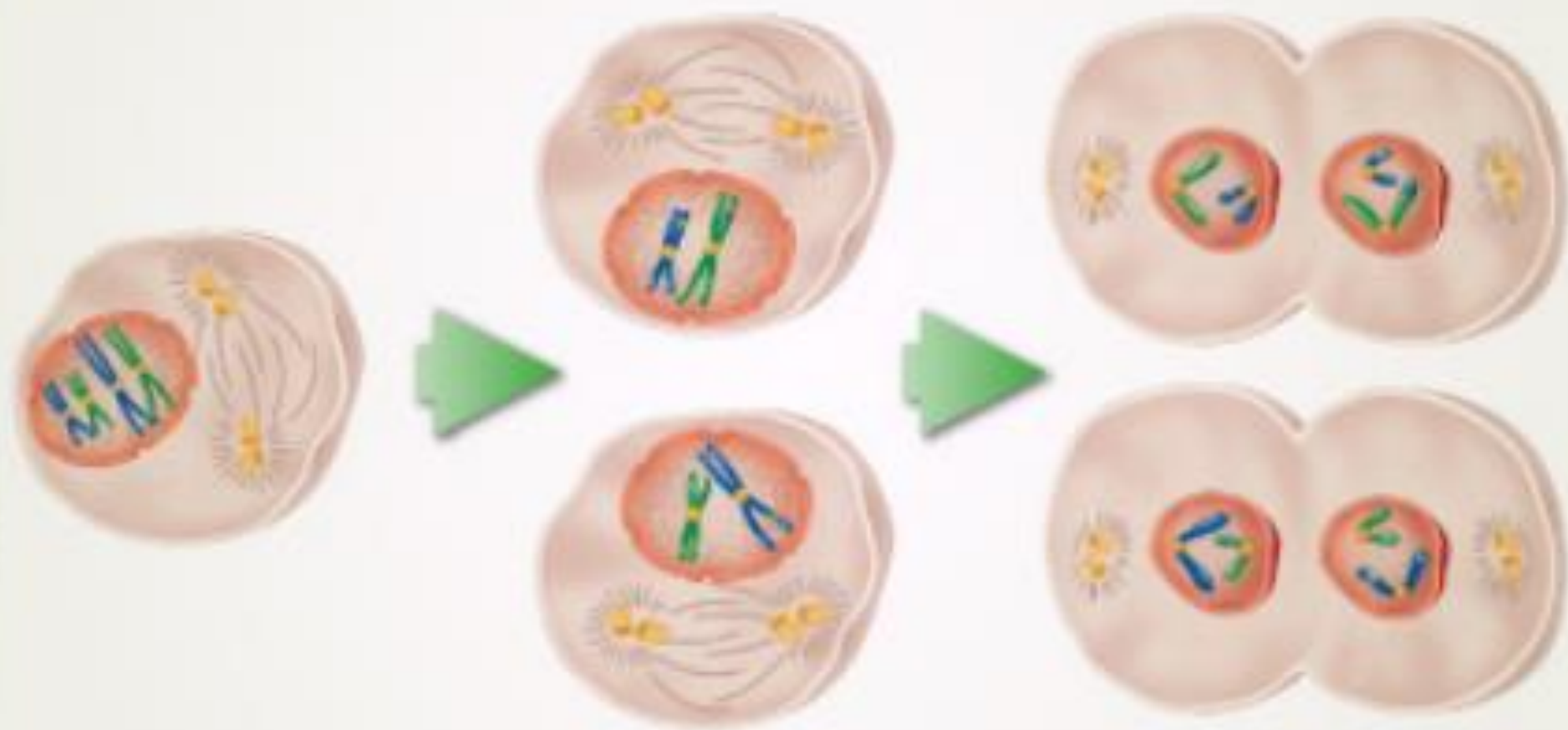


Meiosis

A series of horizontal lines in teal and light blue colors, some solid and some dashed, extending across the bottom of the slide.

Overview of Meiosis

- Nucleus divides twice
- Total number of cells formed is 4
- Chromosome number of each beginning cell is 46
- Chromosome number in each new cell is 23

