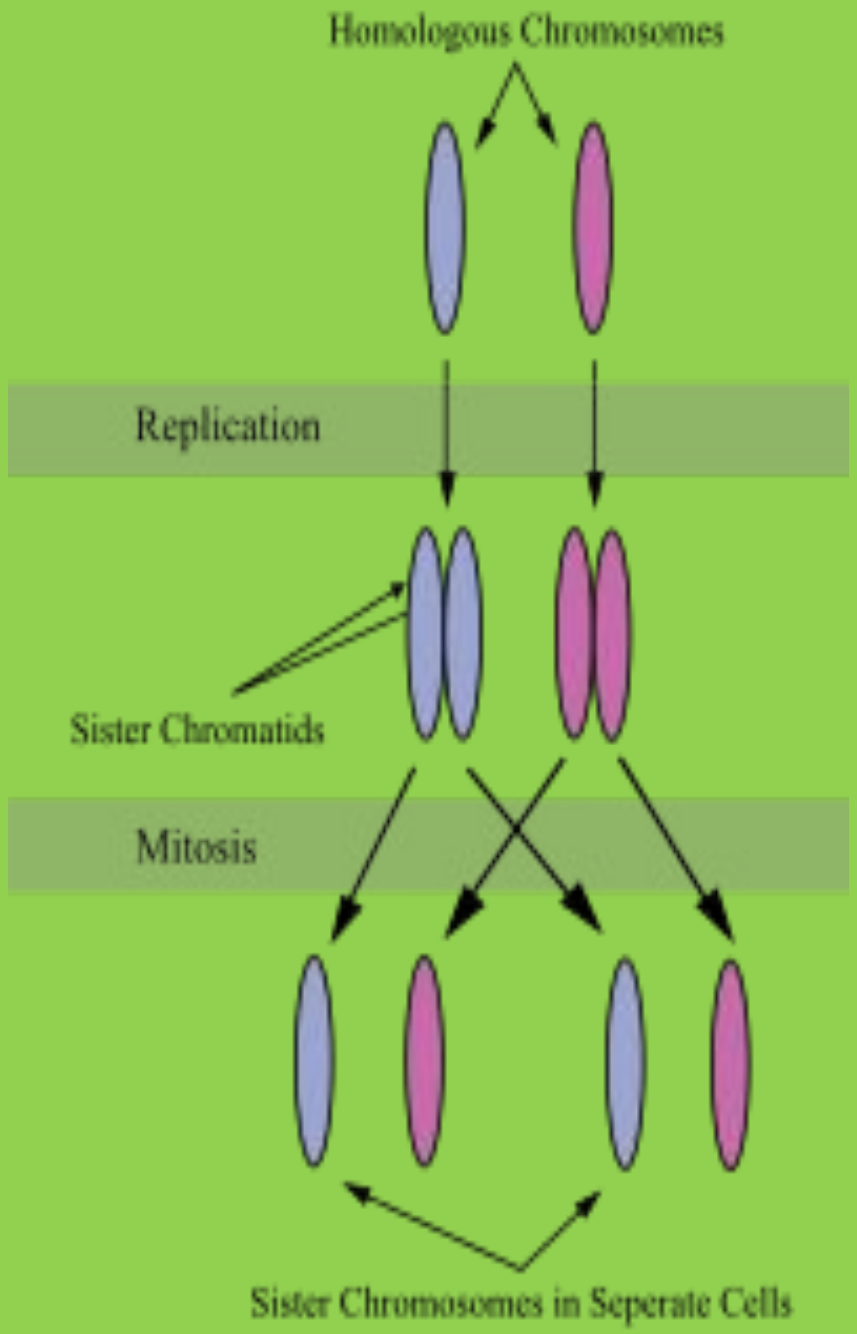
- A eukaryotic nucleus contains multiple DNA molecules, each of which is packaged with proteins and assembled into a structure called a <u>chromosome</u>



Cell cycle

- It is a sequence of events in the life of a dividing cell
- It is a period when parent cell divides into daughter cells

