Chapter 6

Meiosis is the basis for sexual reproduction

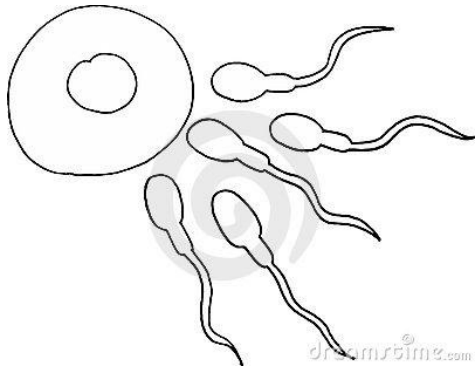
Sexual Reproduction

- Two parents are required
- Produces genetically DIFFERENT offspring
- This variation, or inherited genetic differences, in a species is called GENETIC DIVERSITY

Genetic Diversity

- To get genetic diversity, genetic information from each parent must be COMBINED

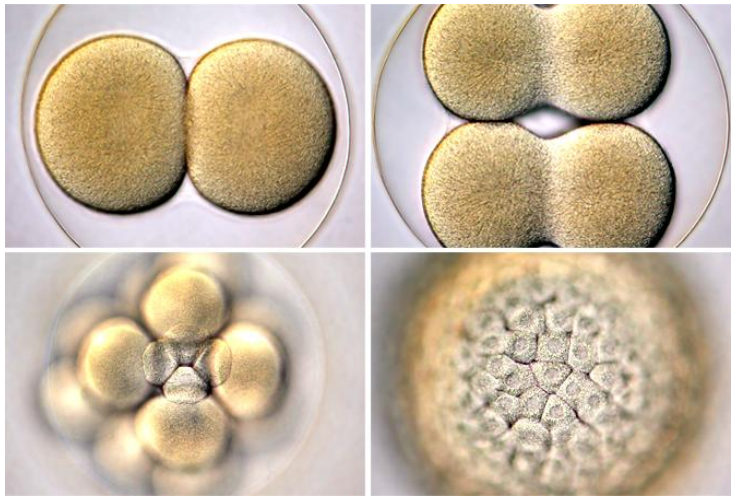
- This genetic information is carried in GAMETES



Gametes

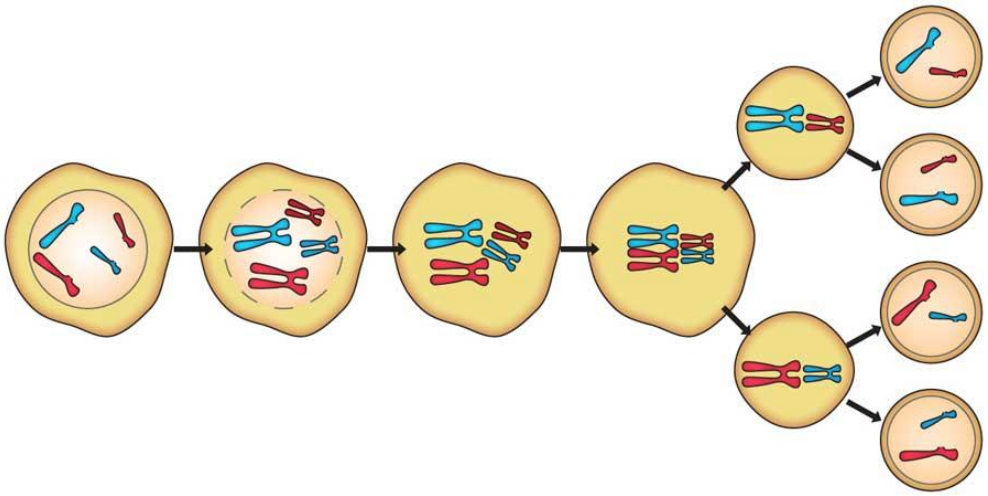
- These gametes (egg and sperm) are brought together during fertilization to create a zygote

