ASEXUAL REPRODUCTION

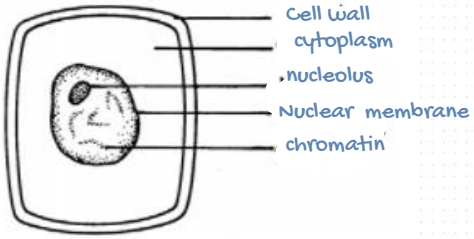
Forms of asexual reproduction

1. Budding: a small offspring emerges (buds) from the parent
2. Vegetative Reproduction: new plants grow from stolon, tubers, etc.
3. Parthenogenesis: common in plants and aphids (plant lice), unfertilized egg develop into an individual
4. Fragmentation: in worms, plants, and fungi, new individuals grow from a fragment of the parents

Bacteria and protist cells divide asexually using binary fission while all other eukaryotic cell divide by mitosis

STAGES OF MITOSIS IN PLANT CELLS

- Interphase → Prophase → Metaphase → Anaphase → Telophase
- Each cell spends most of its life (90% of the time) in interphase, the period after mitotic division has formed a cell and before it divides again.



INTERPHASE- DESCRIPTION

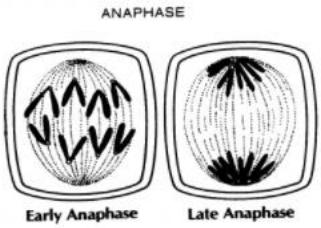
- Growth stage: cell grows, organelles increase in number, chromosomes replicate to form sister chromatids, attached at the centromere
- Chromosomes condensing and become visible
- In animal cells, centrioles replicate

PROPHASE- DESCRIPTION

- MTOCs (microtubule organizing centres migrate to opposite poles)
- Form spindle fibres
- Nuclear membrane begins to dissolve
- In animal cells, centrioles form spindle fibres

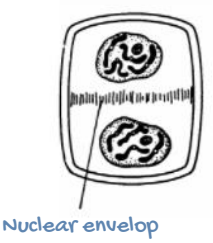
METAPHASE – DESCRIPTION

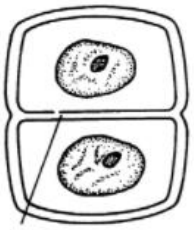
- Spindle fibres attach to chromosomes at the kinetochore
- Chromosomes line up at the equator
- Each chromatid within the pair is attached to the spindle fibre



ANAPHASE – DESCRIPTION

- Centromeres divide
- Spindle fibres shorten, pulling each sister chromatin (now a chromosome) to the opposite pole
  - Creating a V pattern
- In animal cells, cell elongates





TELOPHASE – DESCRIPTION

- Chromosomes reach opposite poles
- Chromosomes unwind
- Spindle fibres disappear
- Nuclear envelop reforms around chromatids

CYTOKINESIS

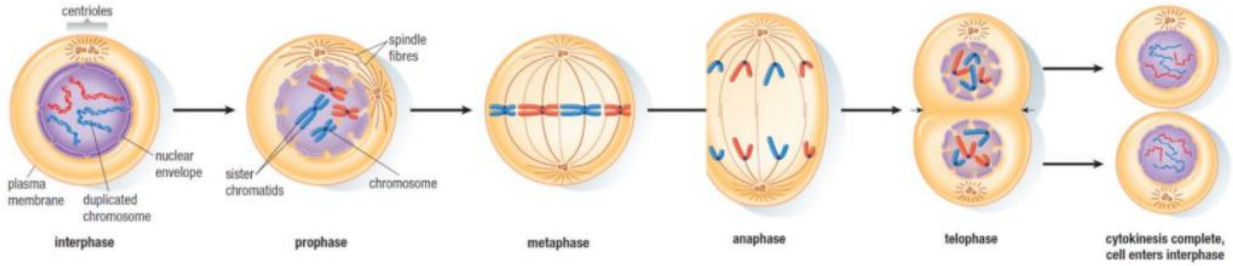
Plants only

- Vesicles gather at the equator and release cell wall material to form a cell plate
- Cell plates become a cell wall and vesicles membrane forms a new cell membrane

Animals only

- Forms cleavage furrow during cytokinesis to separate cells

MITOSIS IN ANIMAL CELLS



THE OUTCOME OF MITOTIC CELL DIVISION

- As result of mitosis, each new nucleus (whether the cell is from a plant, a protist of an animal) contains an exact copy of the DNA
  - Each offspring cell has the exact same number and kind of DNA
- In unicellular organisms (ex. paramecium), mitotic cell division increases the population sizes
- In multicellular organisms growth and repair depend on mitotic cell division