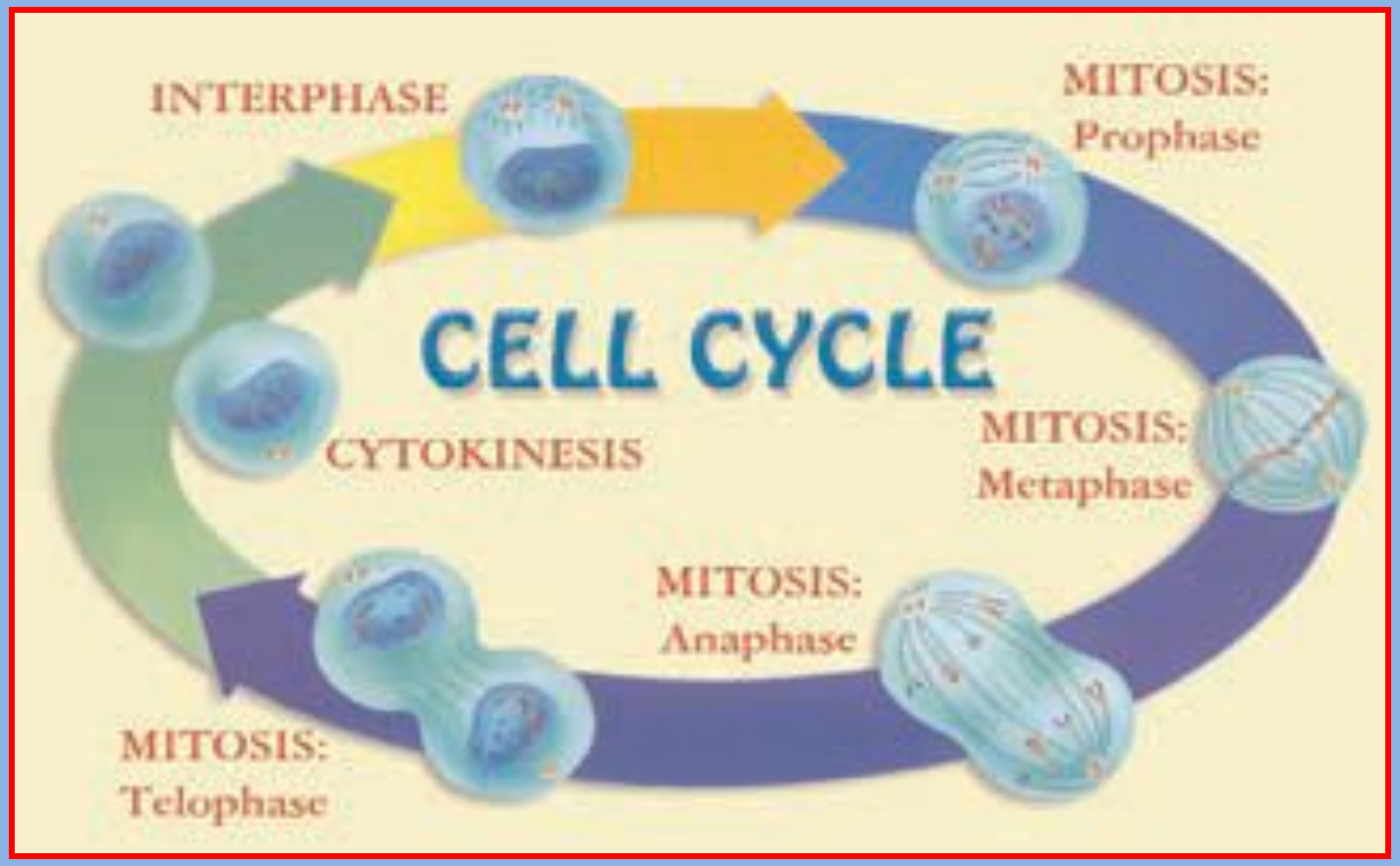




Mitosis

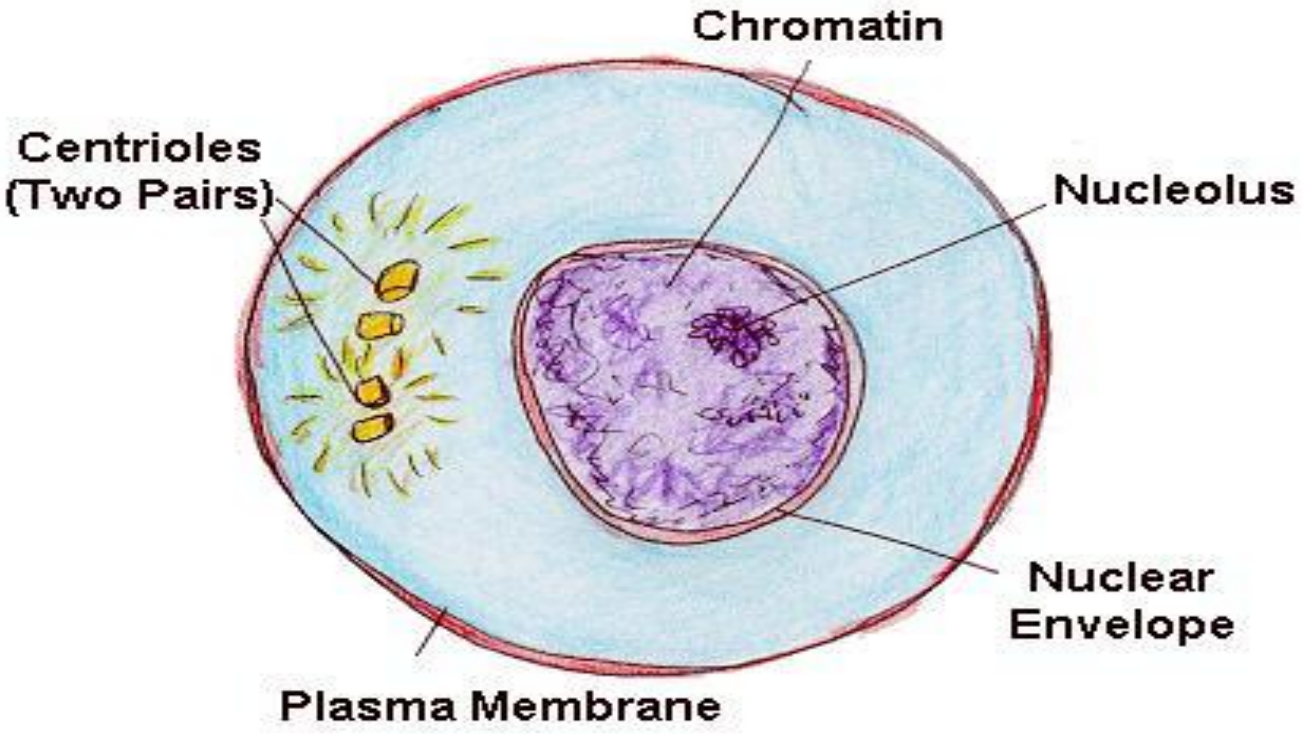
- *Mitosis* is a kind of cell division (body cells) in which a parent cell is divided into two daughter cells
- The chromosome number of both parent and daughter cells are identical

- <u>Mitosis has 3 stages:</u>
- 1. Interphase – preparatory stage
- 2. Karyokinesis – division of nucleus
- 3. Cytokinesis – division of cytoplasm

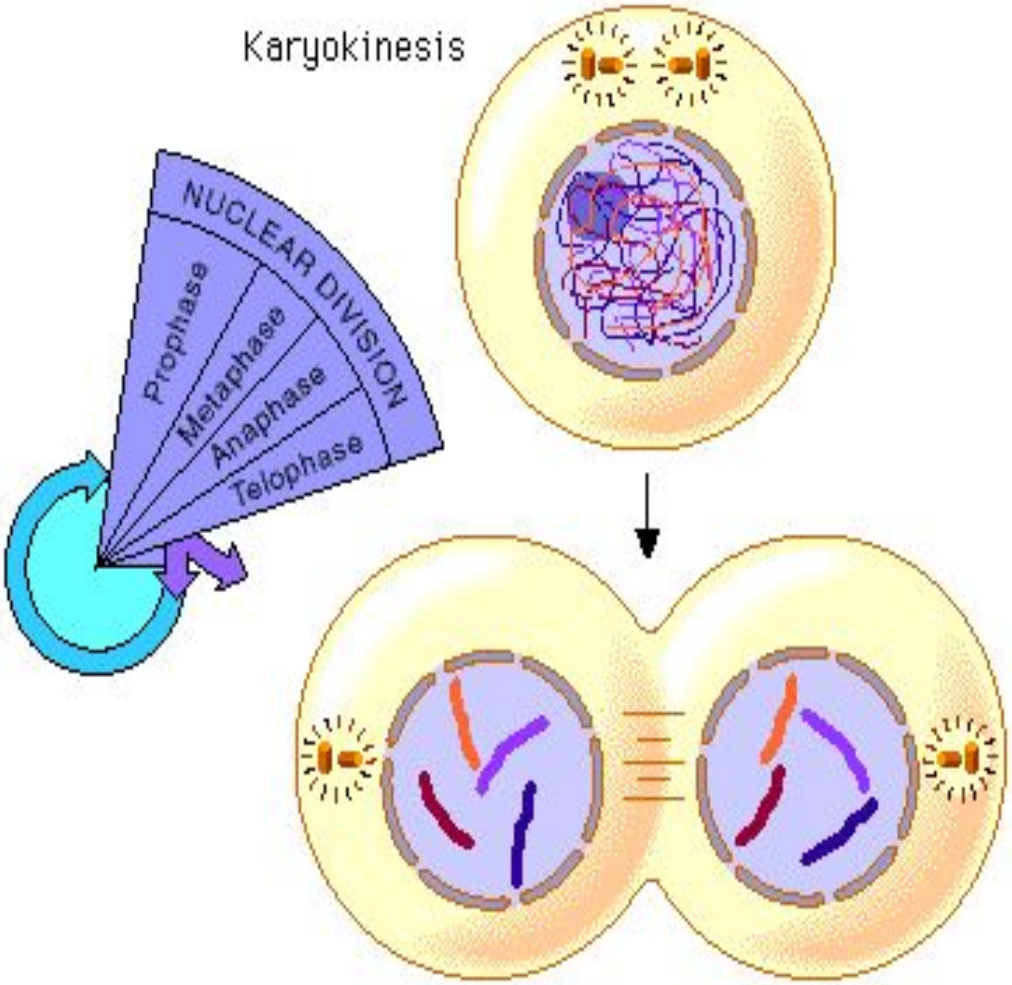


Interphase

- - ATP and all needed materials are synthesised
- DNA is duplicated
- Chromatids are formed



Karyokinesis



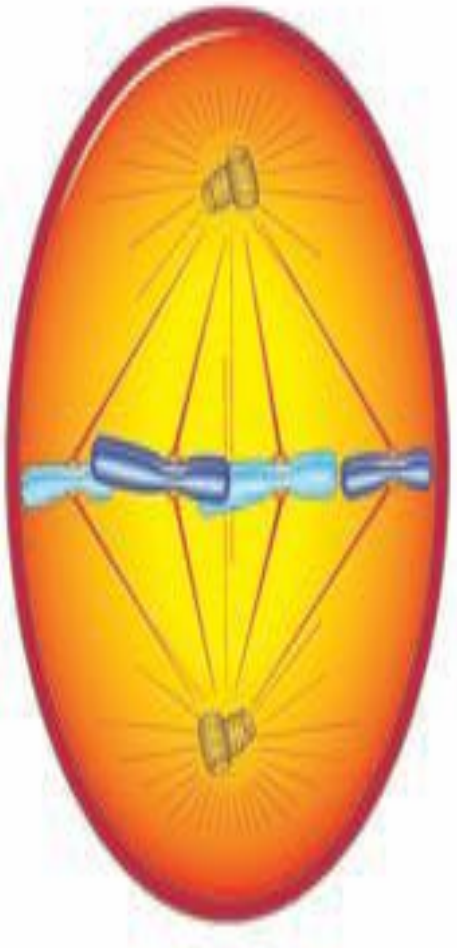
- Karyokinesis occurs in four distinct phases:
  - prophase
  - metaphase
  - anaphase
  - telophase

Prophase

- Nuclear envelope dissapear
- Chromosomes begin to shorten and condense (уплотняться) as visible

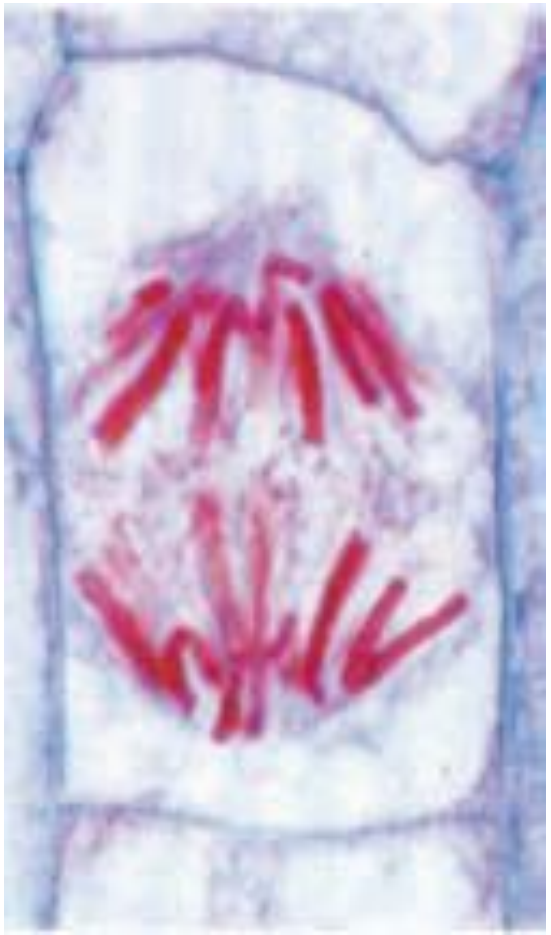
Metaphase

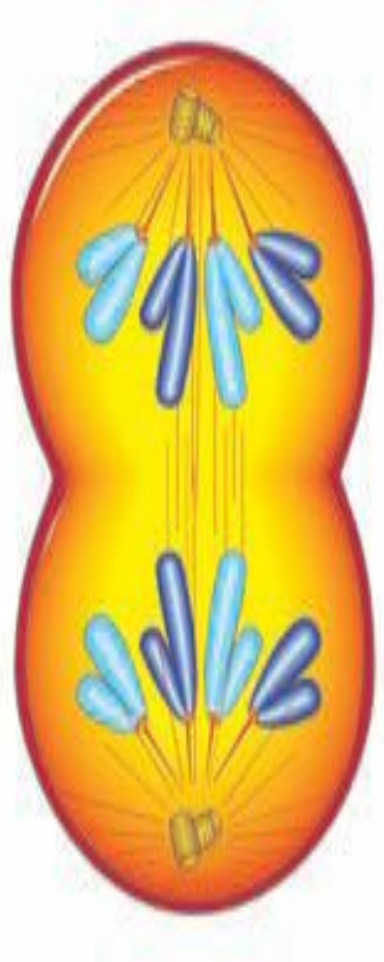
- Chromosomes orient themselves on the equatorial plate
- *Spindle fibers* are attached to **centrosomes**



