

Mitosis & Meiosis Notes:

1. What is Mitosis?
2. What does Mitosis allow living things to do?
3. What is Meiosis?
4. What does Meiosis allow living things to do?

Chromosomes are the long strands of DNA found in living things. Chromosomes are either classified as:

SEX CHROMOSOMES: Determining the sex of the organism.

AUTOSOMOME CHROMOSOMES: All the other chromosomes in an organism.

- When you look at the total number of chromosomes in a typical cell of a living thing the number is always even. WHY?
- What is Diploid?
- Why do sex cells have $\frac{1}{2}$ the number of chromosomes a typical cell has?
- What is Haploid (also called Monoploid)?
- In humans what chromosomes would you find in a...
Male: Female:

CELL DIVISION: The process making new (exact copies) of the cell.

- Bacteria (Prokaryotic Cells) simply copy the DNA and then split in a process known as BINARY FISSION. We will learn more about this in later chapters.

Mitosis – Body Cells

- Results in an exact copy of the original cell

Meiosis – Sex Cells

- Results in a cell that has half the number of chromosomes as the original cell

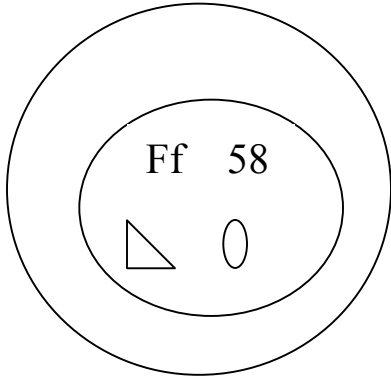
CELL CYCLE: We will be most concerned about actual **MITOSIS!!!**

- INTERPHASE
 - G1 phase – Growth
 - S phase – DNA Replication
 - G2 phase – Preparation for Division
- M-PHASE – Mitosis OR Meiosis (know the phases of mitosis/meiosis)
- CYTOKINESIS – Actual formation of 2 new cells.
 - Animal – pinch into 2 cells
 - Plant – form a plate down the middle forming 2 cells

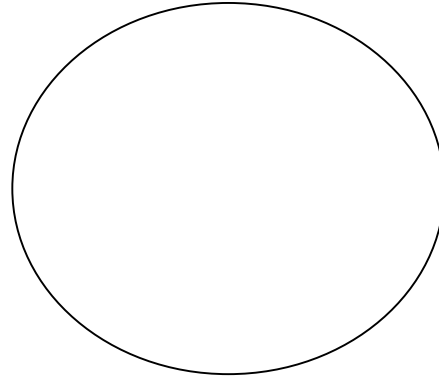
MITOSIS PHASES: (DRAW THE PHASES) (LIST THE MAJOR EVENTS)

- The “Symbols” to represent the paired chromosomes

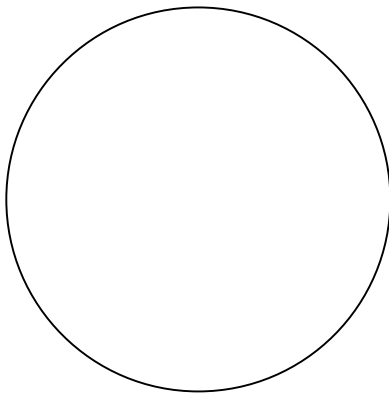
END OF INTERPHASE
(Chromosomes double)



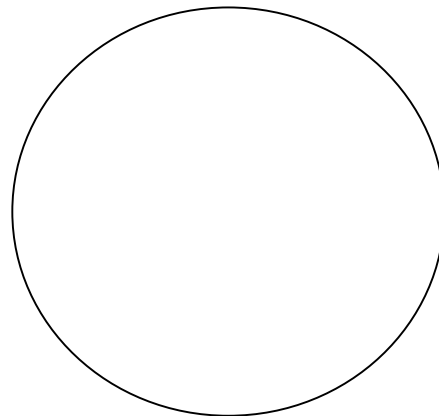
PROPHASE
(Nucleus disappears)
(Chromosomes are doubled)



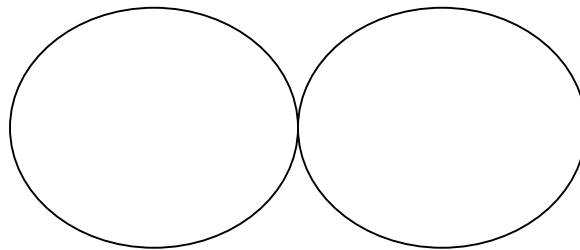
METAPHASE
(Chromosomes line up in the middle)



ANAPHASE
(Chromosomes move away from
the middle)



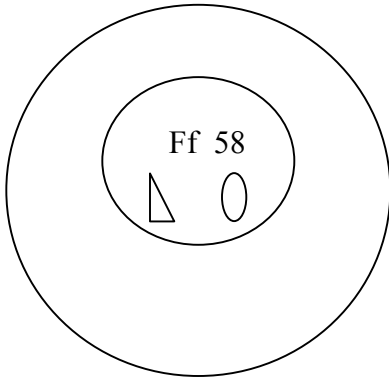
TELOPHASE (Two new cells begin to form with the “diploid” number of chromosomes)