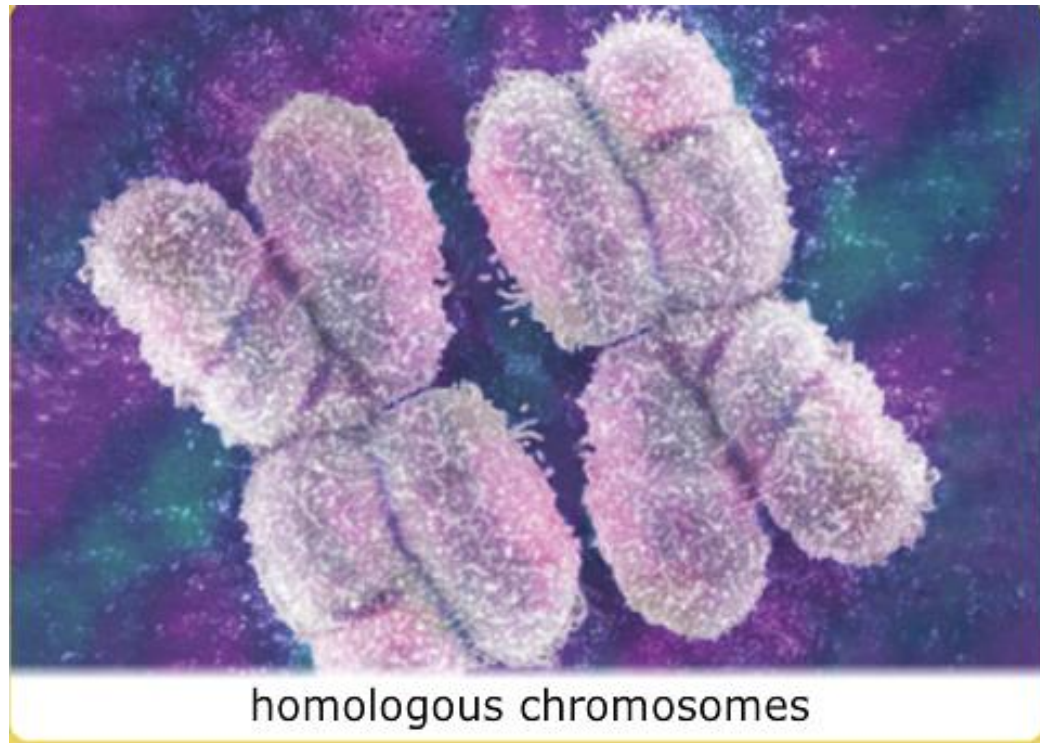


How do sex cells differ from body cells?

- Before sexual reproduction can take place, each parent produces sex cells.
- *Sex cells* have half of the genetic information that body cells have.
- In body cells, chromosomes are found in pairs of **homologous chromosomes**, which have the same structure and size.

Sex Cells

- One chromosome pair is made up of *sex chromosomes*.
- Cells with homologous chromosomes are called *diploid*.



homologous chromosomes

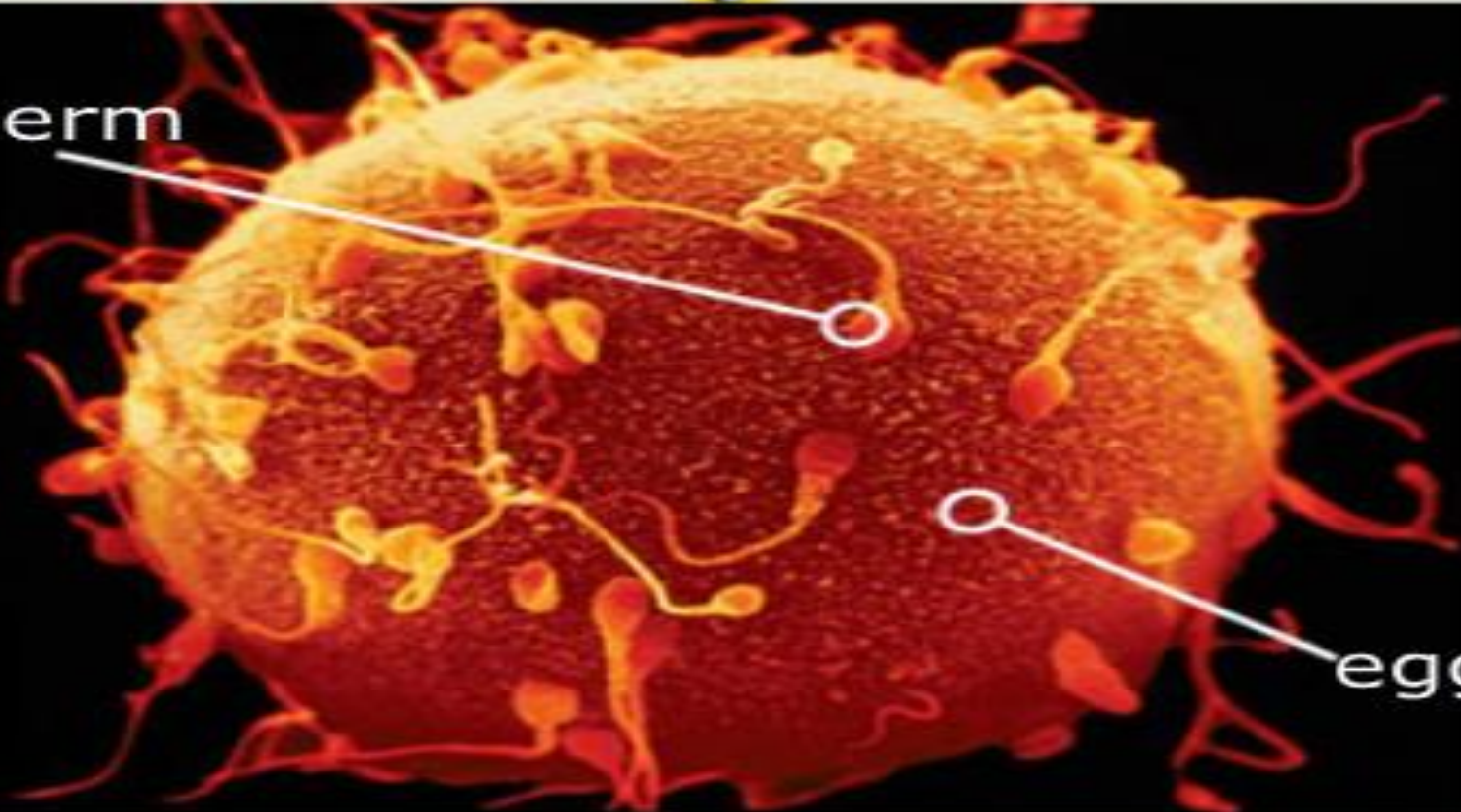
Importance of sex cells

- Normal human body cells contain 46 chromosomes.
- Sex cells are also known as *gametes*. Gametes have half the number of chromosomes (23 chromosomes).
- Gametes are *haploid*, meaning they have one chromosome from each homologous pair.