Anaphase

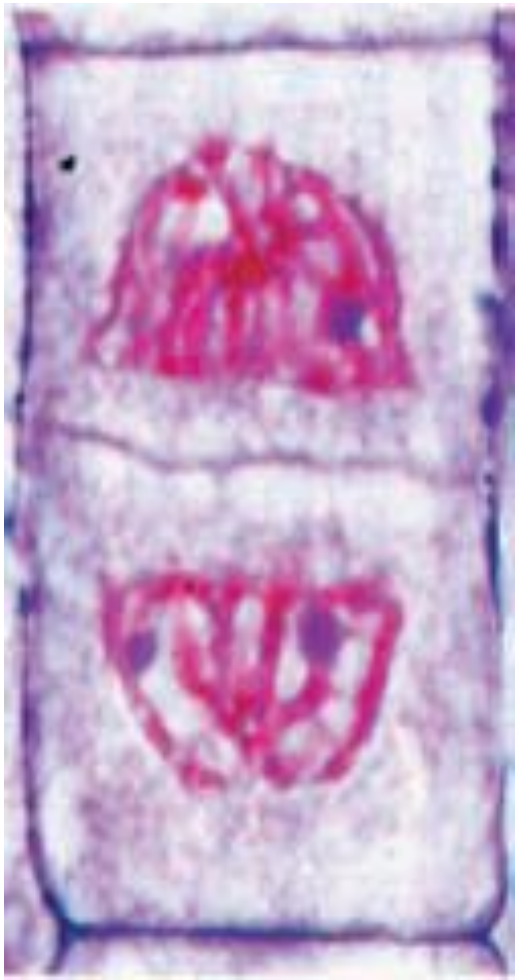
- Chromosomes separate at centromere
- Chromosomes moves toward each pole

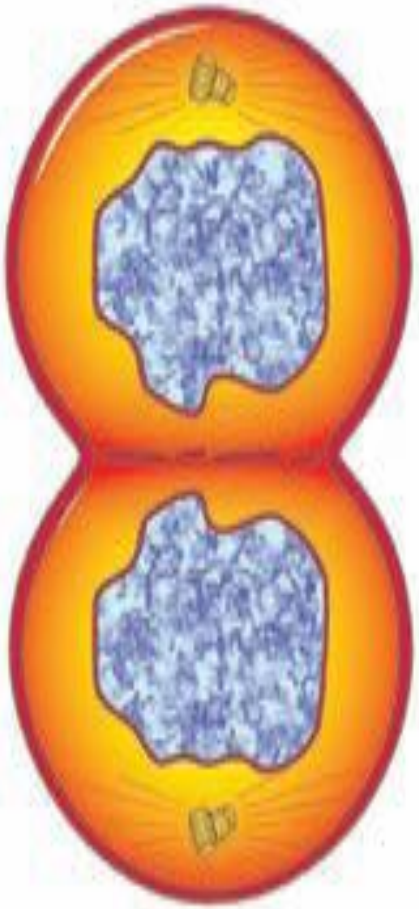




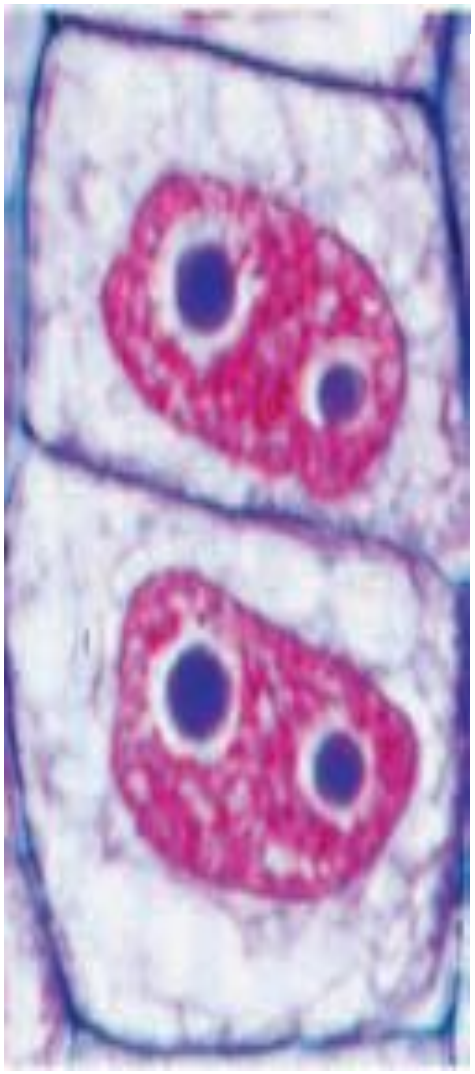
Telophase

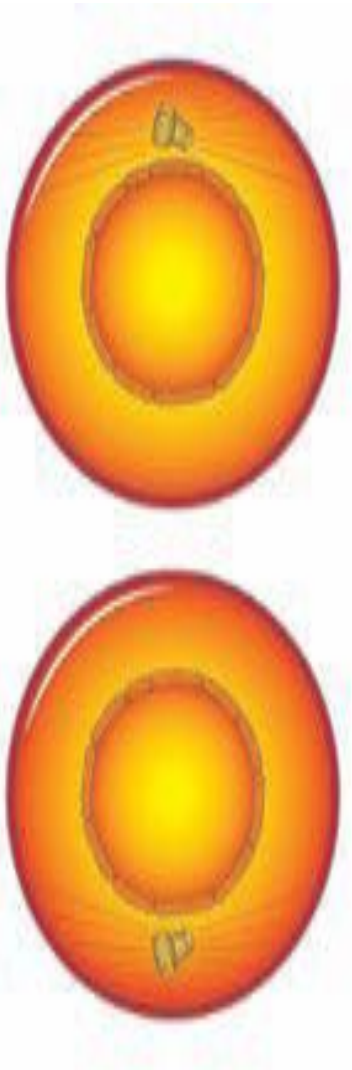
- A new nuclear membrane is formed at each pole which surrounds the daughter chromosomes





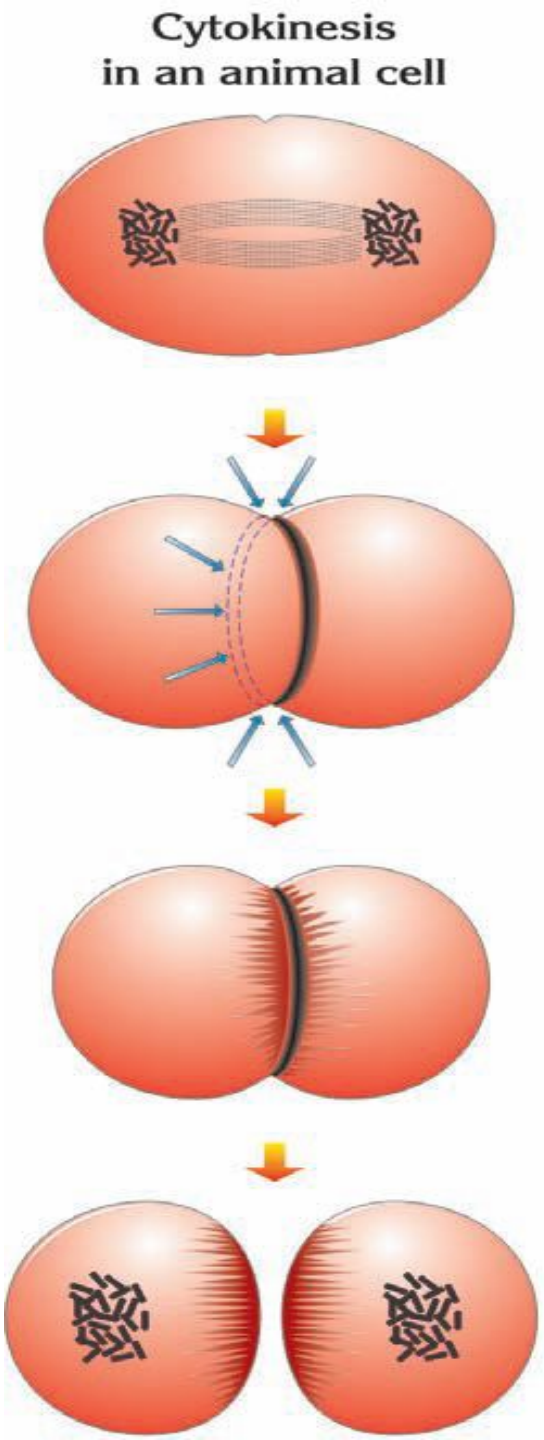
- The result of karyokinesis is **<u>two identical nuclei</u>**

