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DNA Practice

1. In the beginning of this unit, we discussed **stability**, **variability**, and **fidelity**. Using what you know about DNA, explain how DNA exhibits these characteristics.
2. Sketch a generic nucleotide and label the sugar, the phosphate, and the nitrogen base. You may use simple shapes to represent the different parts of the nucleotide; you don’t need a detailed molecular structure.
3. Sketch a DNA molecule that is three base pairs in length. You may use simple shapes to represent the different molecules involved; you do not need detailed molecular structures. Label **adenine, thymine, guanine, cytosine, deoxyribose, and phosphate.**
4. Below is the sequence of one strand of DNA. Write the sequence for the complementary strand:
A T G C G T T T G G C A A C G T A C
5. DNA replication occurs in the nucleus of the cell and can be divided into three phases:
1. Enzymes bind to DNA
2. The enzyme **helicase** “pulls apart” the two strands of the double helix
3. The enzyme **DNA polymerase** synthesizes new DNA strands using the two parent strands as templates

Given this information, and your modeling experience, why do you think DNA replication is described as “semi-conservative?”
6. Explain how the base pairing rules make replication possible.
7. Why is DNA replication necessary?

Use this karyotype to answer 8-10.



1. Is this karyotype from a gamete or from a somatic (non-sex) cell? How can you tell?
2. Does this individual have male or female sex chromosomes?
3. Which pair of chromosomes in this karyotype is not homologous?
4. Using the terms **gamete** (or **egg** and **sperm**), **haploid, diploid,** and **fertilization**, explain how a human ends up inheriting DNA from each parent.