gamete

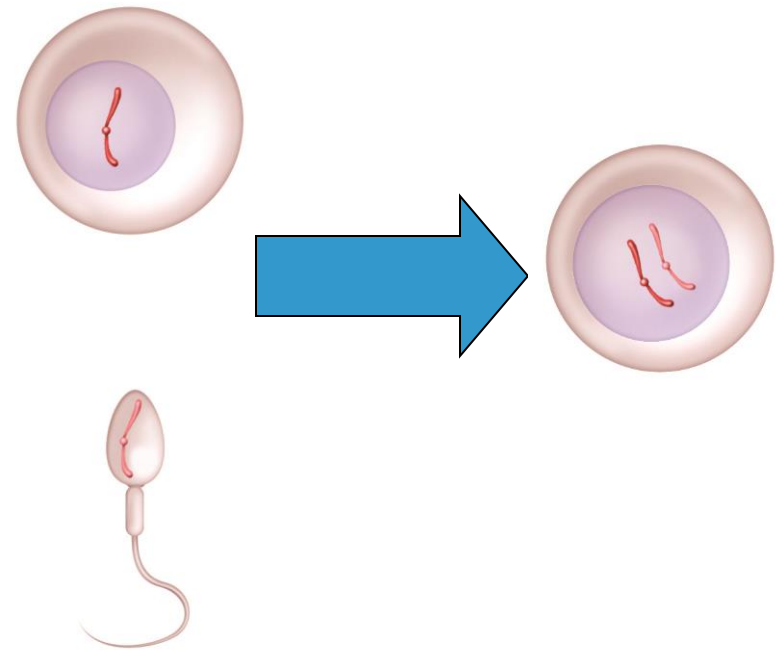
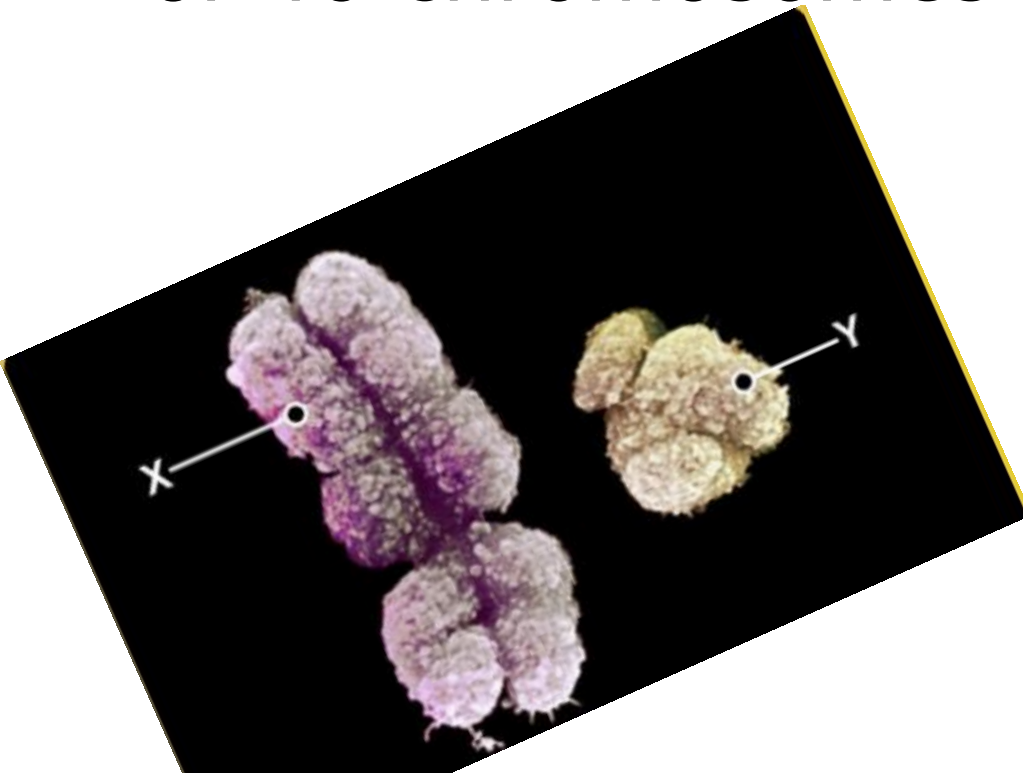
sperm



egg

Importance of sex cells

- Sex cells are needed so that in sexual reproduction offspring receive a total of 46 chromosomes.