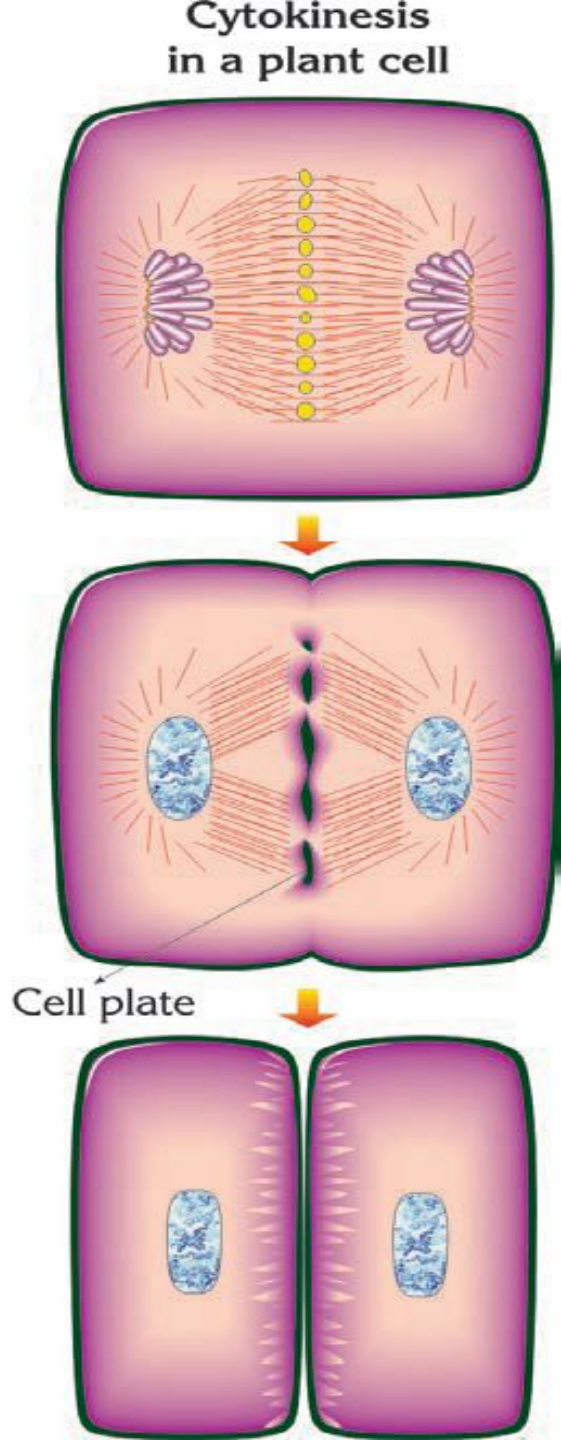




Cytokinesis

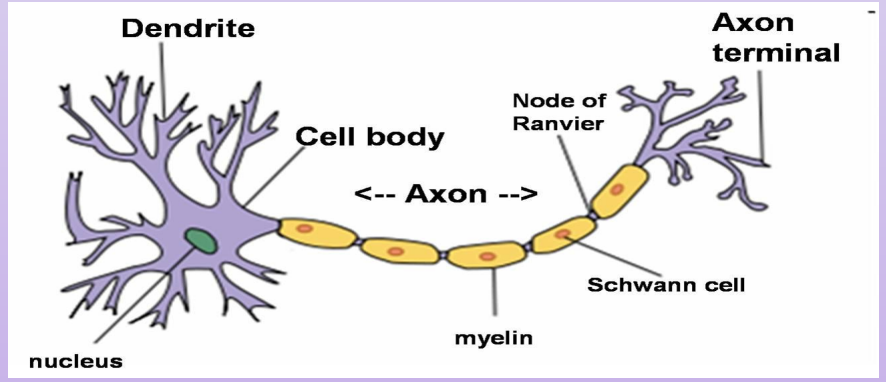
- <u>In animals</u>
  -cytoplasm divides by furrow
- <u>In plants</u> by equatorial cell plate

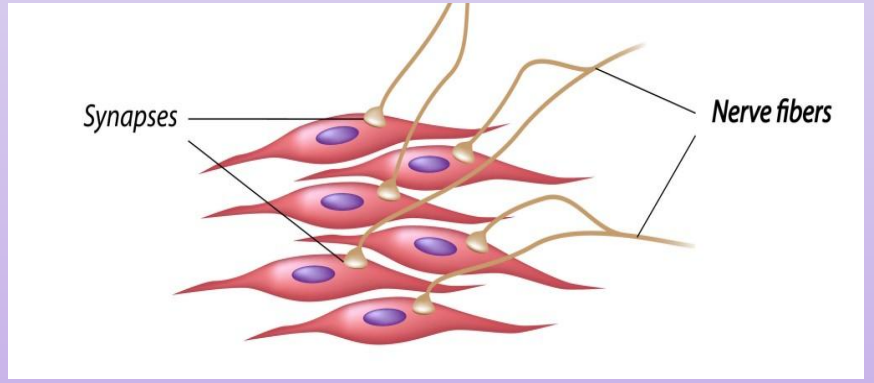




The importance of mitosis

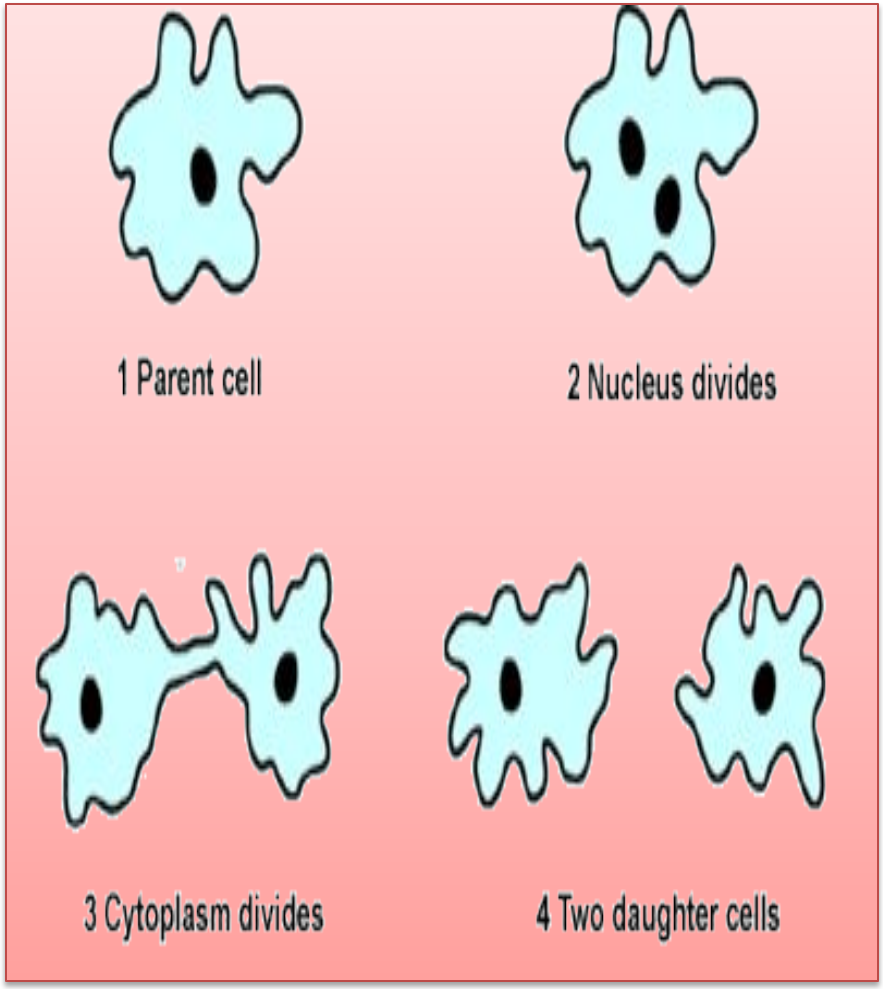
- The chromosome number doesn't change
- Growth and development of embryo
- The recovery of damaged organs
- Formation of all body cells
- Mitosis is the basis for the asexual reproduction
- Nerve (neuron) and muscle cells DON'T divide

