Meiosis Overview

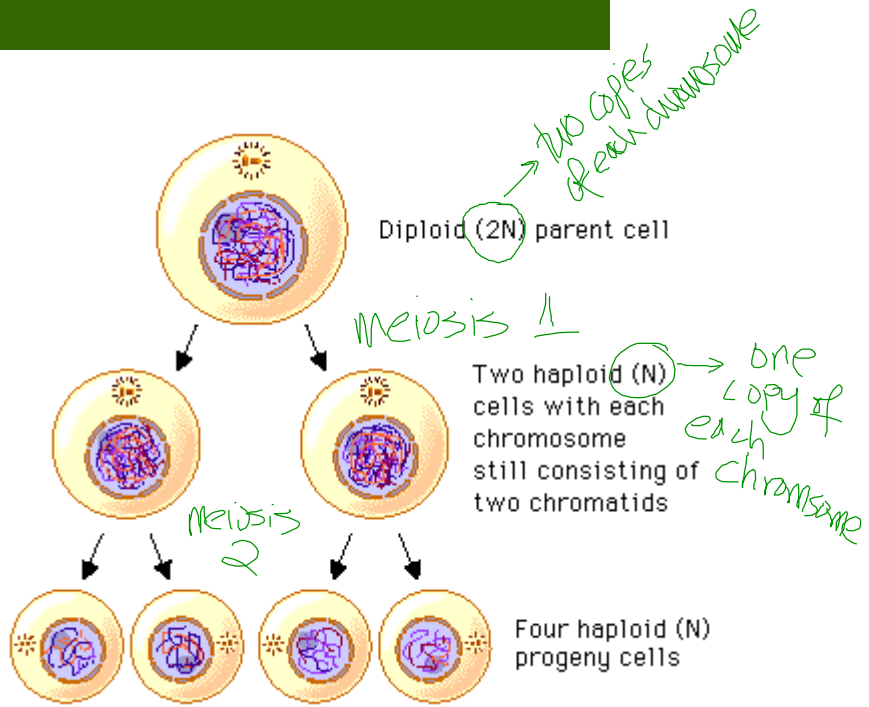
Biology

Objectives:

- Students will understand the main outcome of meiosis
- Students will be able to describe the basic process of meiosis
- Students will be able to explain what organisms use meiosis for

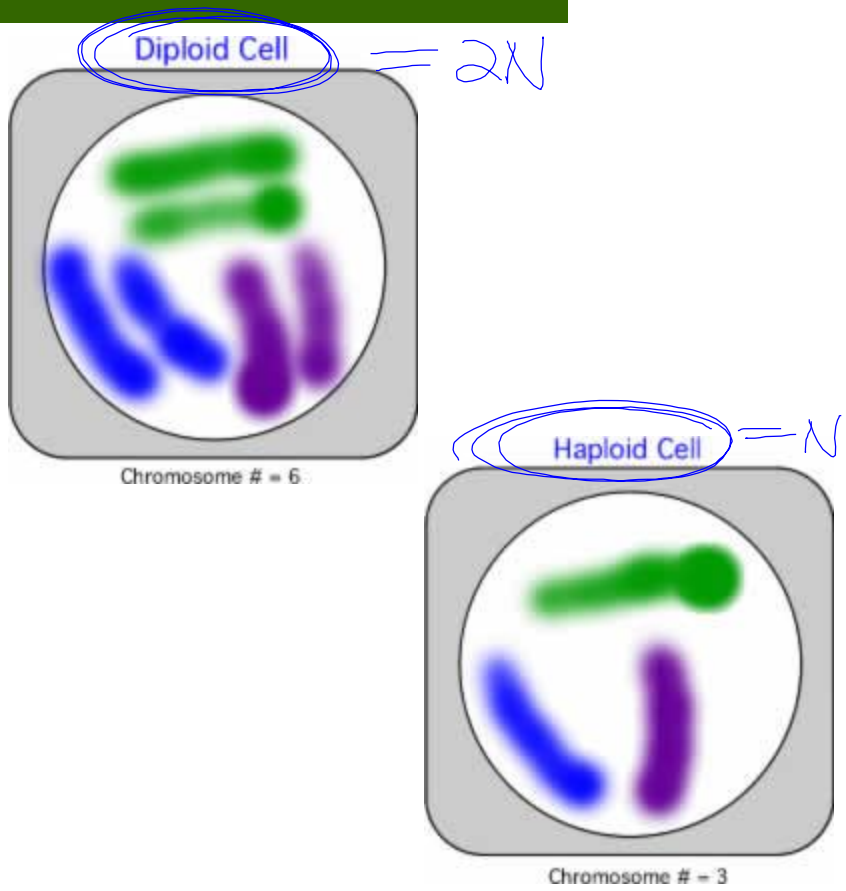
What is Meiosis?