- When the human egg & sperm join together
 - Egg -> 23 Chromosomes
 - Sperm -> 23 Chromosomes
 - TOTAL = 46 Chromosomes

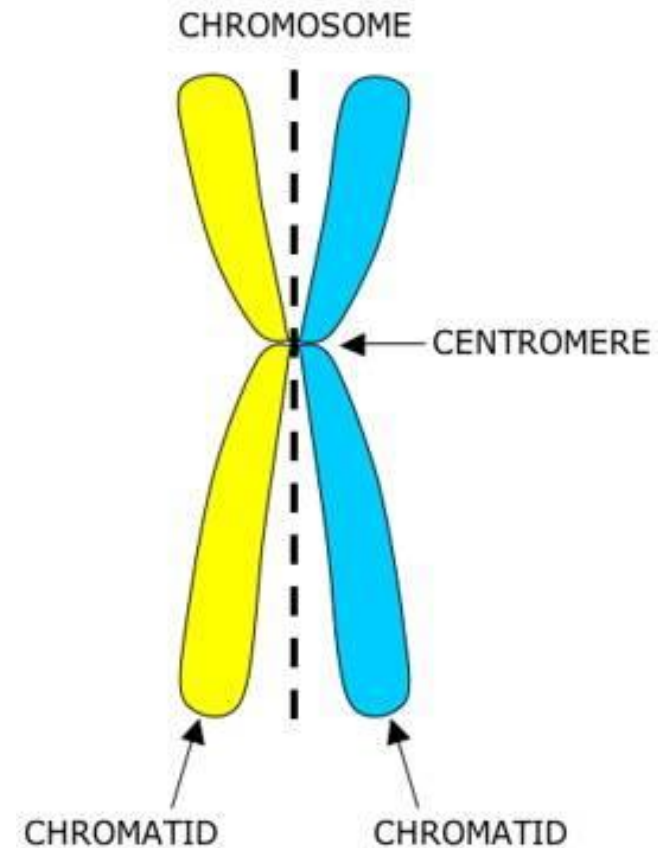


How are sex cells made?

- Meiosis produces haploid sex cells such as sperm or egg cells.
- When an egg is *fertilized* by a sperm cell, a new diploid cell forms.
- Meiosis has two parts: meiosis I and meiosis II.

Stages of Meiosis

- Before meiosis I begins, each chromosome is duplicated.
 - Each half is called a *chromatid*.
- Chromatids are connected by *centromeres*.
- During meiosis I, pairs of homologous chromosomes and sex chromosomes split apart into two new cells.



Prophase I

- Duplicated homologous chromosomes pair up.



Metaphase I

- Homologous chromosome pairs line up in the middle of the cell.



Anaphase I

- The homologous chromosomes separate from their partners and move to opposite sides.



Telophase I & Cytokinesis

- The nuclear membranes re-form and the cell divides into two cells. The chromatids are still joined.



Meiosis II

- Meiosis II involves both of the new cells that formed during meiosis I.
- The new cells divide during meiosis II.
- Meiosis II results in four haploid sex cells.

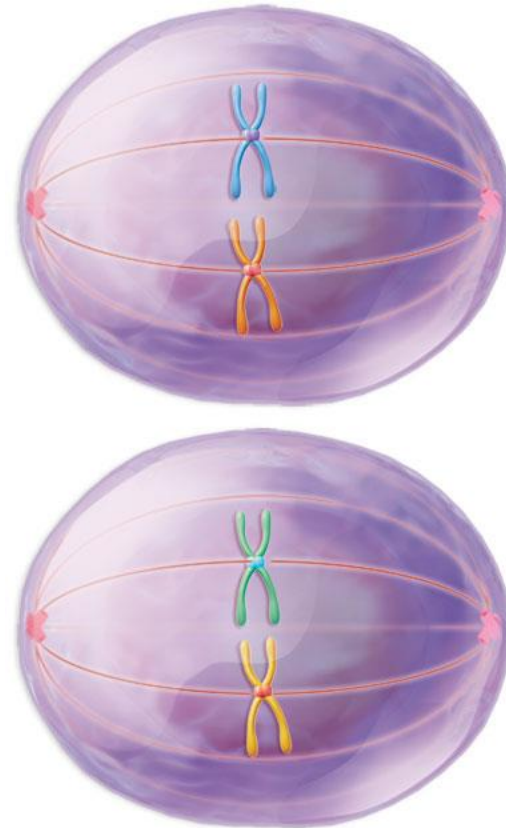
Prophase II

- The nuclear membrane breaks apart.



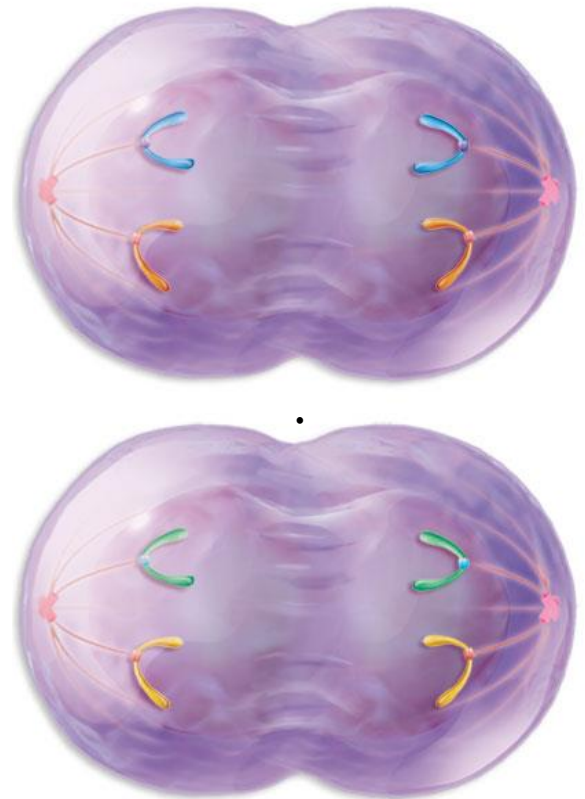
Metaphase II

- The chromosomes line up in the middle of the cells.