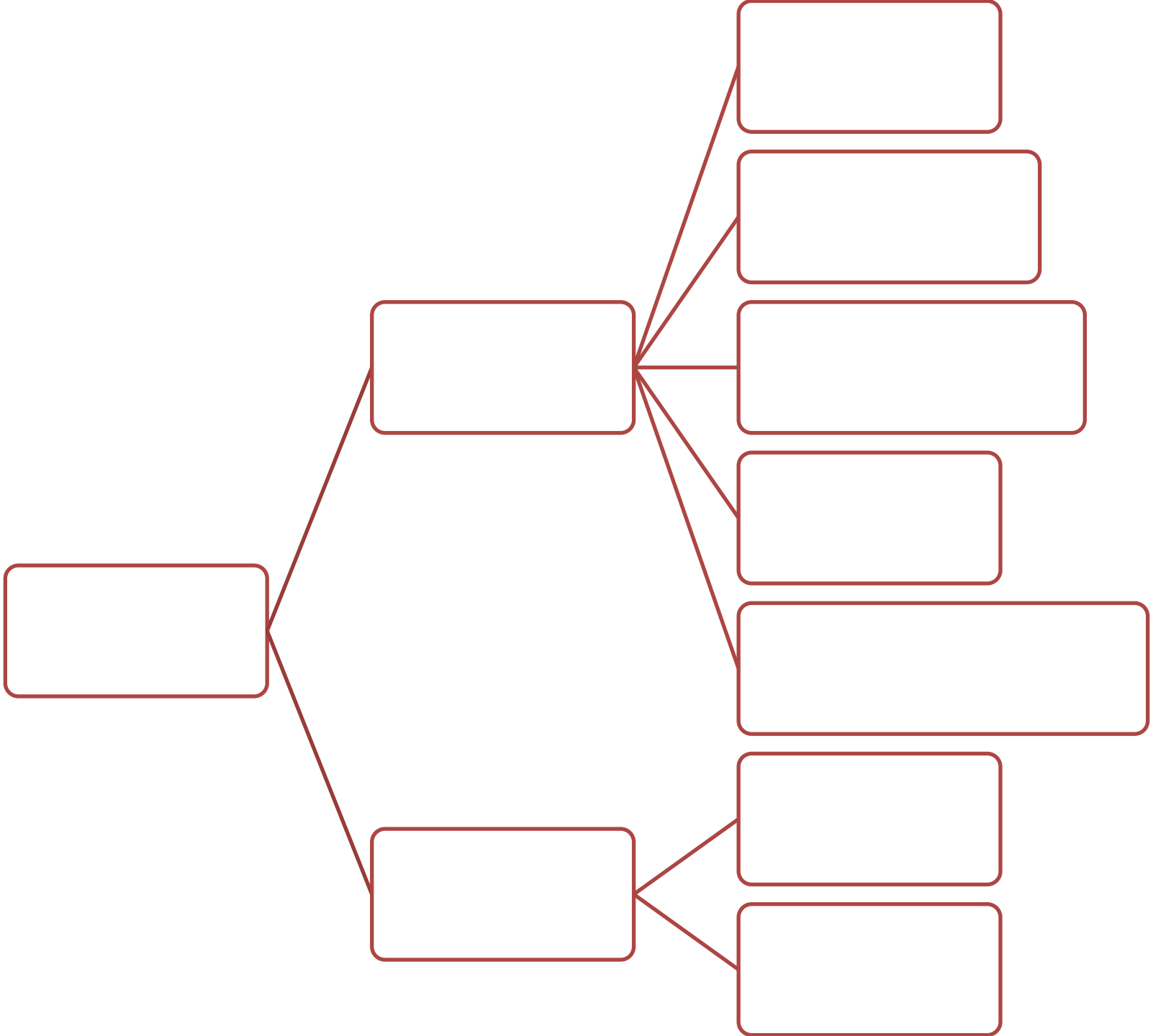




Asexual reproduction

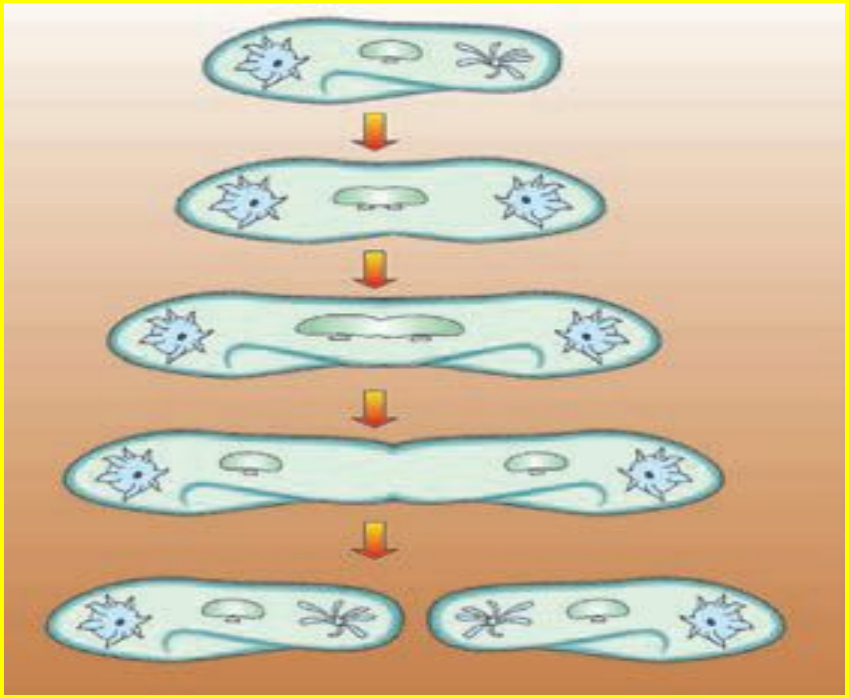
- *Asexual reproduction* is the production of offspring from a single parent by simple division without producing gametes
- The offspring are genetically identical in every aspect