- Meiosis creates four new cells from one original cell
- The new cells are used for reproduction – they are gametes (reproductive cells)
- In mammals, gametes are eggs and sperm



Vocabulary Details

- Cells that have two different versions of each chromosome - one of Mom's and one of Pop's - are called "diploid". (Like our original cell.)
- Cells that have only one version of each chromosome are called "haploid". (Like our four new cells.)

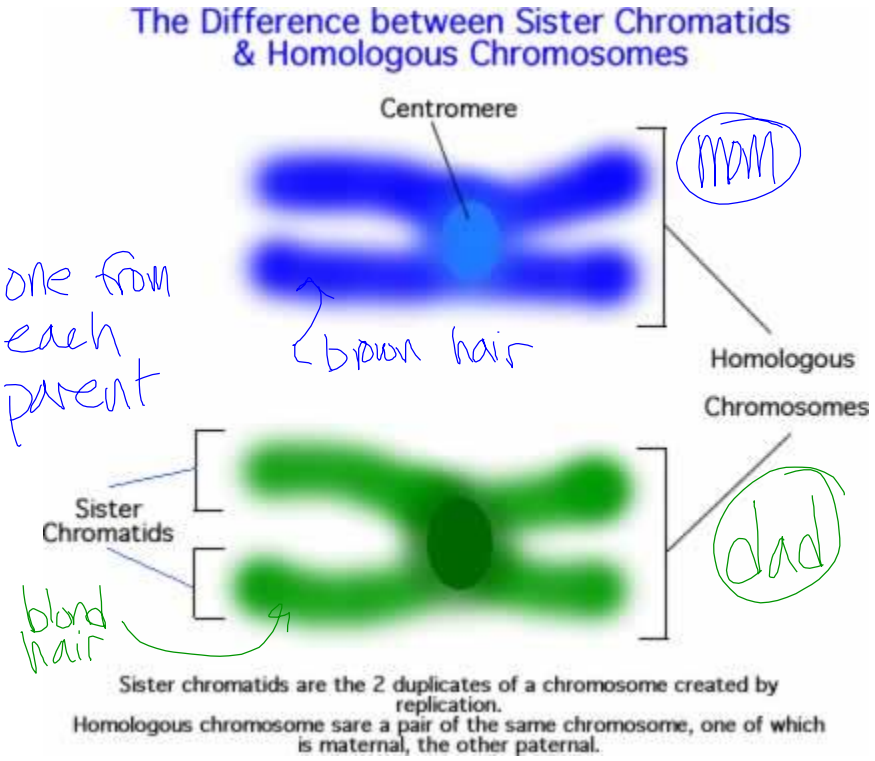


More Vocabulary

result from DNA replication

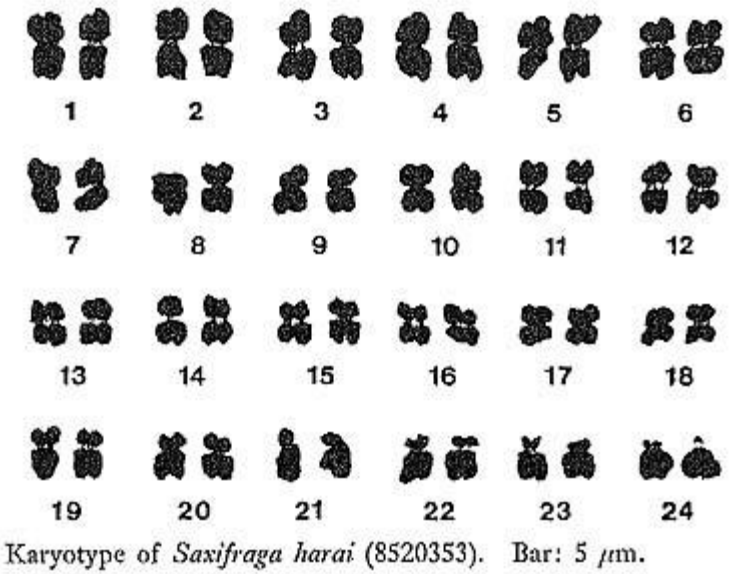
- Sister chromatids are exact, identical copies of the same sequence of DNA
- Homologous means two unique versions of the same chromosome – they have the same genes, but contain different information (hair color, for example…)

one from each parent



What Happens?