- The zygote undergoes mitosis to develop into an embryo



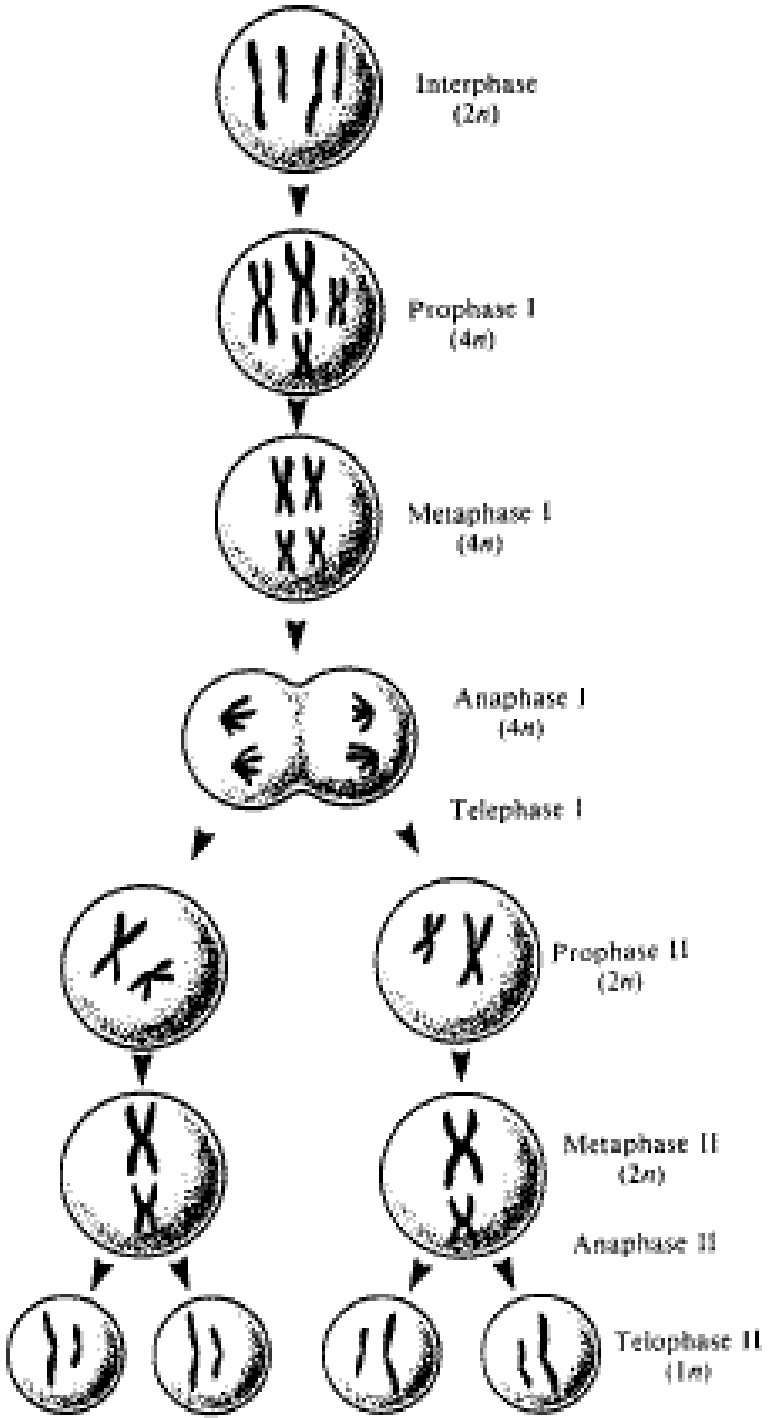
Gametes

- But, to produce gametes with the correct number of chromosomes a process of cell division called MEIOSIS occurs.



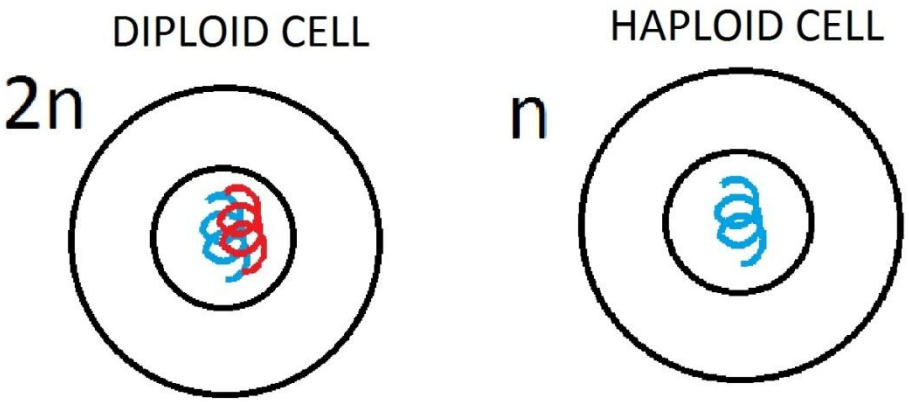
Introductory Definitions

- Meiosis
  - The process that produces gametes with half the number of chromosomes as body cells