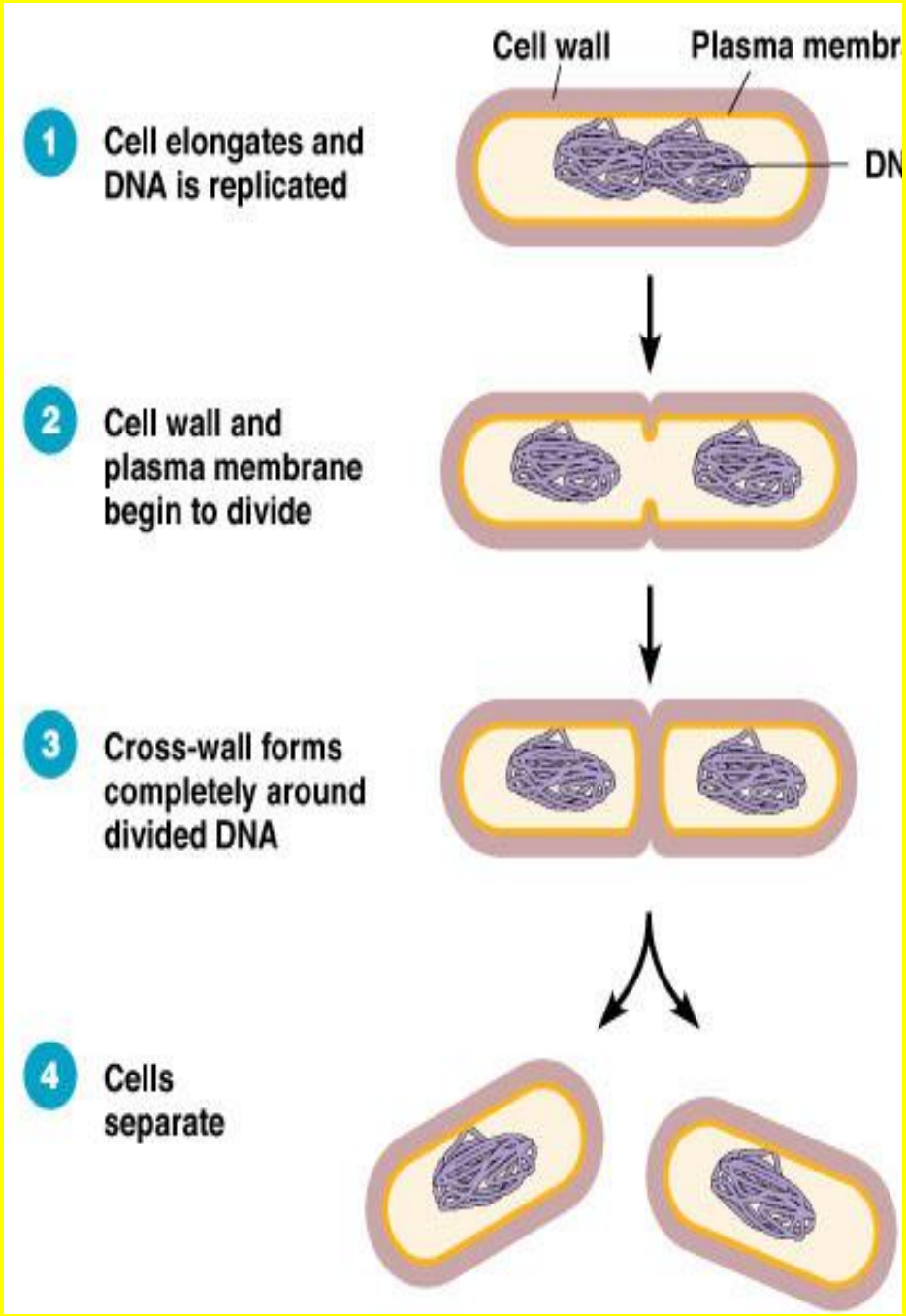




Binary fission – one cell divides into two

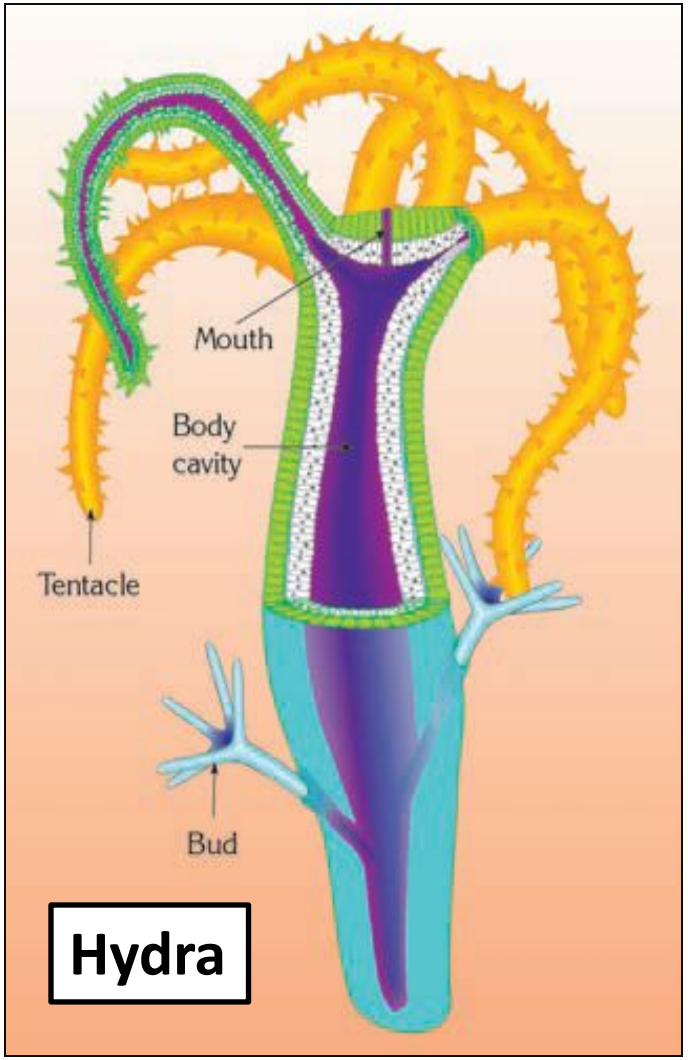
- Paramecium
- Euglena
- Bacterium

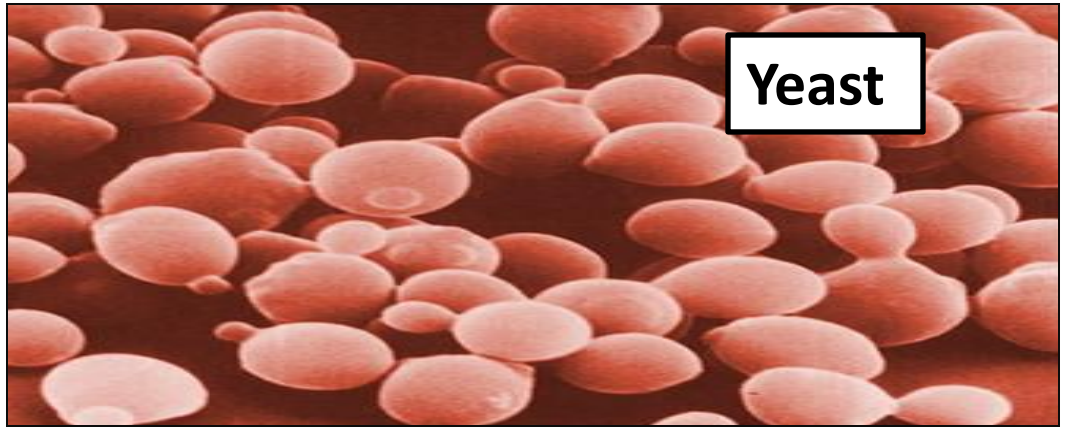


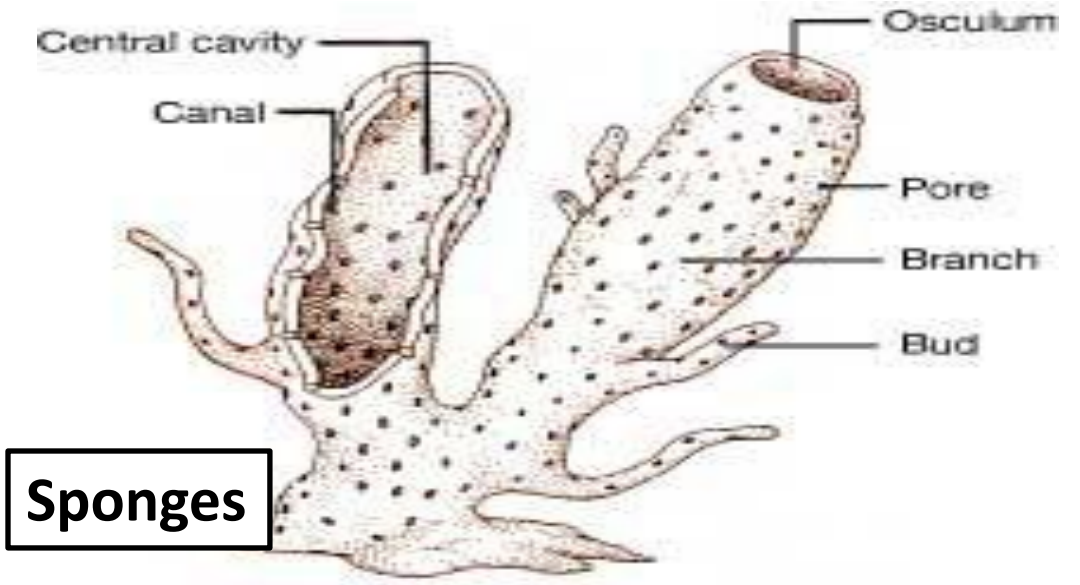


- Ex: yeast, sponges, coelenterates (hydra)