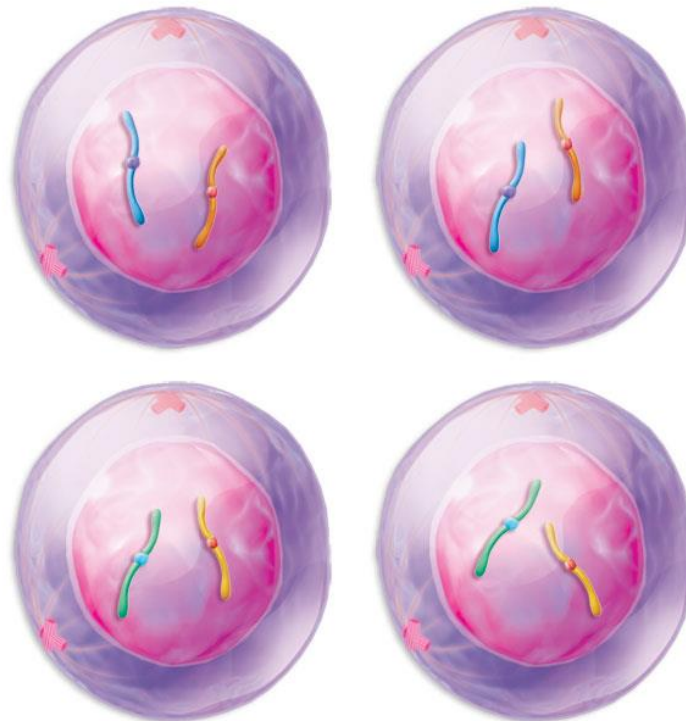
Anaphase II

- The chromatids are pulled apart and move to opposite sides.



Telophase II & Cytokinesis

- The nuclear membranes re-form and the cells divide. Each cell is haploid.