Introductory Definitions

- Diploid – condition of a body cell which has *two sets of chromosomes* (e.g. humans have 2 sets of 23 chromosomes or 46 chromosomes in total)

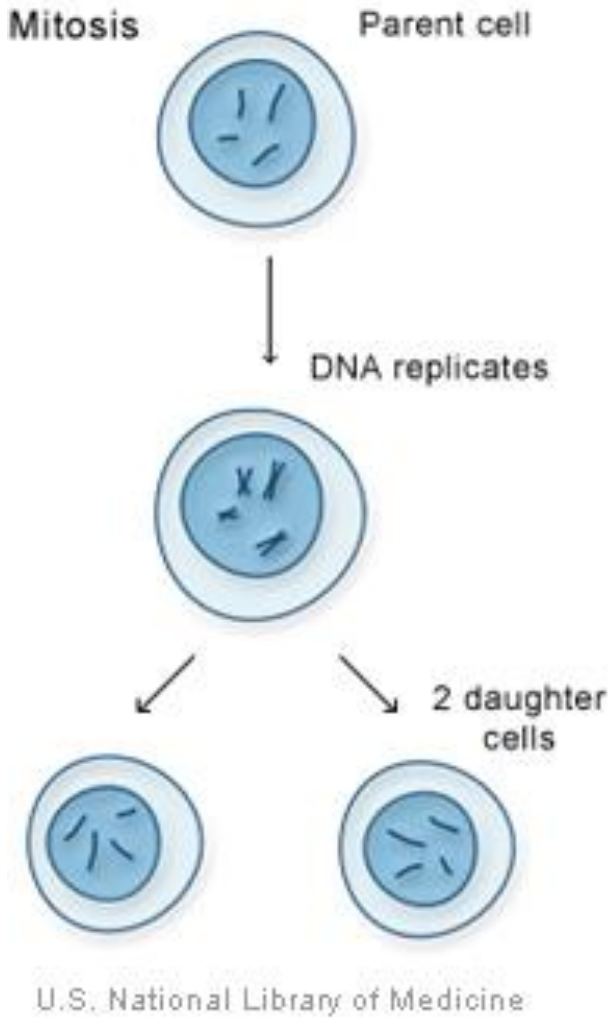


- Haploid – condition in a gamete (e.g. egg or sperm) where there is only one set of chromosomes (or half the total number of chromosomes in a body cell)

