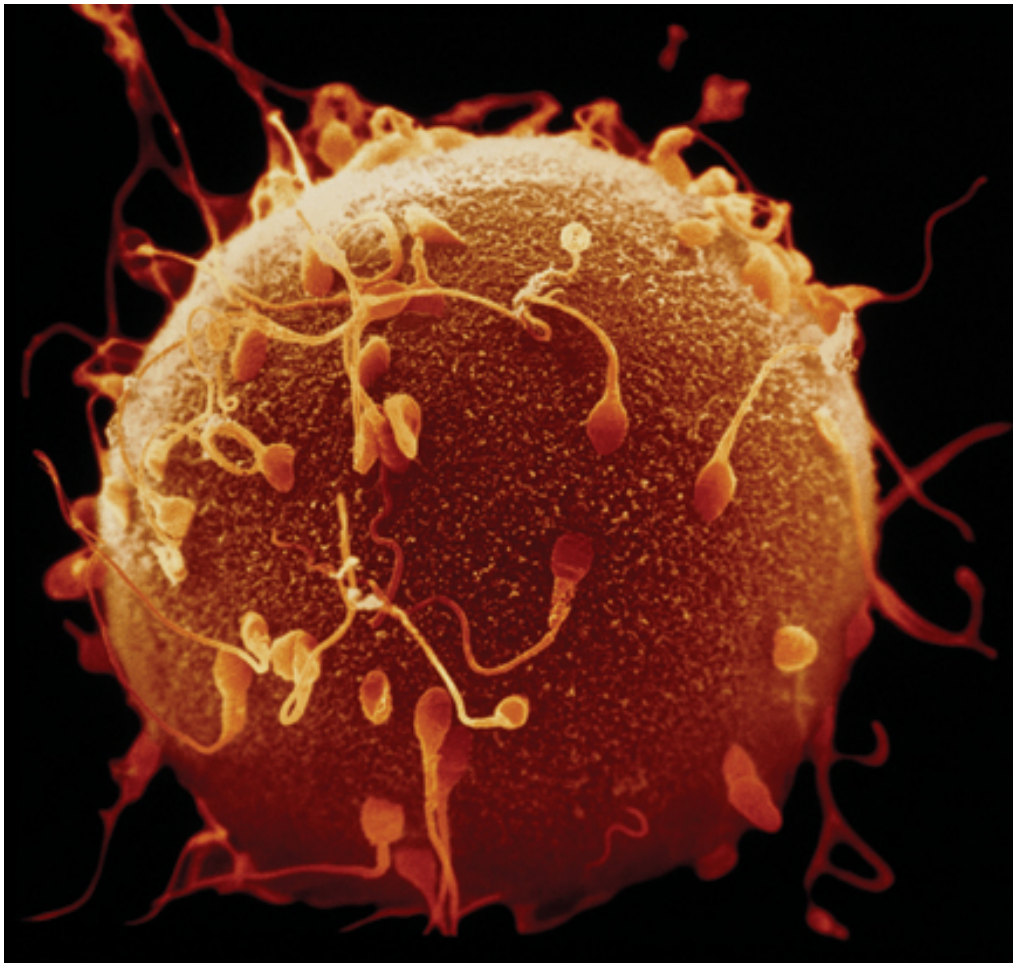
6.6 Meiosis and Genetic Variation

KEY CONCEPT

Independent assortment and crossing over during meiosis result in genetic diversity.



6.6 Meiosis and Genetic Variation

- **Sexual reproduction creates unique combinations of genes.**
  - Sexual reproduction creates unique combination of genes.
    - independent assortment of chromosomes in meiosis
    - random fertilization of gametes
  - Unique phenotypes may give a reproductive advantage to some organisms.

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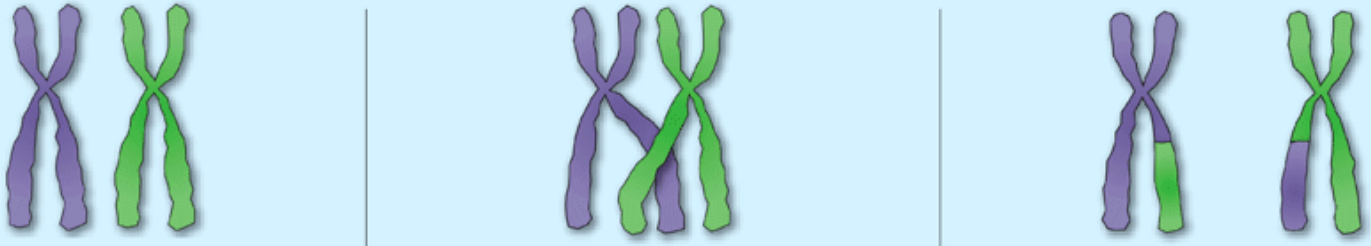
Crossing over during meiosis increases genetic diversity.

- Crossing over is the exchange of chromosome segments between homologous chromosomes.
  - occurs during prophase I of meiosis I
  - results in new combinations of genes

Crossing over exchanges segments of DNA between homologous chromosomes.



1. Two homologous chromosomes pair up with each other during prophase I in meiosis.
2. In this position, some chromatids are very close to each other and segments cross.
3. Some of these segments break off and reattach to the other homologous chromosome.

Synthesize **Draw the four chromosomes that would result after the above chromosomes go through meiosis.**

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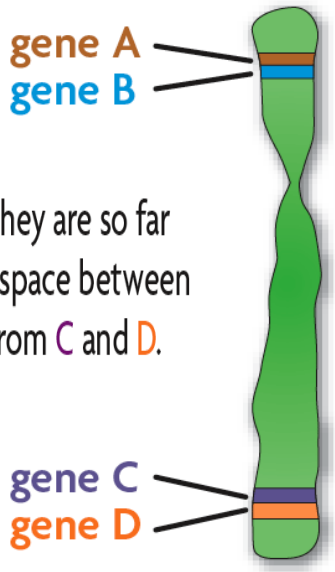
- Chromosomes contain many genes.
  - The farther apart two genes are located on a chromosome, the more likely they are to be separated by crossing over.
  - Genes located close together on a chromosome tend to be inherited together, which is called genetic linkage.
- Genetic linkage allows the distance between two genes to be calculated.



A and B are referred to as linked because they would likely be inherited together.

A and B are not linked to C and D because they are so far apart. Crossing over is likely to occur in the space between genes B and C, thereby separating A and B from C and D.

C and D are referred to as linked because they would likely be inherited together.