6.6 Meiosis & Genetic Variation

Warm Up 4-3

- Complete the following crosses using simple Punnett Squares
  - BB x Bb
  - Yy x yy
  - Hh x Hh
- Find the percentage of dominant phenotypes for each of the crosses
- Find the percentage of recessive phenotypes for each of the crosses
- Now, use the following table to help identify the phenotypes of the offspring.

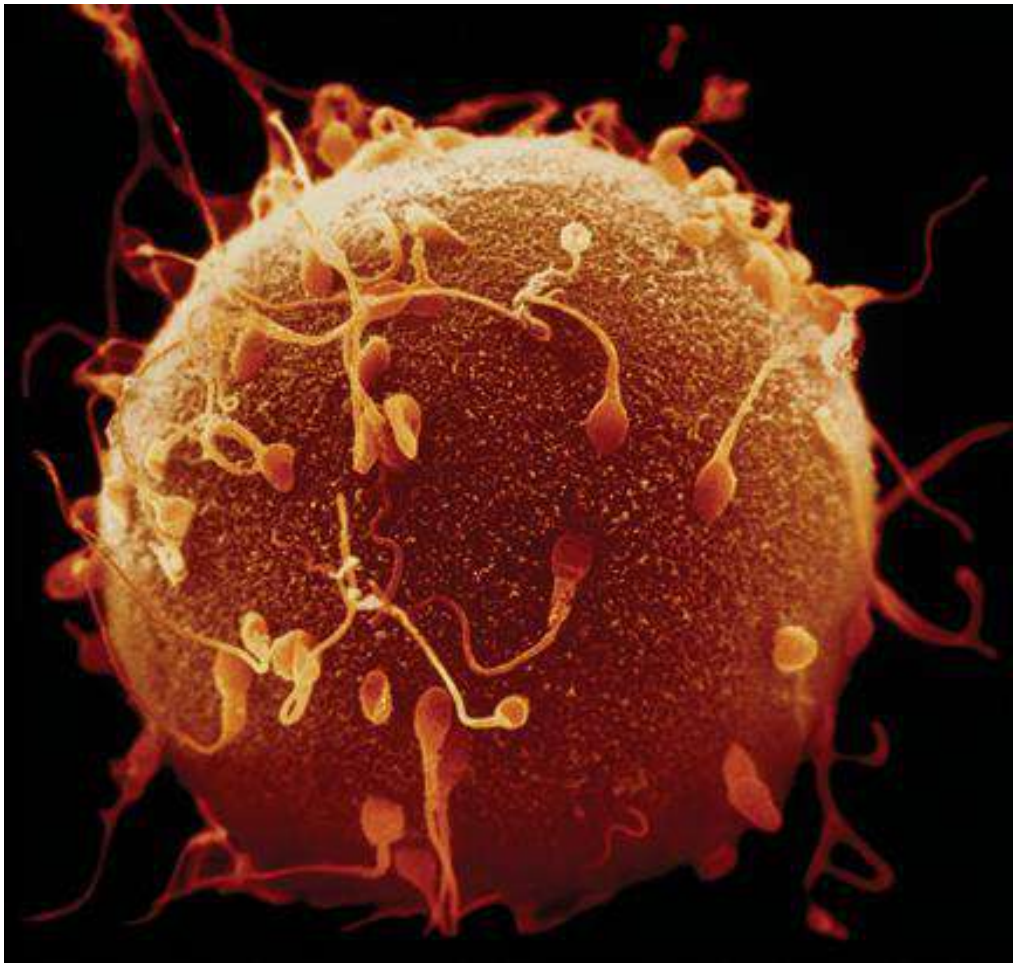
	Flower color	Fruit Color	Plant Height
DOMINANT	Blue (B)	Yellow (Y)	Tall (H)
RECESSIVE	White (b)	Green (y)	Short (h)

Objectives

- Describe how sexual reproduction creates unique gene combinations
- Explain how crossing over during meiosis increases genetic diversity