MEIOSIS

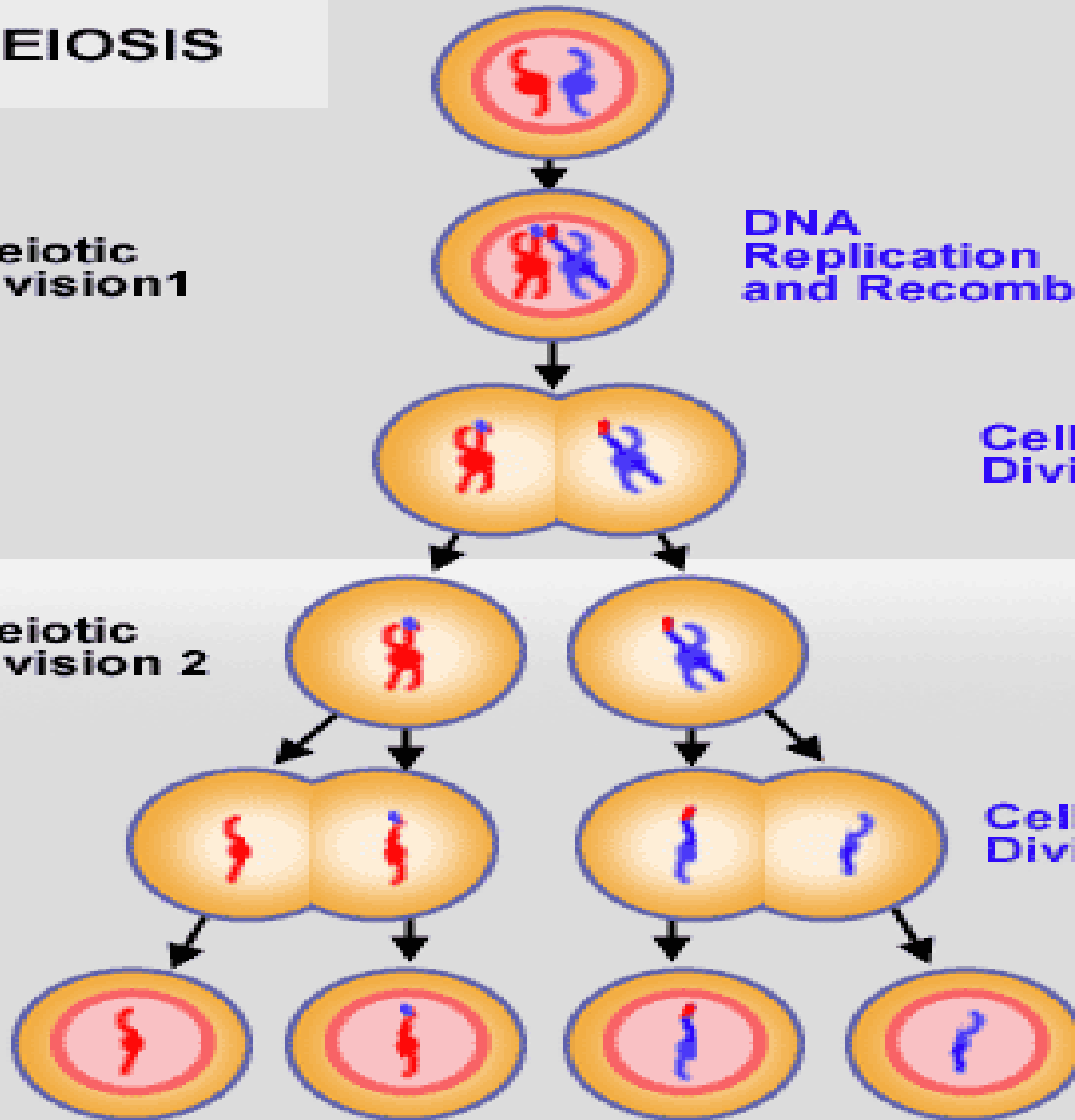
Meiotic
Division 1

DNA
Replication
and Recombination

Cell
Division 1

Meiotic
Division 2

Cell
Division 2



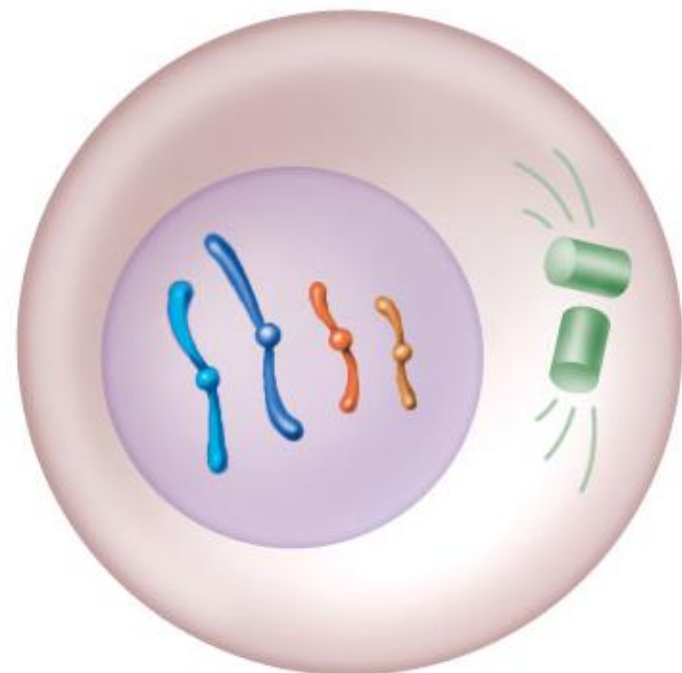
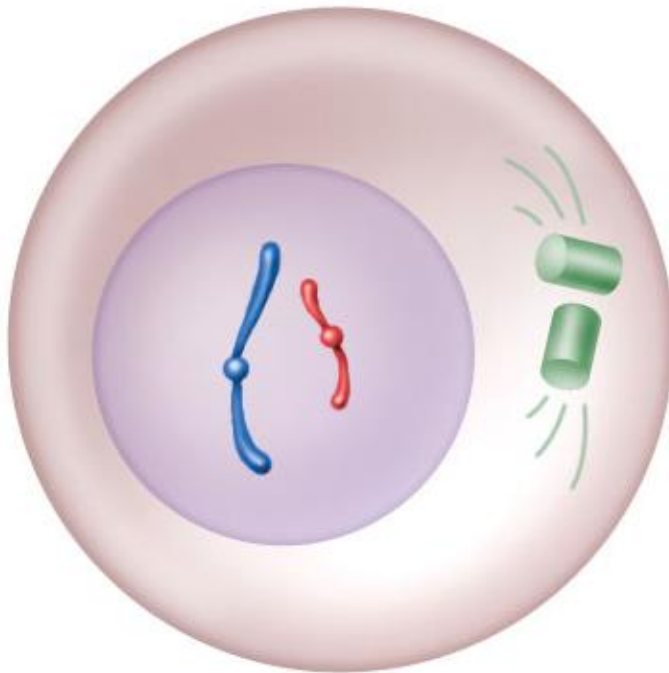
Meiosis vs Mitosis