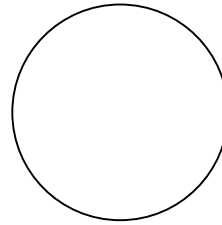
MEIOSIS PHASES: Draw the phases of Meiosis

- Two divisions – the second division is a “reduction” division resulting in sex cells. Half the number of chromosomes as the original cell (“HAPLOID”).
- Use the same chromosomes from Mitosis. (The cells are smaller only to fit on the page) (USE THE ENTIRE CELL TO FIT YOUR CHROMOSOMES!)

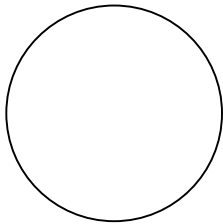
END OF INTERPHASE
(Chromosomes double)



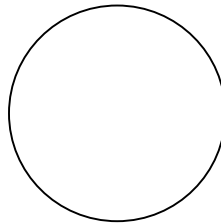
PROPHASE I
(Nucleus disappears)
(Chromosomes are doubled)



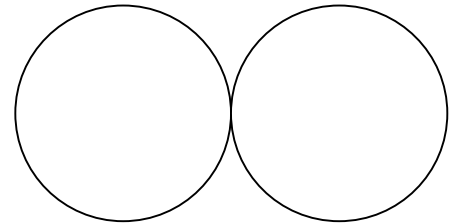
METAPHASE I
(MIDDLE)



ANAPHASE I
(AWAY)



TELOPHASE I
(TWO CELLS)

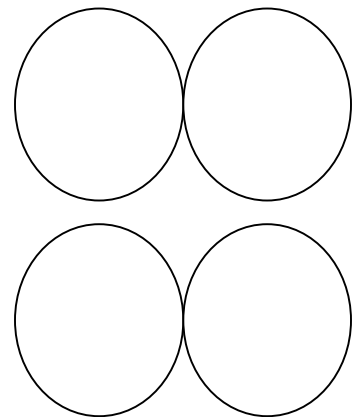
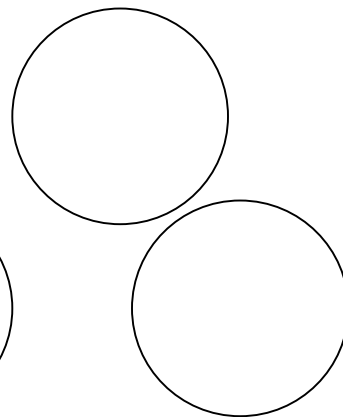
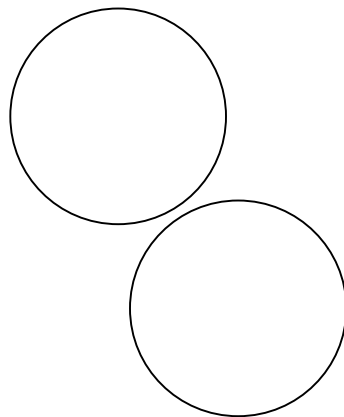
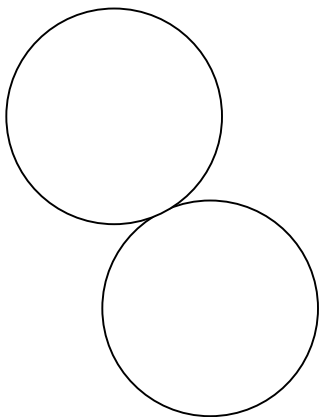


PROPHASE II

METAPHASE II

ANAPHASE II

TELOPHASE II



MITOSIS & MEIOSIS: (ODDS & ENDS)

- Each new “Sex Cell” must have a representative from each type of chromosome. If they do not the resulting offspring would be lacking significant “genes”!
- Terminology clarification
 - DNA – Molecule providing genetic information for a cell resulting in the traits of all living things
 - Chromosome – The complete long strand of DNA
 - Gene – A small section of DNA that codes for a particular trait
 - Gametes – Sex Cells (Egg, Sperm, Pollen)

Crossing Over – During the process of cell division the chromosomes are all coiled together and sometimes they will go from one chromosome to another. This results in what we call GENETIC RECOMBINATION.

**What would be the sex chromosomes of a:
Human Male?**

Human Female?

As you age what happens to mitosis?

What happens to mitosis in cancer cells? Why is this bad?

Mutations: Change in the genetic make-up

- Not all mutations are bad! Most go unnoticed or may be positive

Mutagens:

- Chemicals (tobacco, pesticides, asbestos, etc.)
- Radiation (X-Rays, Ultraviolet, etc.)

Birth defects would be caused by mutations in what type of cells?

Skin cancer would be caused by mutations in what type of cells?