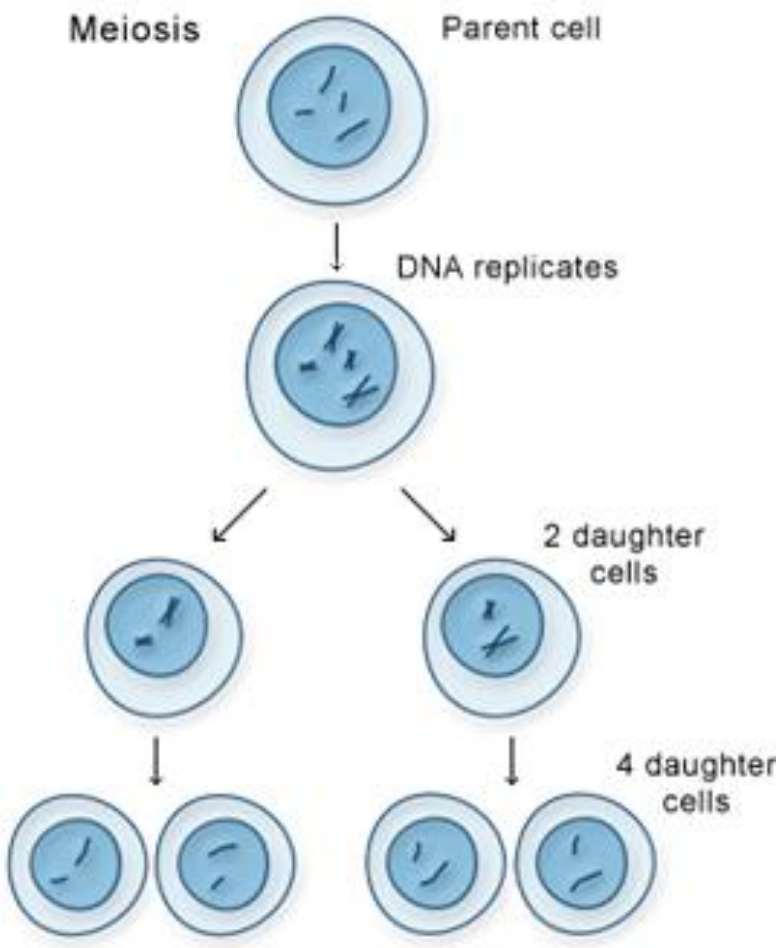
Comparing Mitosis and Meiosis

Mitosis

- Occurs in body cells
- Produces 2 daughter cells
- Diploid daughter cells (two sets of chromosomes)
- Asexual reproduction



Comparing Mitosis and Meiosis



- Meiosis

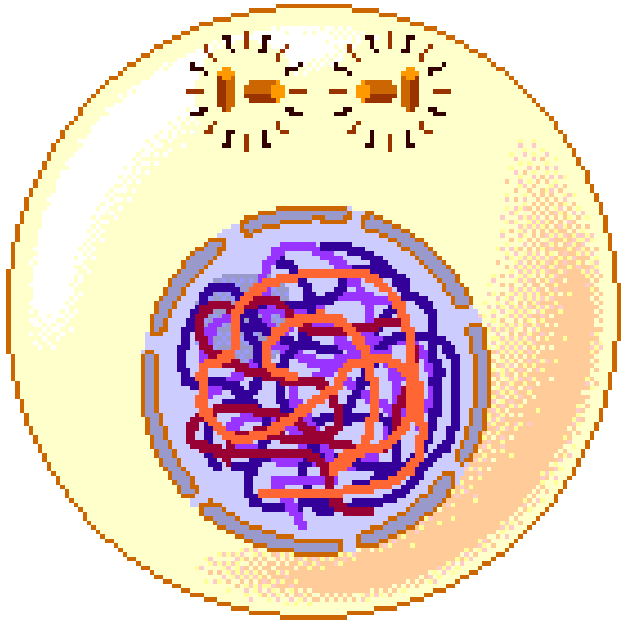
- Occurs in sex cells
- Produces 4 daughter cells
- Haploid daughter cells (half the number of chromosomes as body cells)
- Sexual reproduction

Meiosis

- What are the two stages of meiosis called:
  - Meiosis I
  - Meiosis II

Meiosis I

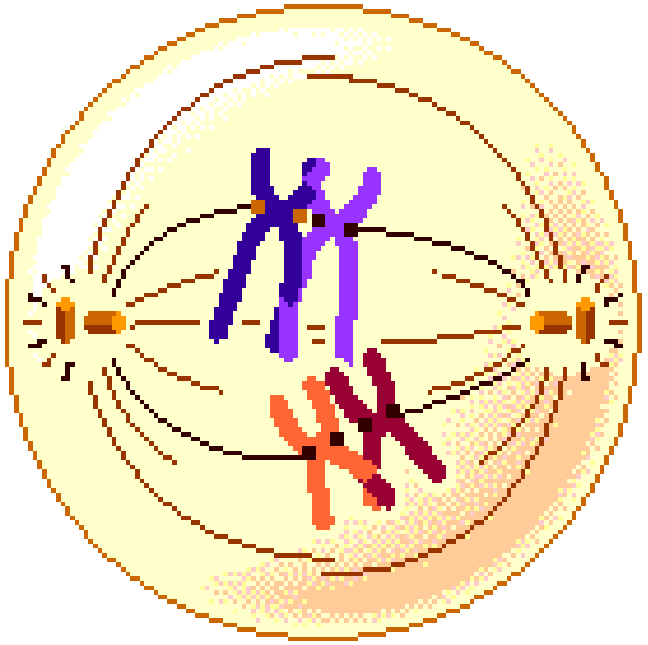
- Prophase I
- Homologous chromosomes pair up