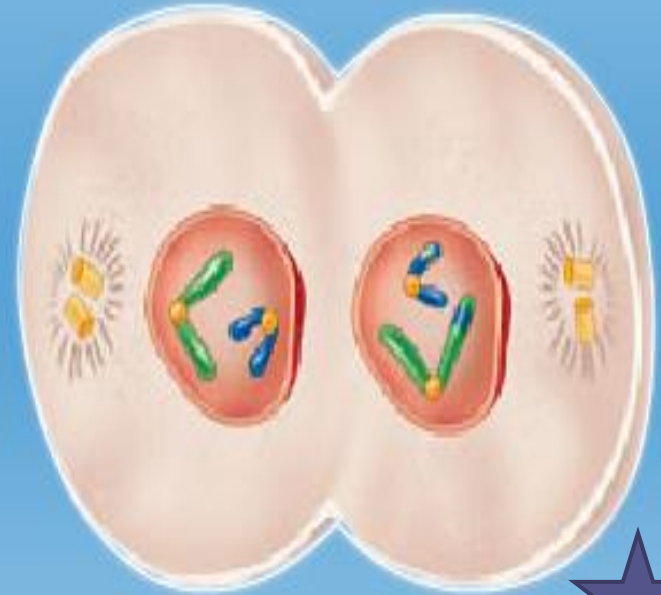
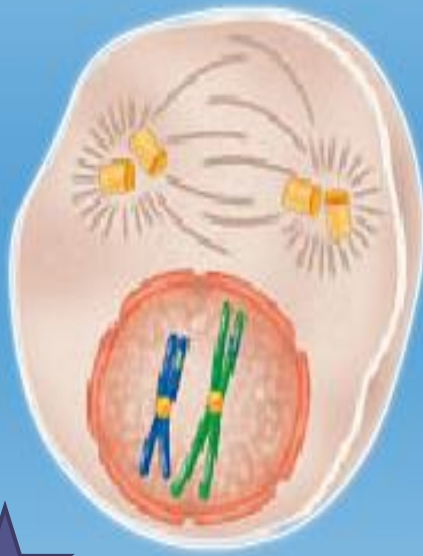


- Only sex cells undergo meiosis. All other cells divide by mitosis.
- In meiosis, chromosomes are copied once, and the nucleus divides twice.
- In mitosis, the chromosomes are copied once, and the nucleus divides once.

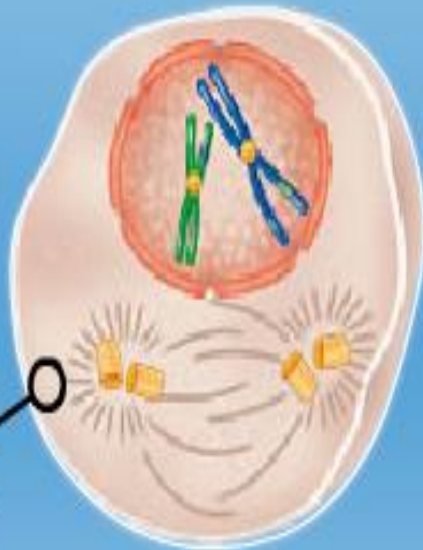
Meiosis vs Mitosis

- Meiosis produces haploid cells.
Mitosis produces diploid cells.

