

② Sexual Reproduction and Meiosis

What You'll Learn:

Describe the stages of meiosis and how sex cells are produced.

Explain why meiosis is needed for sexual reproduction.

Name the cells that are involved in fertilization.

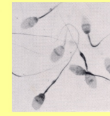
Explain how fertilization occurs in sexual reproduction.

Sexual Reproduction

•During **sexual reproduction**, two sex cells, sometimes called an egg and a sperm, come together.

***Sperm and egg are formed in reproductive organs.**

•**Sperm** are formed in the male reproductive organs.



•**Eggs** are formed in the female reproductive organs.

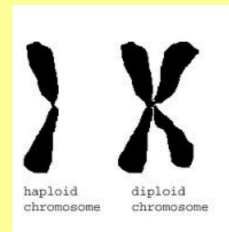
The joining of an egg and a sperm is called **fertilization**, and the cell that forms is called a **zygote**



After fertilization cell division begins.

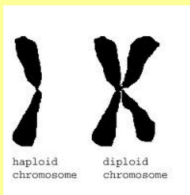
Diploid Cells

***Chromosomes have a mate that is similar in size, shape, and DNA. (Full set of chromosomes.)**



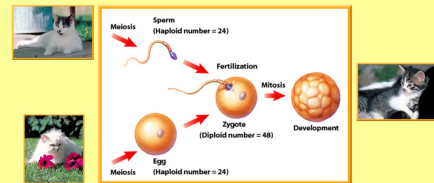
Haploid Cells

***Sex cells have half the number of chromosomes, because they are going to combine to form the full set.**

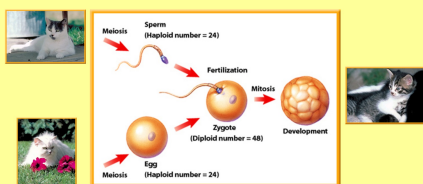


Meiosis and Sex Cells

•A process called **meiosis** (mi OH sus) produces haploid sex cells.

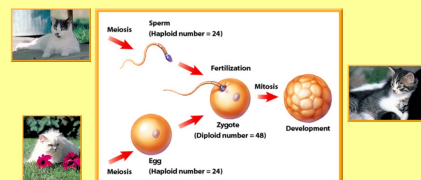


***Meiosis ensures the offspring has the same number of chromosomes as the parents.**

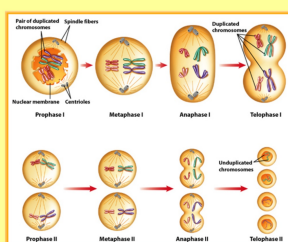


***Two haploid sex cells combine to form a diploid zygote.**

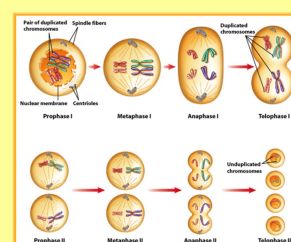
$$1/2 + 1/2 = 1$$



***Meiosis has two divisions of the nucleus.**

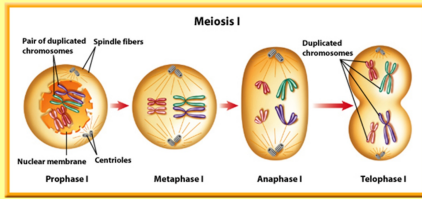


•The steps of each division have names like those in mitosis and are numbered for the division in which they occur.

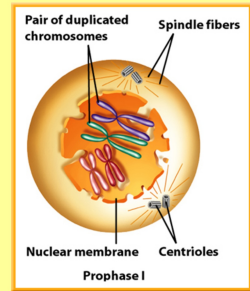


Meiosis I

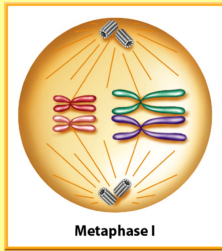
*Chromosomes are duplicated before meiosis begins.



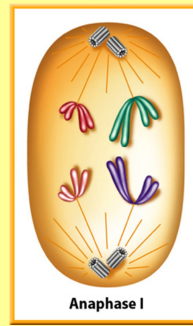
*Prophase I duplicated pairs move near each other.



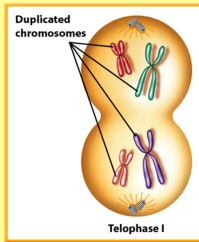
*Metaphase I pairs line up in the center and spindle fiber attach the pair.



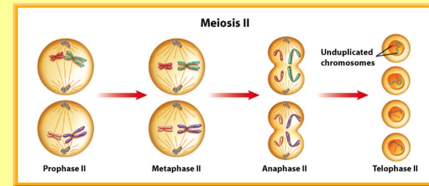
*Anaphase I pairs move to opposite ends of the cell.



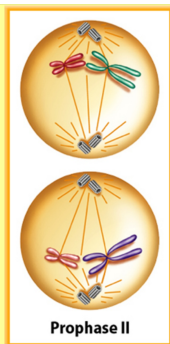
*Telophase I cytoplasm divides and two new cells form with duplicated chromosome pairs.



Meiosis II



*Prophase II chromosomes and spindle fibers reappear.



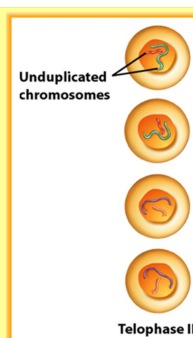
*Metaphase II chromosomes move to the center. Spindle fibers attach to individual chromosomes.



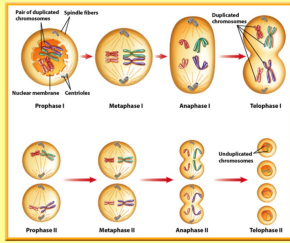
*Anaphase II individual chromosomes move to opposite ends of the cells.



*Telophase II cytoplasm divides and haploid cells are formed.



•Remember that meiosis produces haploid sex cells.



Mistakes of Meiosis

*Mistakes can produce cells with too many or too few chromosomes.

*Often the zygote will not survive.

*Organisms with the wrong number may not grow normally.