

**Biology Standard 3.2.1:** Explain the role of meiosis in sexual reproduction and genetic variation.

Know:	Understand:	Do:
<ul style="list-style-type: none"> <li><input type="checkbox"/> Phases of meiosis and mitosis</li> <li><input type="checkbox"/> Purpose/role of meiosis in sexual reproduction and genetic variation</li> <li><input type="checkbox"/> Know what genetic diversity/variation means with examples</li> <li><input type="checkbox"/> Importance of genetic diversity (more likely to survive changing environments)</li> <li><input type="checkbox"/> Importance of genes on separate chromosomes</li> <li><input type="checkbox"/> Sex cells produced through meiosis which allows sexually reproducing organisms to produce genetically different offspring, and maintain the number of chromosomes</li> <li><input type="checkbox"/> Diploid cell produces 4 haploid cells that mature to become gametes</li> <li><input type="checkbox"/> Differences between mitosis and meiosis including:               <ul style="list-style-type: none"> <li>● Chromosome number</li> <li>● Number of cell divisions</li> <li>● Number of cells produced</li> <li>● Type of reproduction</li> <li>● Replication of DNA</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Process of meiosis using diagrams and phases</li> <li><input type="checkbox"/> Why it is important that genes are on separate chromosomes during meiosis</li> <li><input type="checkbox"/> How meiosis leads to greater genetic variation</li> <li><input type="checkbox"/> How the processes of crossing over, fertilization, gene mutations, nondisjunction, and random assortment lead to genetic variation</li> <li><input type="checkbox"/> Importance of crossing over</li> <li><input type="checkbox"/> How mitosis and meiosis are alike and different</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Identify processes occurring in each phase of meiosis by analyzing diagrams and phases</li> <li><input type="checkbox"/> Link the importance of genes being on separate chromosomes during meiosis</li> <li><input type="checkbox"/> Explain how meiosis can lead to greater genetic diversity</li> <li><input type="checkbox"/> Explain how the following processes can lead to genetic variation:               <ul style="list-style-type: none"> <li>● Crossing Over</li> <li>● Fertilization</li> <li>● Gene Mutation</li> <li>● Nondisjunction</li> <li>● Random Assortment</li> </ul> </li> <li><input type="checkbox"/> Compare and contrast mitosis and meiosis</li> </ul>

Academic Vocabulary	What does mastery look like?
<p>Meiosis Mitosis Genes Chromosomes Crossing Over Nondisjunction Homologous Chromosomes Gametes Somatic Cells Variation Haploid Diploid Gamete Zygote</p>	<ul style="list-style-type: none"> <li>● Able to recall the process of meiosis and identify process occurring in diagrams</li> <li>● Infer the importance of the genes being on separate chromosomes as it relates to meiosis</li> <li>● Explain how the process of meiosis leads to independent assortment and ultimately to greater genetic diversity</li> <li>● Exemplify sources of genetic variation in sexually reproducing organisms including crossing over, random assortment of chromosomes, gene mutation, nondisjunction, and fertilization</li> <li>● Compare meiosis and mitosis including               <ul style="list-style-type: none"> <li>○ Type of reproduction (asexual or sexual)</li> <li>○ Replication and separation of DNA</li> <li>○ Cellular material</li> <li>○ Changes in chromosome number</li> <li>○ Number of cell divisions</li> <li>○ Number of cells produced in a complete cycle</li> </ul> </li> </ul>

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**Review Questions:**

1. Why is the process of meiosis important to sexual reproduction?
  - a. It provides genetic variation in offspring.
  - b. It doubles the number of chromosomes in offspring.
  - c. It reduces the number of alleles from parent to offspring.
  - d. It produces a hybrid of all genetic traits in offspring.
2. Exemplify sources of genetic variation in sexually reproducing organisms including: (give examples if you are able):
  - a. Crossing Over
  
  - b. Independent assortment of chromosomes
  
  - c. Gene Mutation
  
  - d. Nondisjunction
  
  - e. Random Fertilization
3. Compare meiosis and mitosis including type of reproduction (asexual or sexual), replication and separation of DNA and cellular material, changes in chromosome number, number of cell divisions, and number of cells produced in a complete cycle. Complete the table:

	Type of Reproduction	Is DNA replicated?	Changes in Chromosome from parent to daughter cell	Number of Cell Divisions	Number of Daughter cells produced	Type of Daughter cells produced
Mitosis						
Meiosis						

4. What events take place in meiosis that don't occur mitosis?

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**Review Videos & Links:**

[Crash Course: Meiosis](#)

**Read About it:**

[Meiosis Khan Academy](#)