Budding – formation of a bud

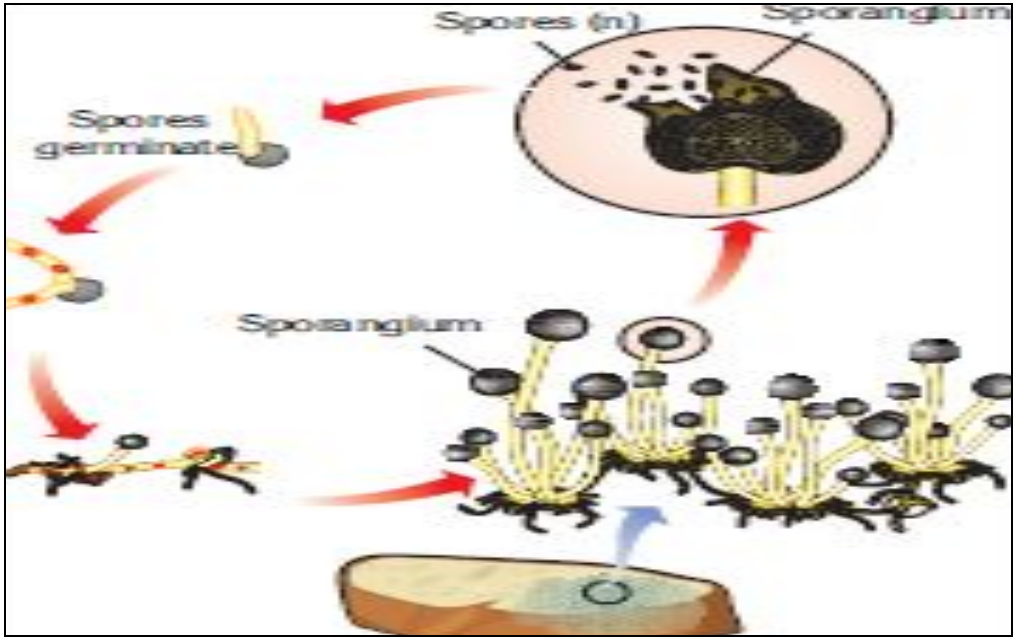


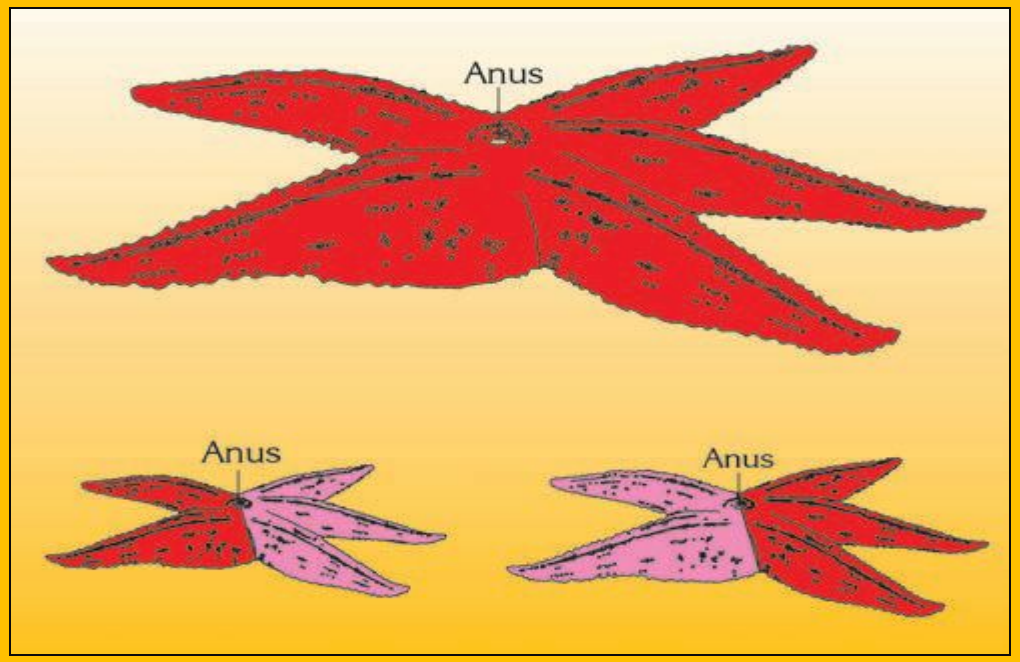


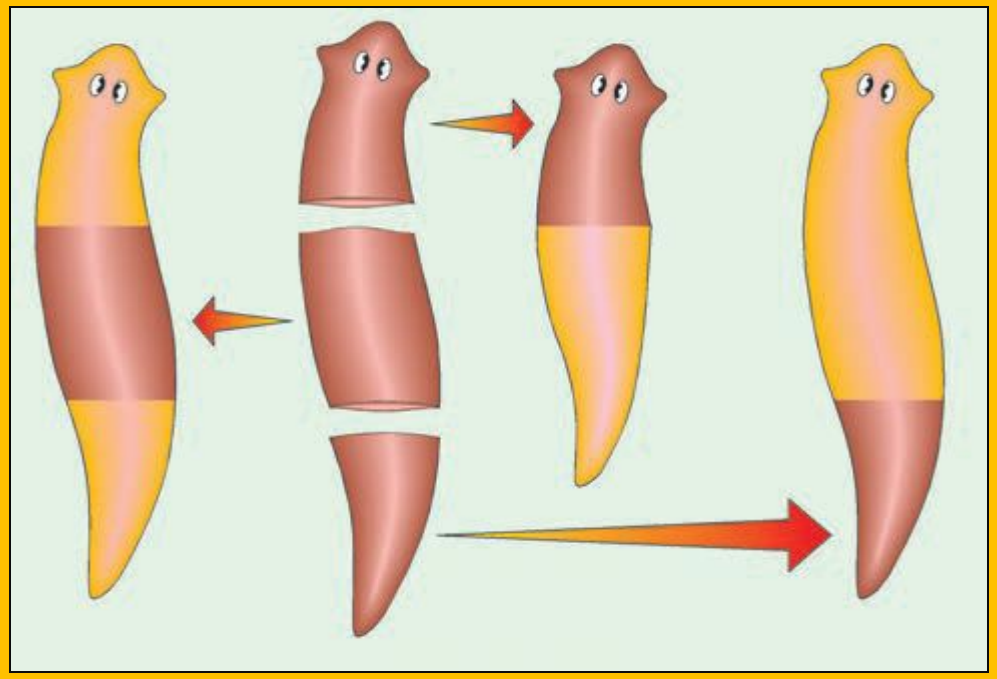


Sporulation

- One cell divides into cells and forms spore
- **Spore** is a cell covered with a thick protective layer
- Ex: bacteria, fungi and all nonflowering plants sporulate







Regeneration

- Ability to remake of missing or damaged part of the body
- Planaria, earthworms and sea stars are capable of forming complete new individuals by regeneration

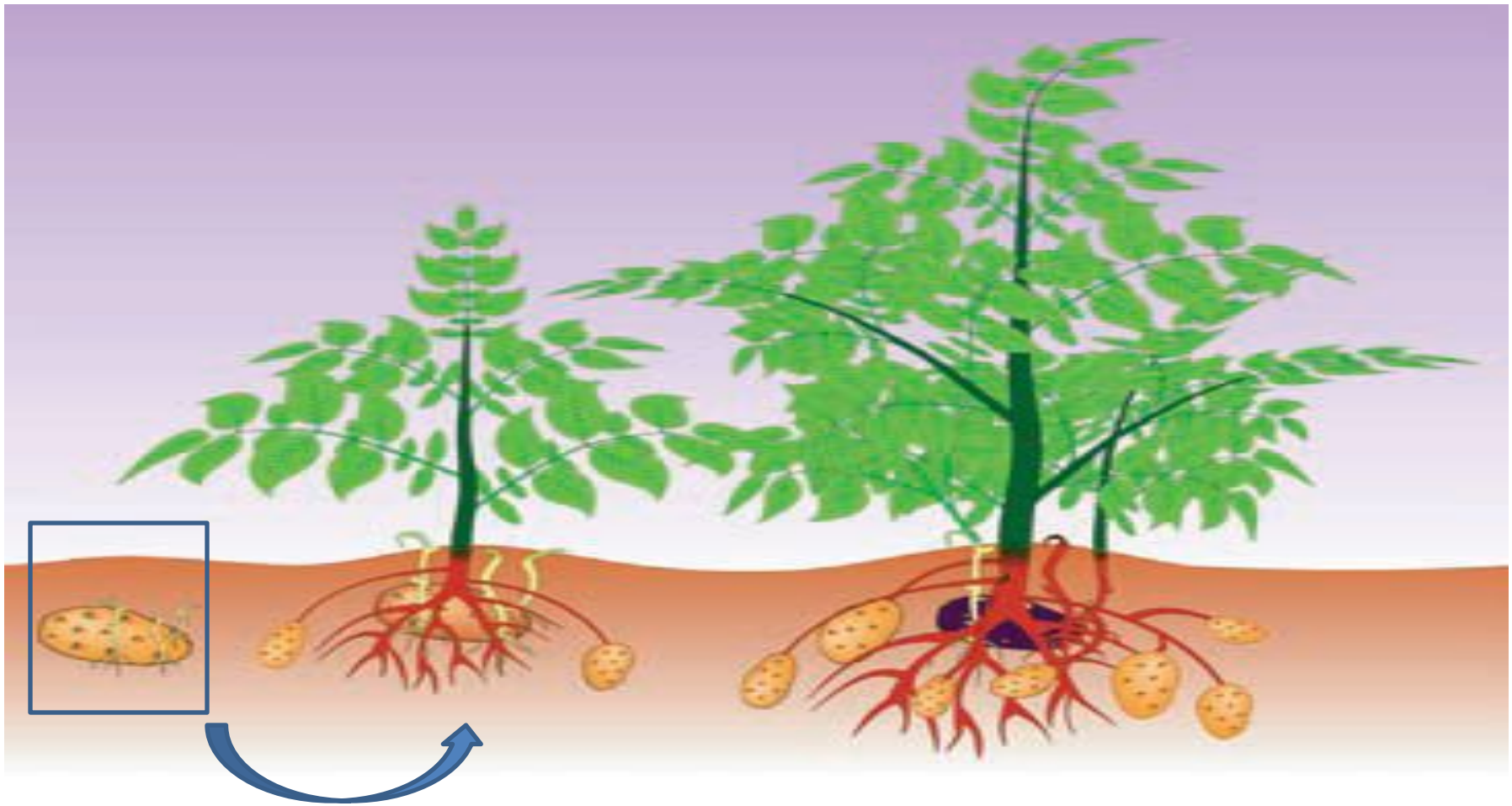
Vegetative Propagation

- is seen mostly in flowering plants

- ***Stem Tubers***
- ***Stolons***
- ***Cuttings***
- ***Bud and Stem Grafting***

Stem Tubers

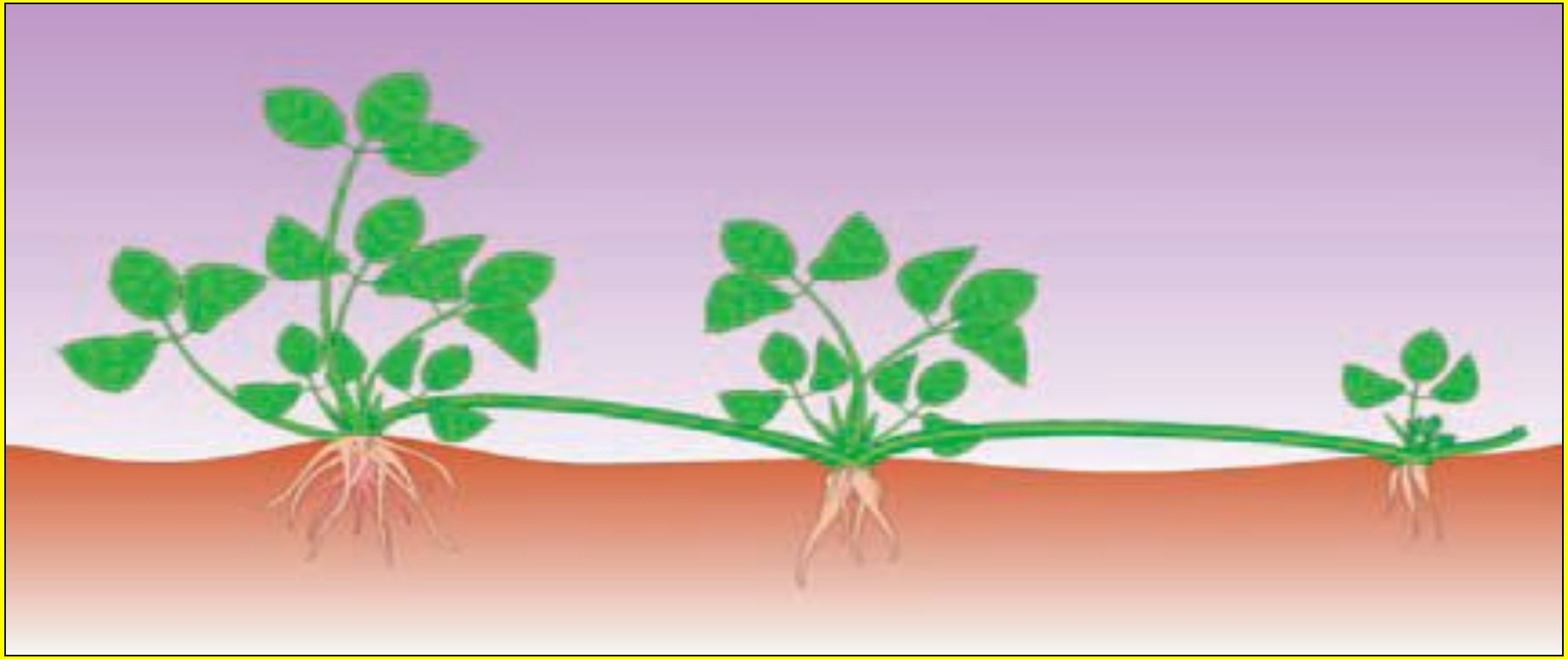
- A **stem tuber** has many axillary buds (*eyes) and* scale-like leaves