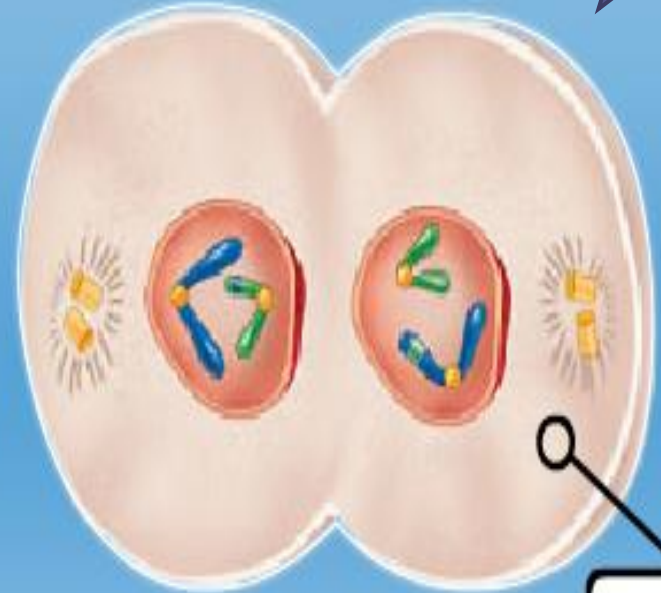




<http://www.pbs.org/wgbh/nova/body/how-cells-divide.html>




mitosis



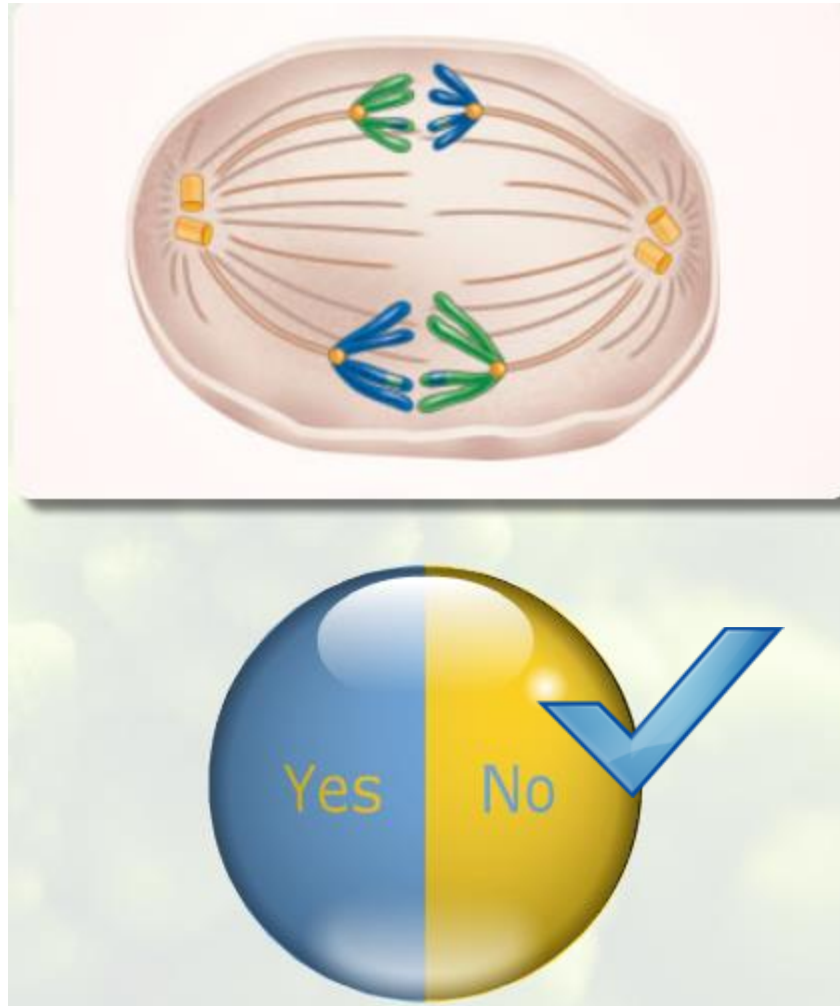
meiosis

REVIEW


What kind of cell does meiosis form?

- Diploid Cells
 - Sex Cells
 - Sperm Cells
 - Egg Cells
- 

Chromosome duplication takes place between meiosis I and meiosis II.



A pair of homologous chromosomes contains genetic information from...

- Dad only
- Mom only
- Both Mom & Dad 
- Neither

Suppose a diploid animal cell has 16 chromosomes. How many chromosomes would a sex cell of this animal have?

32

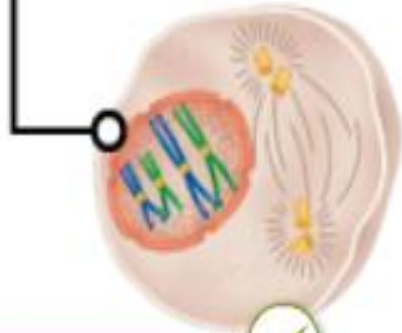
8



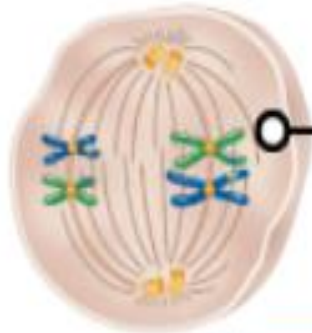
4

16

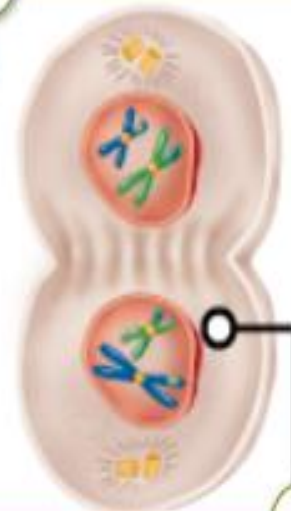
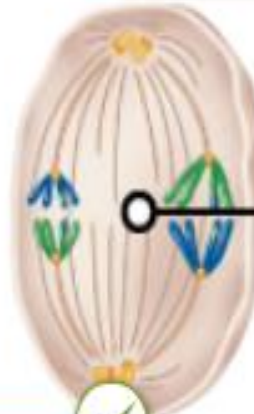
prophase I



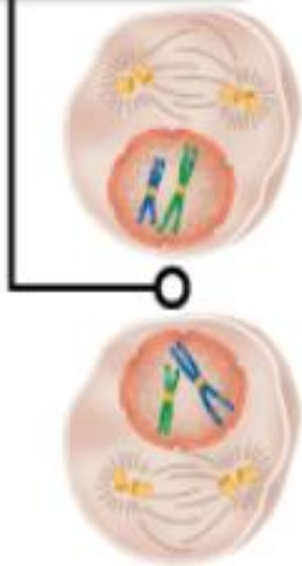
metaphase I



anaphase I



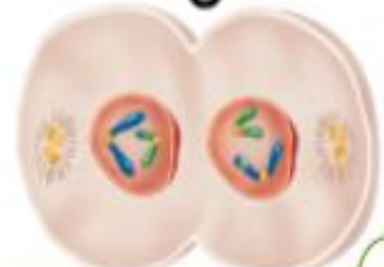
prophase II



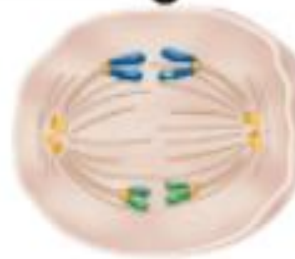
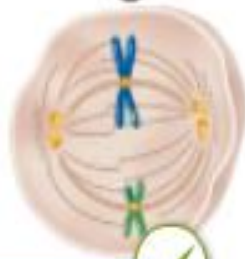
anaphase II



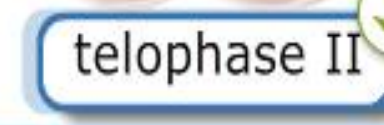
telophase I



metaphase II



telophase II



- End result of Meiosis: Four daughter cells with half the number of chromosomes in the original cell.