



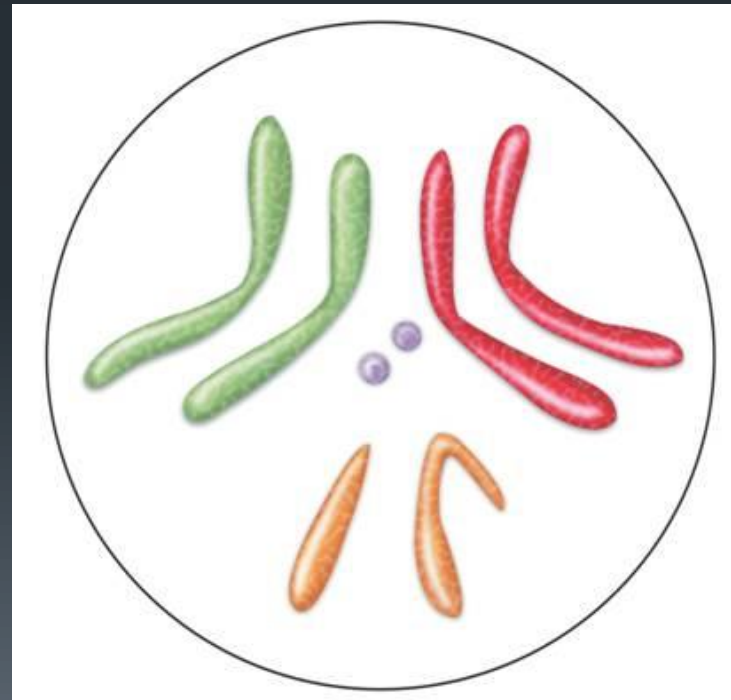
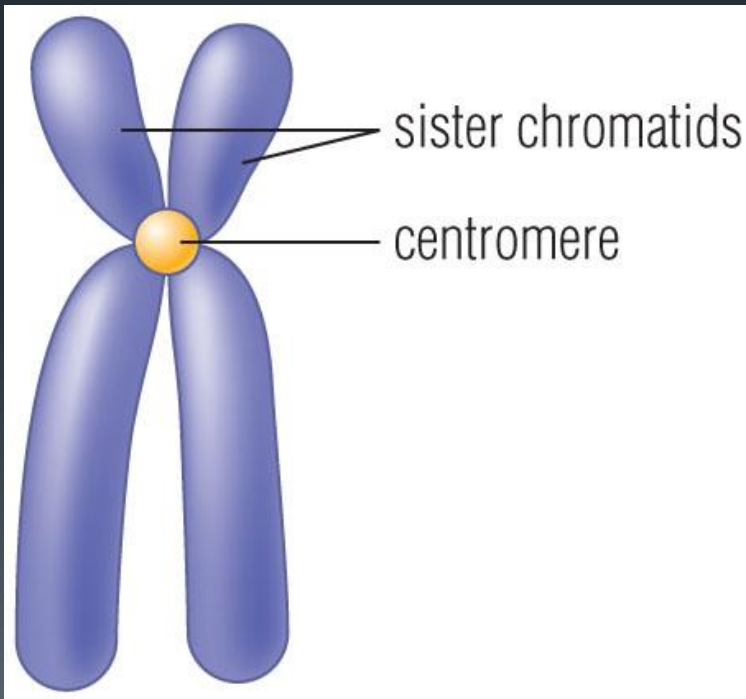
# Chromosomes

This presentation aims to meet the following standards:

- *2. Cell Biology –*
  - 2.7: Describe how the process of meiosis results in the formation of haploid cells. Explain the importance of this process in sexual reproduction, and how gametes form diploid zygotes in the process of fertilization.
- *3. Genetics –*
  - *Central Concept: Genes allow for the storage and transmission of genetic information. They are a set of instructions encoded in the nucleotide sequence of each organism. Genes code for the specific sequences of amino acids that comprise the proteins characteristic to that organism.*