Meiosis I

- Metaphase I

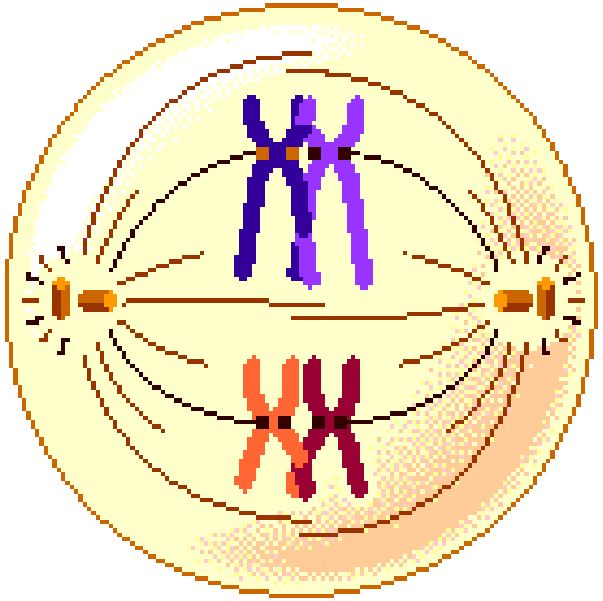
- Homologous chromosomes pair up at the equator



Meiosis I

- Anaphase I

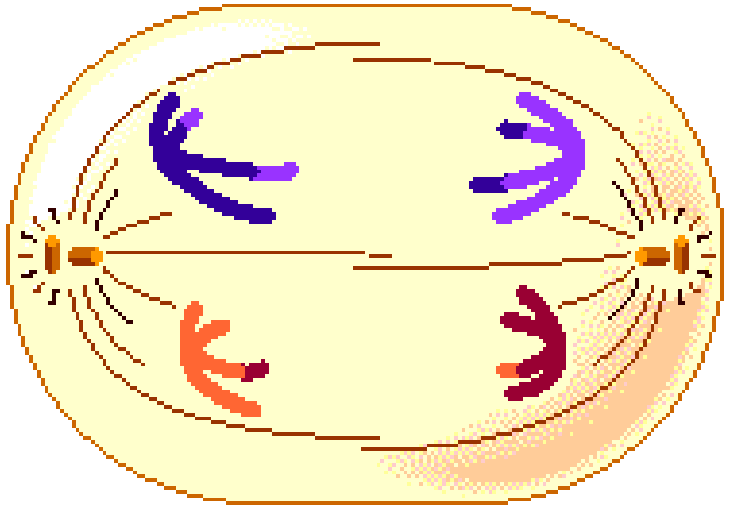
- Homologous chromosomes separate and are pulled to opposite poles