---Stolons are horizontal stems that develop from axillary buds

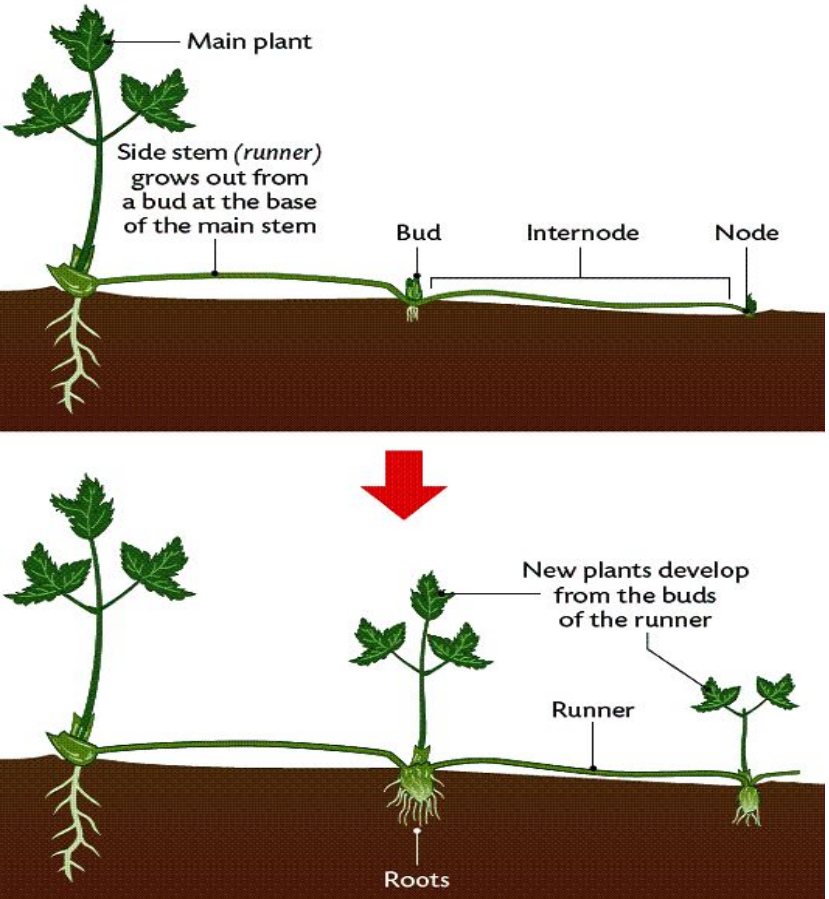
---They extend over the surface of the soil forming new plants a distance away from the parent

---Ex: <u>strawberries</u>



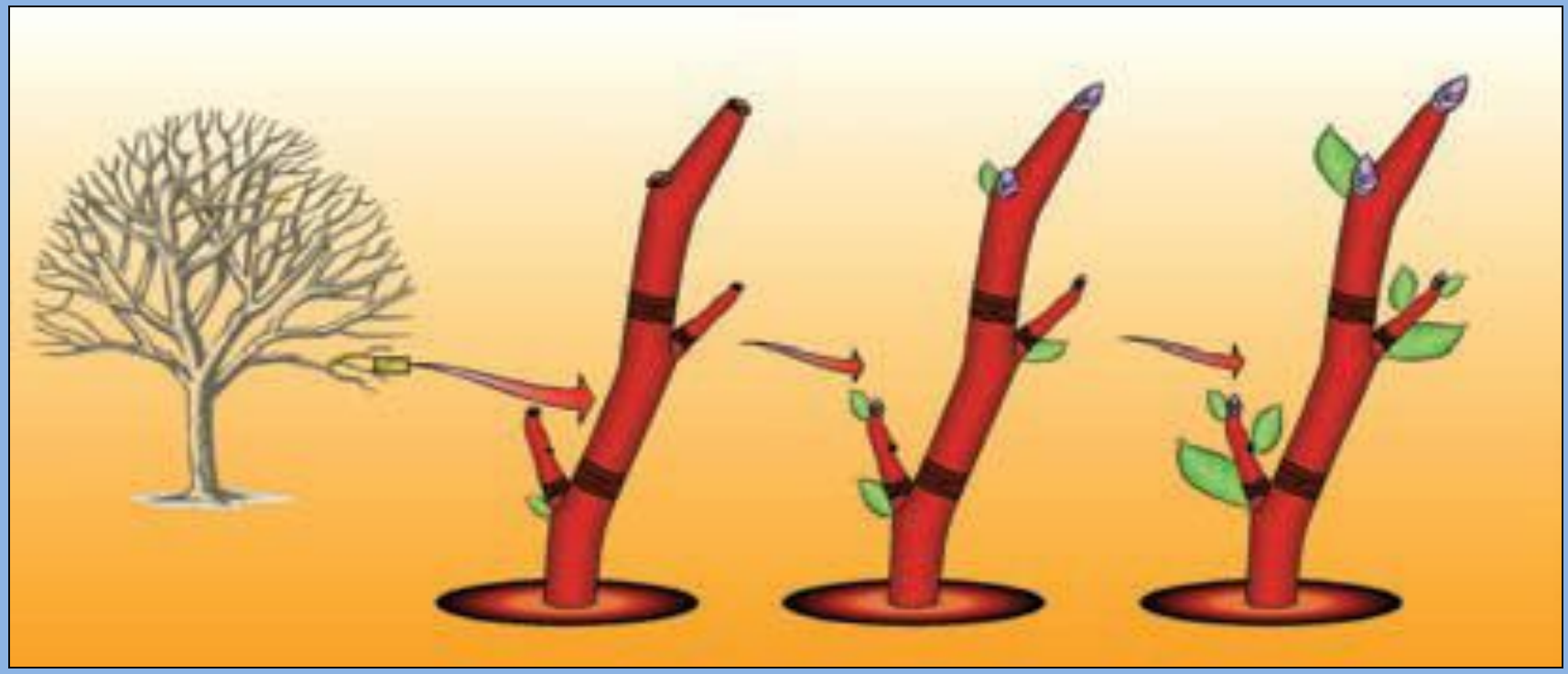
Artificial asexual reproduction

- used in agriculture and biotechnology



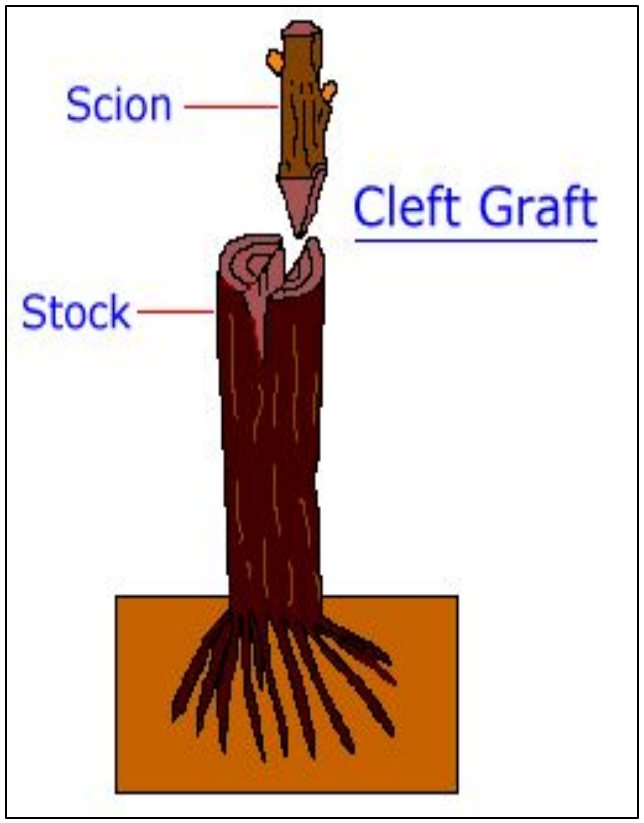
Cuttings

- A root or shoot of the parent plant, known as a cutting, is severed and used to form a new plant



Grafting

- Involves the artificial joining of the stem of one plant to the roots of another




THANKS!!!!!!!