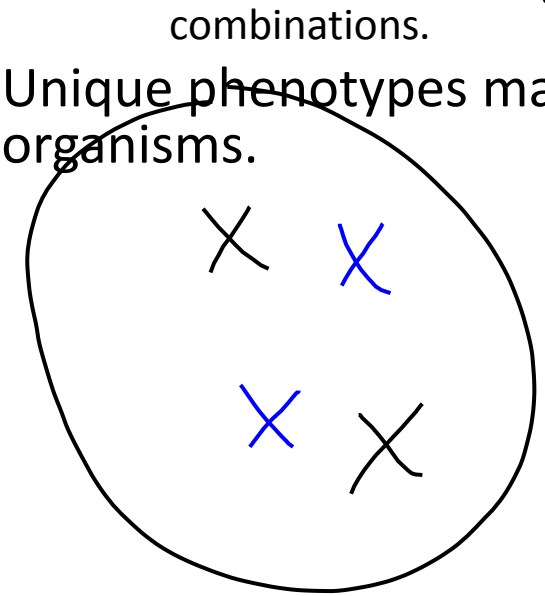
KEY CONCEPT

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



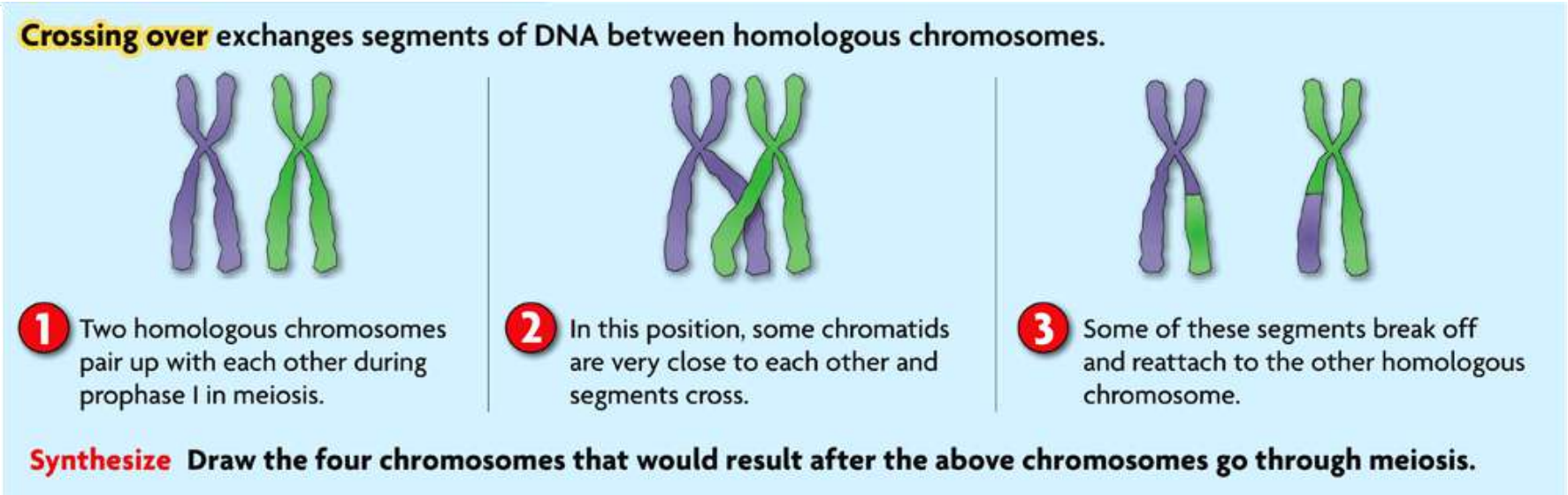
Sexual reproduction creates unique combinations of genes.

- Sexual reproduction creates unique combination of genes.
  - independent assortment of chromosomes in meiosis
    - 2^{23} (8 million) different combos can be produced through meiosis f/ one human cell
  - random fertilization of gametes
    - Random combo of egg & sperm so 2^{23} x 2^{23} (70 trillion) different chromosomes combinations.
- Unique phenotypes may give a reproductive advantage to some organisms.

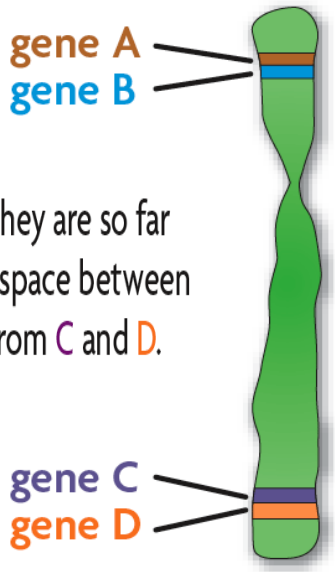


Crossing over during meiosis increases genetic diversity.

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



- 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.