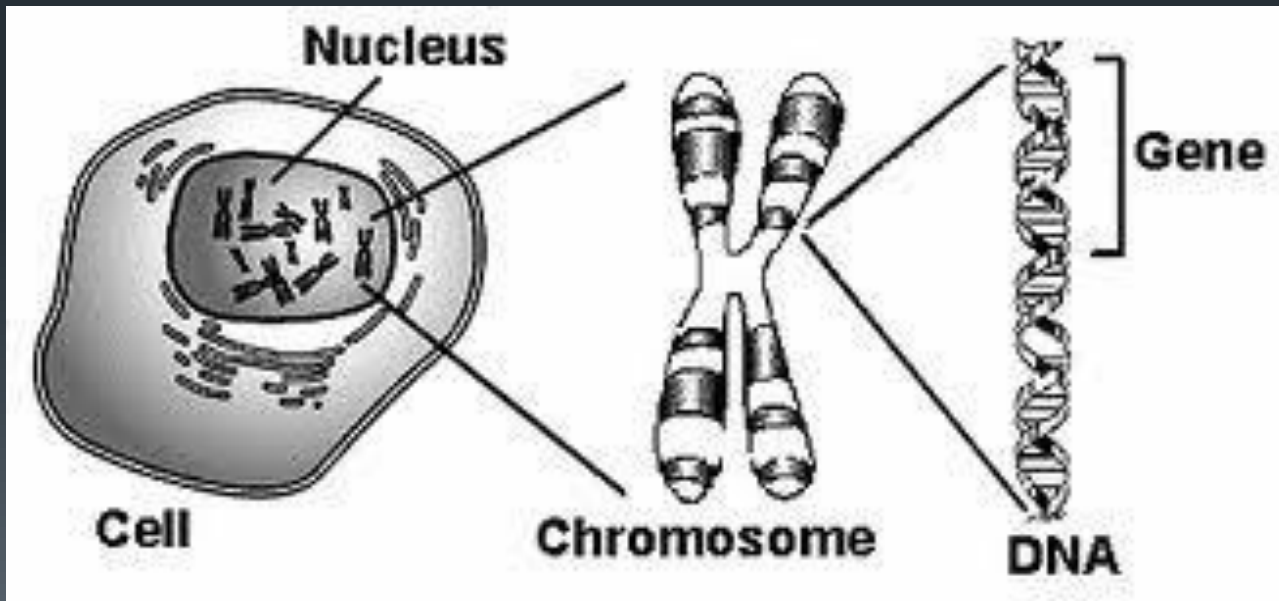
# Chromosomes

- **What are chromosomes?**
  - Located in the nucleus
  - Contain our genetic information.



# Chromosomes

- Our DNA is located on our chromosomes:
  - DNA is arranged in segments called genes.
  - Each chromosome has hundreds of genes, each one codes for a different characteristic.

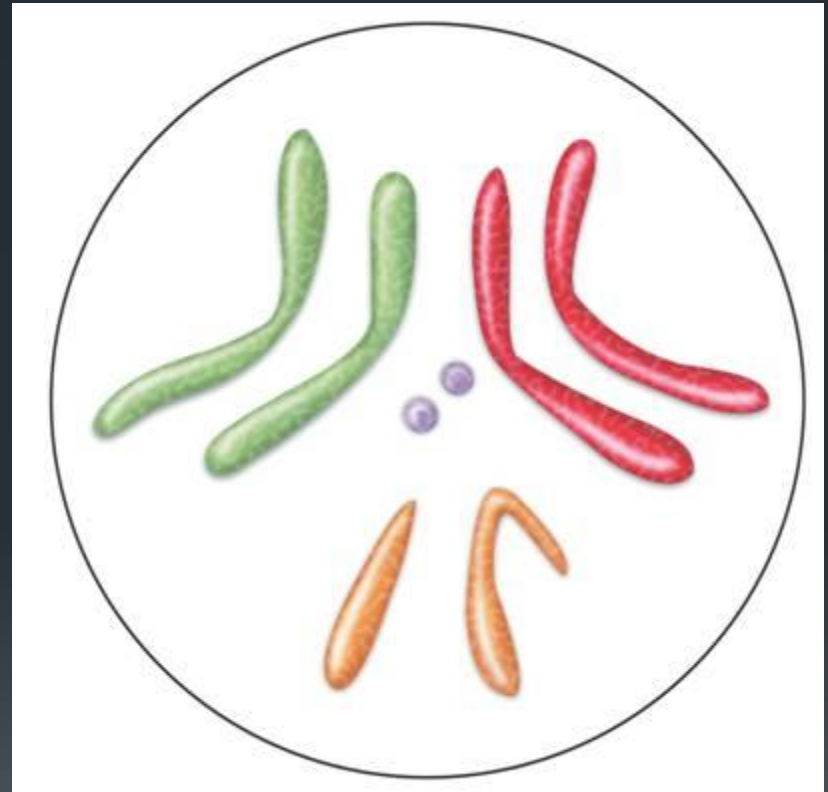


# Chromosomes

- **Why do we all look different from each other?**
  - Each organism inherits a copy of every gene from each of its “parents”.
  - Each student in this class has characteristics, such as hair color, height, and eye color, that are passed down from their parents (traits).
  - The instructions for each trait are located on chromosomes.