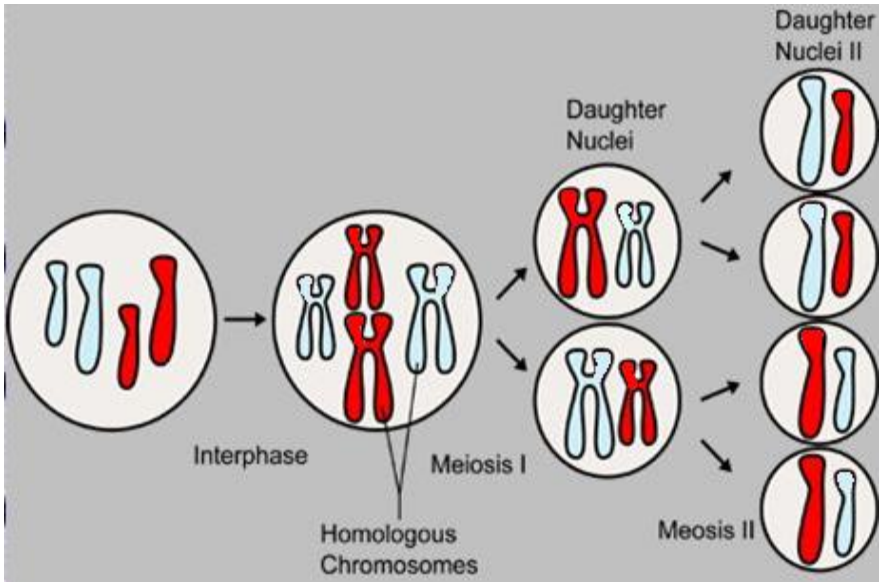
- Meiosis only happens in organisms that reproduce sexually
- Organisms have genetic material from both mom and pop
- Half of the genetic info comes from mom and the other half comes from pop.
- So every sexually reproducing organism has two versions of each chromosome!



Karyotype of *Saxifraga harai* (8520353). Bar: 5 μm.

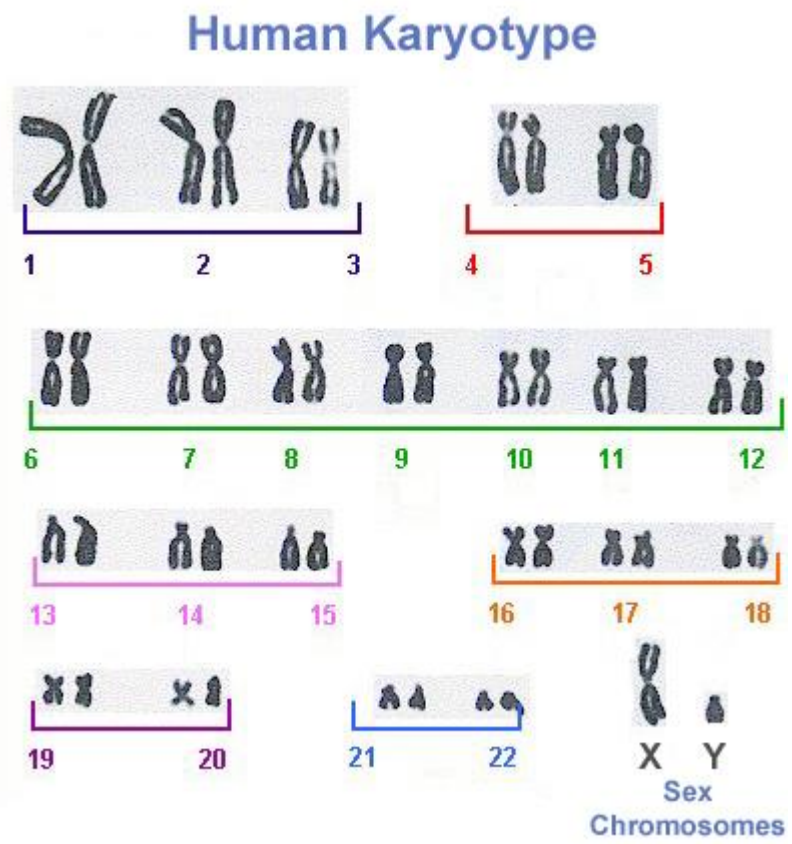
What Happens? (continued)

- Before meiosis, The DNA is replicated so there are two copies of Mom's chromosomes and two copies of Pop's chromosomes
- During meiosis, each copy mix together ("cross over") and are separated out and distributed into four new cells



Important Points

- Every chromosome comes from either Mom or Pop
- Humans have 23 different chromosomes, but are paired so we end up with 46 (23 from mom and 23 from dad)
- Every chromosome can be identified by the specific genes they contain
- For example, in humans, chromosome 1 has a gene that helps determine brain size – and chromosome 3 has a gene that helps determine blood type



The end result:

- Meiosis results in FOUR cells (N) from one original parent cell (2N)
- Each new cell has half the genetic material GAMETE
- Each new cell has ONE copy of each chromosome
- These new cells will be used for reproduction!