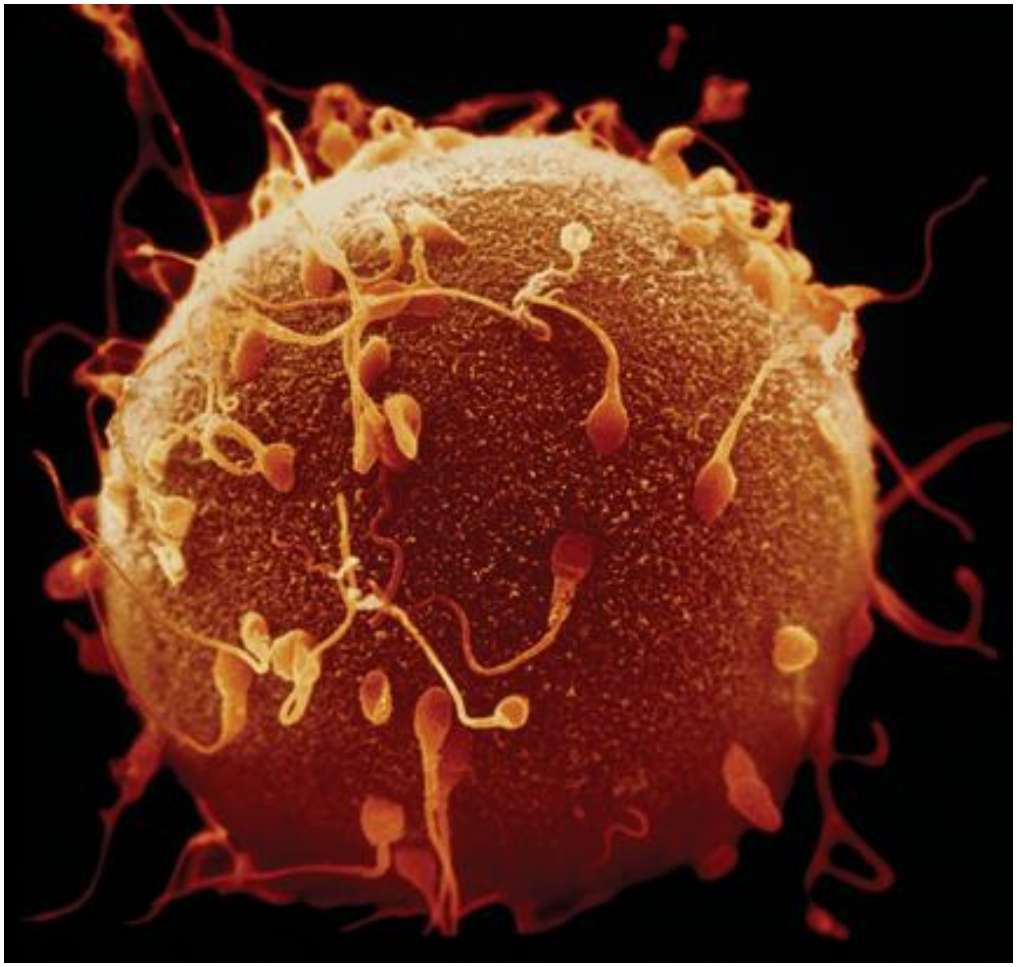
# 6.6 Meiosis and Genetic Variation

## KEY CONCEPT

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



# 6.6 Meiosis and Genetic Variation

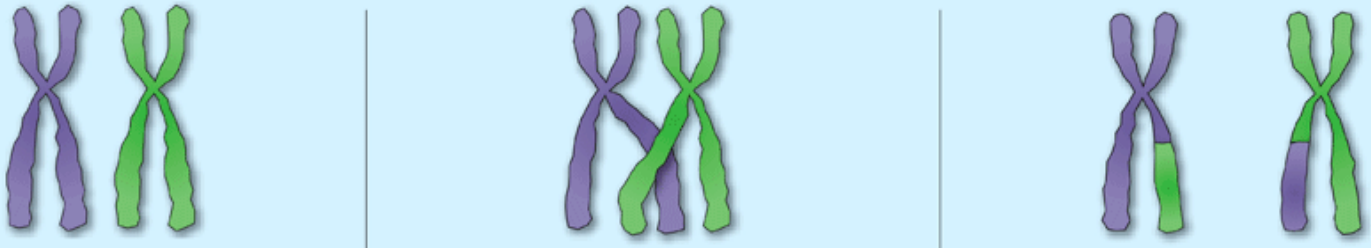
- **Sexual reproduction creates unique combinations of genes.**
  - independent assortment of chromosomes in meiosis
  - random fertilization of gametes
- Unique phenotypes may give a reproductive advantage.

# 6.6 Meiosis and Genetic Variation

## 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.

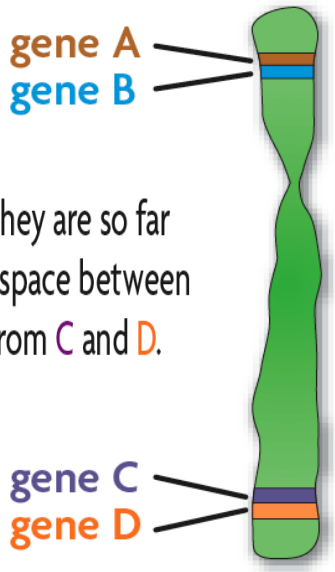


1. Two homologous chromosomes pair up with each other during prophase I in meiosis.
2. In this position, some chromatids are very close to each other and segments cross.
3. Some of these segments break off and reattach to the other homologous chromosome.

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

# 6.6 Meiosis and Genetic Variation

- 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**.




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.

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

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