# Chromosome Number

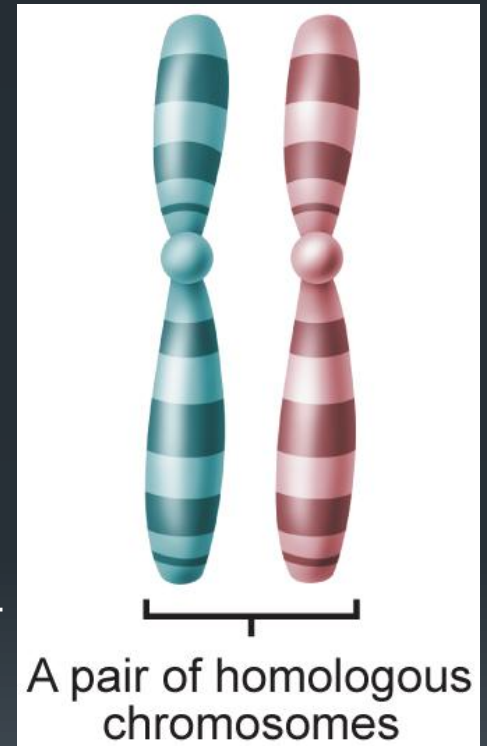
- The number of chromosomes a cell has changes with each organism:
- Fruit flies have 8 chromosomes in their body cells – 4 from each parent.



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# Homologous Chromosomes

- Human body cells have 46 chromosomes:
  - 23 come from MOM
  - 23 come from DAD
- **HOMOLOGOUS CHROMOSOMES:**  
corresponding chromosome pairs (one from each parent)



# Homologous Chromosomes & Traits

- Homologous chromosomes carry genes for any given trait at the **same location**.
- Ex: genes that code for earlobes might not code for the exact same type of earlobe.

From mom



Detached Earlobes

From dad



Attached Earlobes



# Chromosome Number

- DIPLOID CELLS: cells that contain two sets of homologous chromosomes.
- the number of chromosomes in a diploid cell is represented by the symbol 2N.
- For *Drosophila*, the diploid number is 8, which can be written as  $2N=8$ .



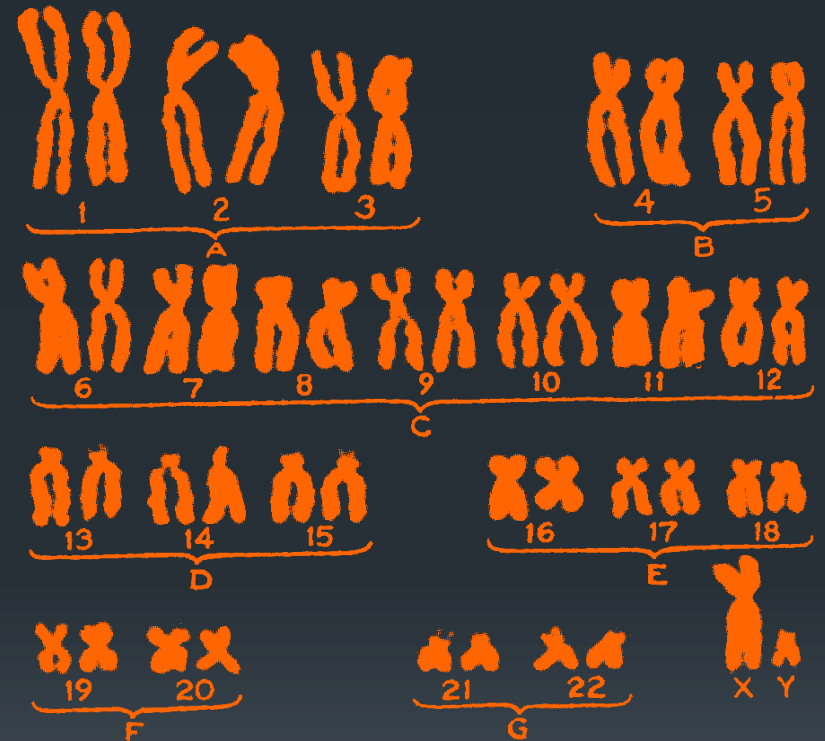
# Chromosome Number

- **HAPLOID CELLS**: cells that contain only one set of chromosomes.
- the number of chromosomes in a haploid cell is represented by the symbol N.
- For *Drosophila*, the haploid number is 4, which can be written as  $N=4$ .