Meiosis I

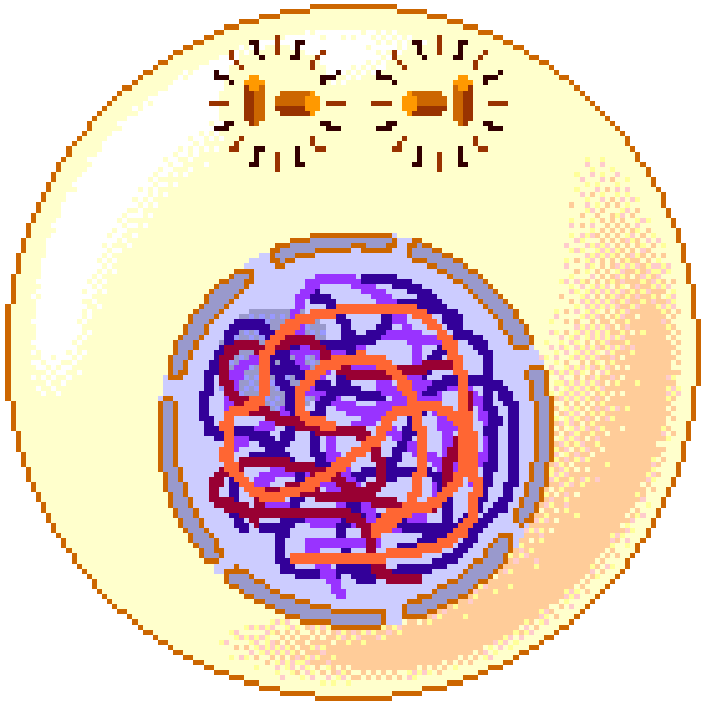
- Telophase I

- One chromosome from each homologous pair is at each pole of the cell



Meiosis I

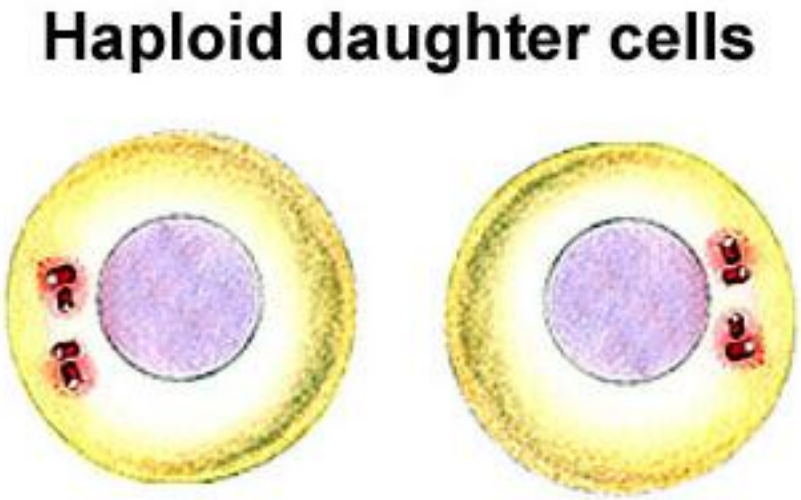
- Review:



Interkinesis

- The stage between cell divisions

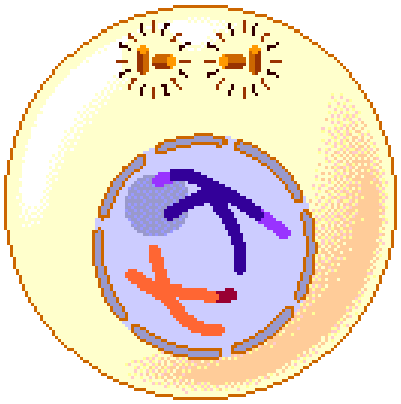
- The cell will grow and make proteins (NO DNA is replicated)

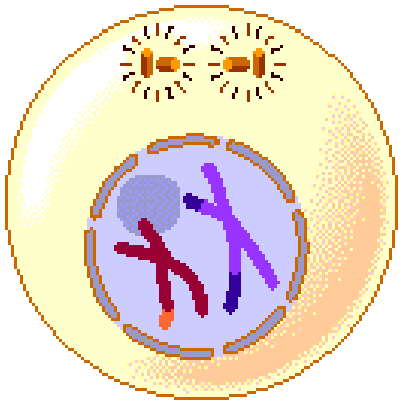


Meiosis II

- Prophase II

- There is one chromosome of the homologous pair in each cell

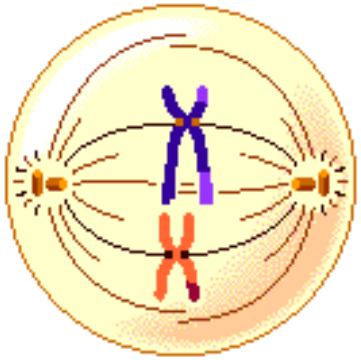


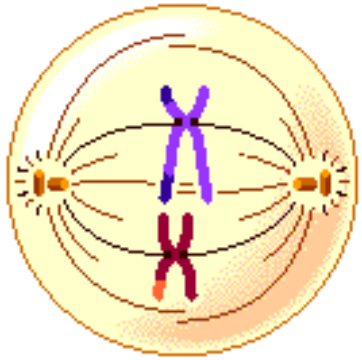


Meiosis II

- Metaphase II

- The X-shaped chromosomes form single line across the middle of the cell

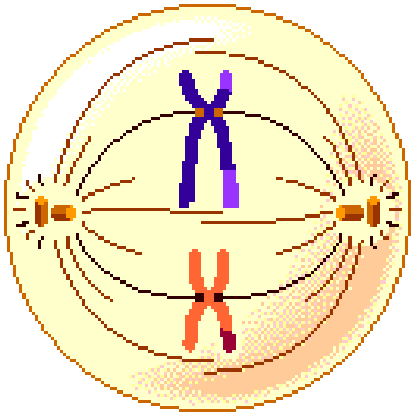


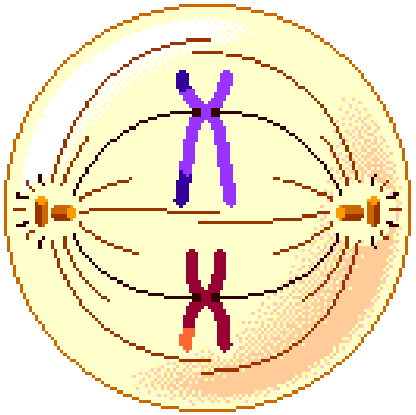


Meiosis II

- Anaphase II

- Sister chromatids move to opposite poles of the cell
- (once separated, each sister chromatid is considered a chromosome)

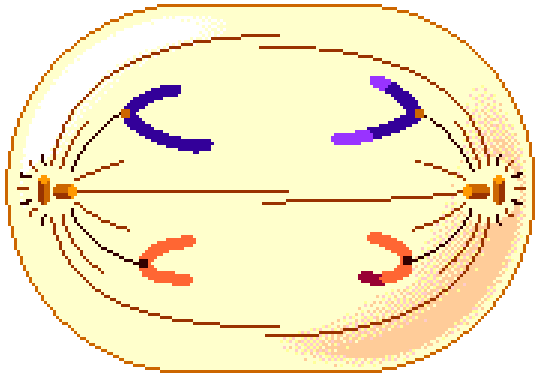


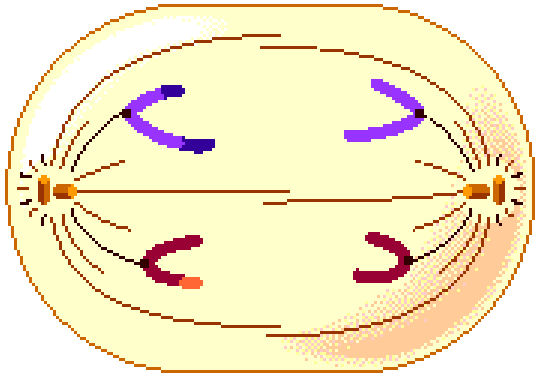


Meiosis II

- Telophase II

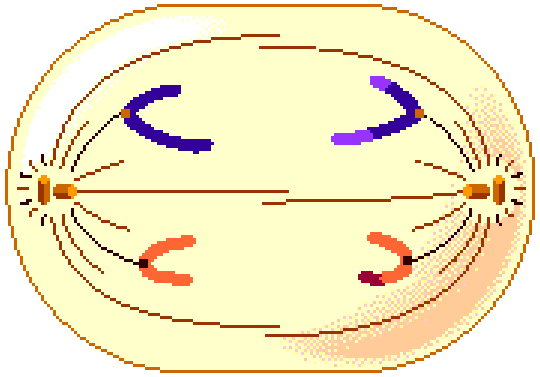
- A nuclear membrane forms around each set of chromosomes