# Gametes

- Gametes = sex cells (egg, sperm).
- Human gametes only contain a single set of genes (haploid).
- Egg and sperm cells each contain one set of 23 chromosomes



# Karyotype

- organized picture of a person's chromosomes.
- chromosomes are paired, numbered 1 through 22, from largest to smallest.
- 2 chromosomes specify gender — XX for female and XY for male.
- helps scientists quickly identify chromosomal changes.

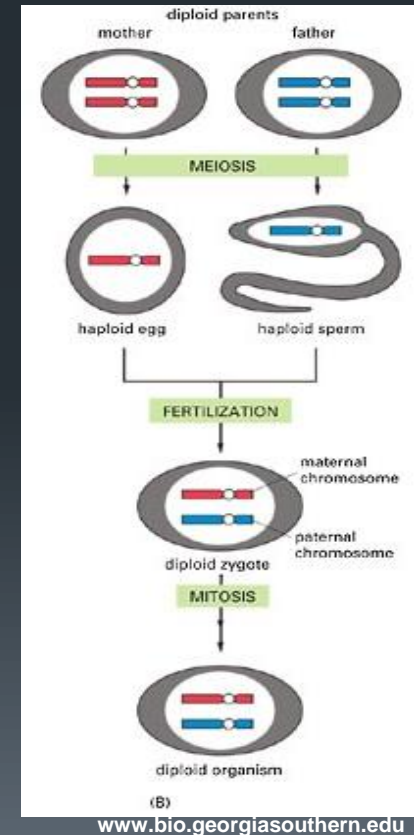
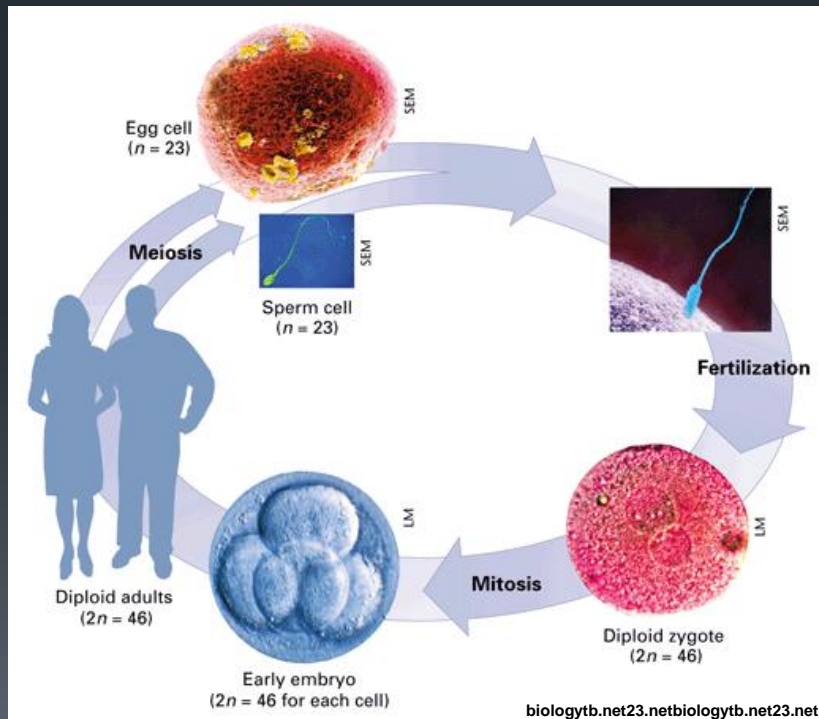


# Fertilization & Diploid Cells

Egg cell + sperm cell → fertilization = zygote

haploid egg cell (N) + haploid sperm cell (N) = DIPLOID (2N)

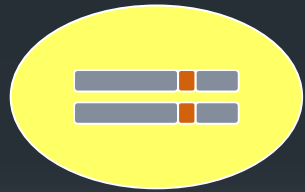
zygote.



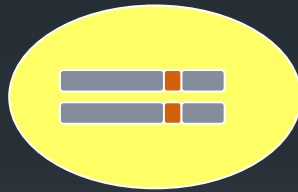
# Meiosis

- Meiosis = the creation of gametes (sex cells).
- Meiosis reduces the number of chromosomes per cell by separating the homologous chromosomes in a diploid cell.

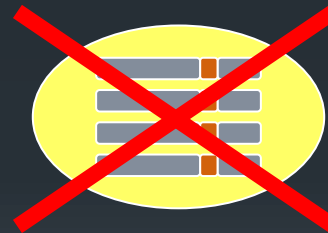
from mom



from dad



child



too much!

meiosis reduces  
genetic content