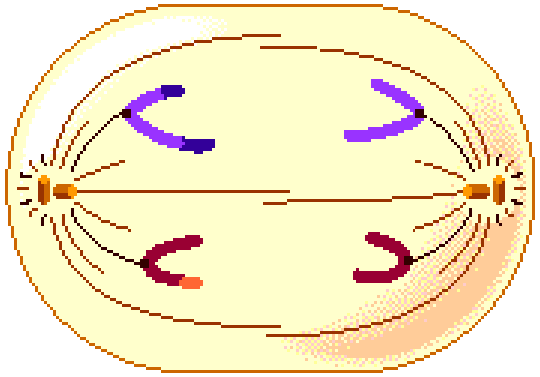




Cytokinesis

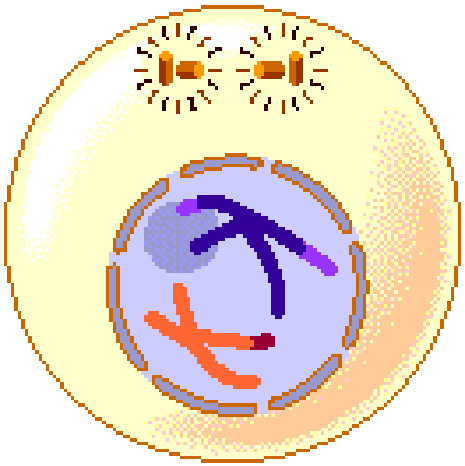
- The two daughter cells are separated

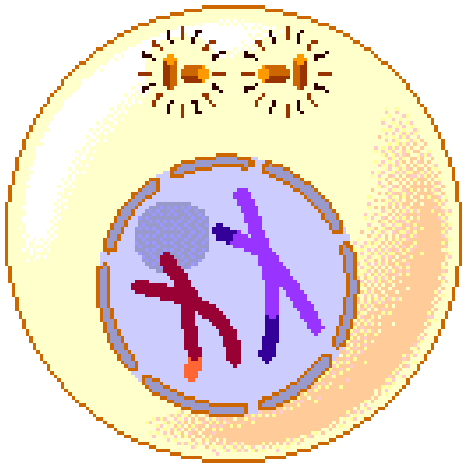




Meiosis II

- Review:



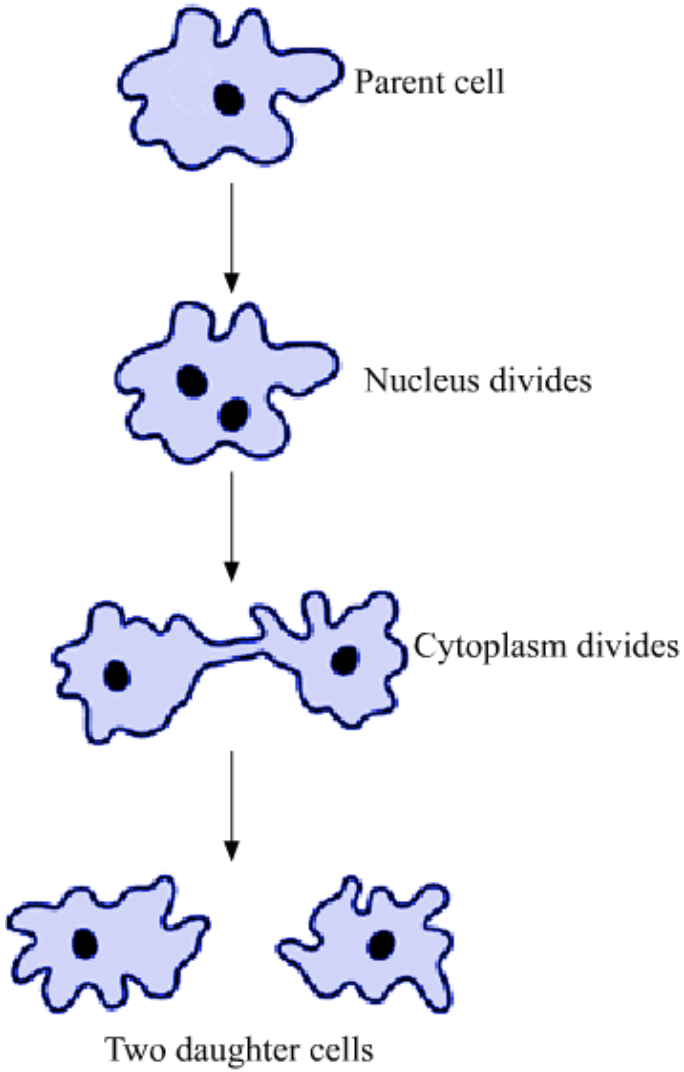


Core Lab – pg 176-177

- Compare MITOSIS and MEIOSIS and answer the questions on your sheet:
  - Is meiosis I or meiosis II similar to mitosis? Explain.
  - List three similarities between mitosis and meiosis
  - List three differences between mitosis and meiosis
  - Which method (mitosis or meiosis) contribute to genetic variation? Why?

Comparison of Asexual and Sexual Reproduction

- Asexual Reproduction
  - 1 parent cell
  - No gametes created/required
  - Less variation in offspring
  - Less energy required
  - Less parental care



Comparison of Asexual and Sexual Reproduction

- Sexual Reproduction
  - 2 parent cells
  - Gametes created/required
  - More variation in offspring
  - More energy required
  - More parental care