DNA Replication

Each time a new cell is made, the cell must receive an exact copy of the parent cell DNA. The new cells then receive the instructions and information needed to function. The process of copying DNA is called replication. Replication occurs in a unique way – instead of copying a complete new strand of DNA, the process "saves" or conserves one of the original strand. For this reason, replication is called semi-conservative. When the DNA is ready to copy, the molecule "unzips" itself and new nucleotides are added to each side.

1. The first step in the process of DNA Replication begins with _____ breaking the _____ bonds between the bases and unzipping the helix.

   The _____ enzyme begins to unwind the DNA at the _____. This is a specific site on the DNA.

   The helicase enzyme moves in both directions from the _____, forming a _____. At either end is a _____, a Y-shaped region where the new strands of DNA are elongating.

2. Single stranded _____ react with the single-stranded regions on the DNA and _____ the unwound DNA

3. An _____, called a _____ constructs an RNA primer, a sequence of about _____ nucleotides, complementary to the parent DNA. (Remember base pairing)

4. _____ is the major enzyme involved in DNA replication. The enzyme adds _____ to the RNA primer.

   Energy is required for the bonding to take place. The nucleotides arrive as _____. The DNA bases have a _____ sequence. DNA bases arrive with their own _____ as they are bonded by DNA polymerase III.

   DNA polymerase III can only add a nucleotide to the _____ end of a pre-existing chain of nucleotides and cannot initiate a nucleotide chain. Therefore the new DNA strand grows from _____ to _____.

   Parent strands are _____. Leading strand is replicated from _____ to _____ while the laggin strand is replicated from _____ to _____

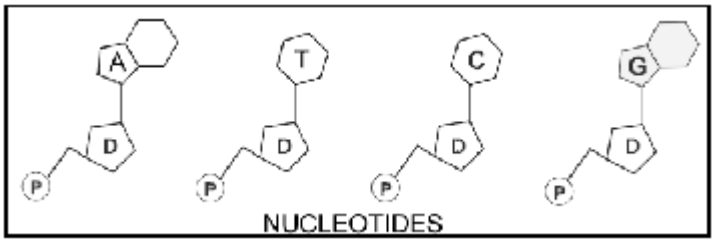
   When replication occurs on the laggings strand the DNA polymerase III reaches _____ it is replaced by _____. At this point the RNA is removed and replaced by _____. The enzyme _____ attached to the DNA strand to form _____ bonds. New primers are made a a new _____ is put into place.

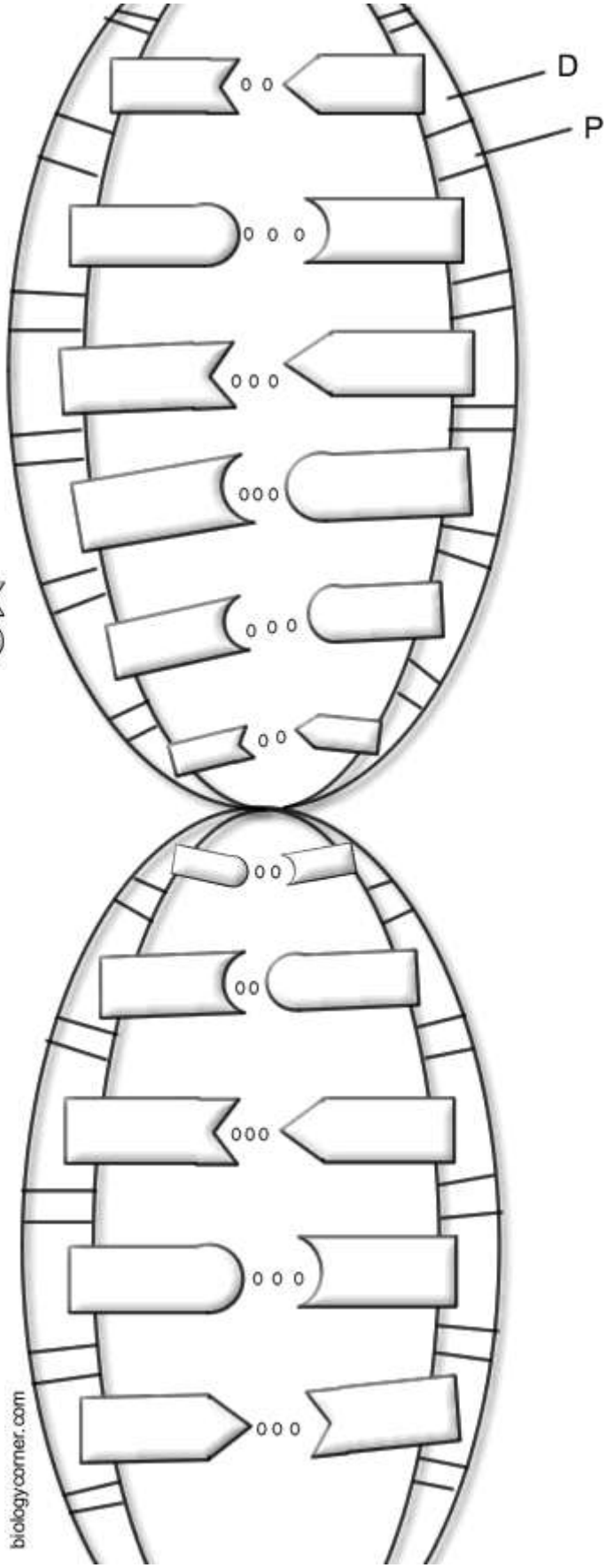
Note the nucleotides are shown as their 3 parts – sugar (blue), phosphate (pink) and one of the four bases (colour codes are below). Colour the DNA model on the first page, then repeat with the replication model on the second page. Notice that several nucleotides are floating around, they are waiting to pair up with their match.

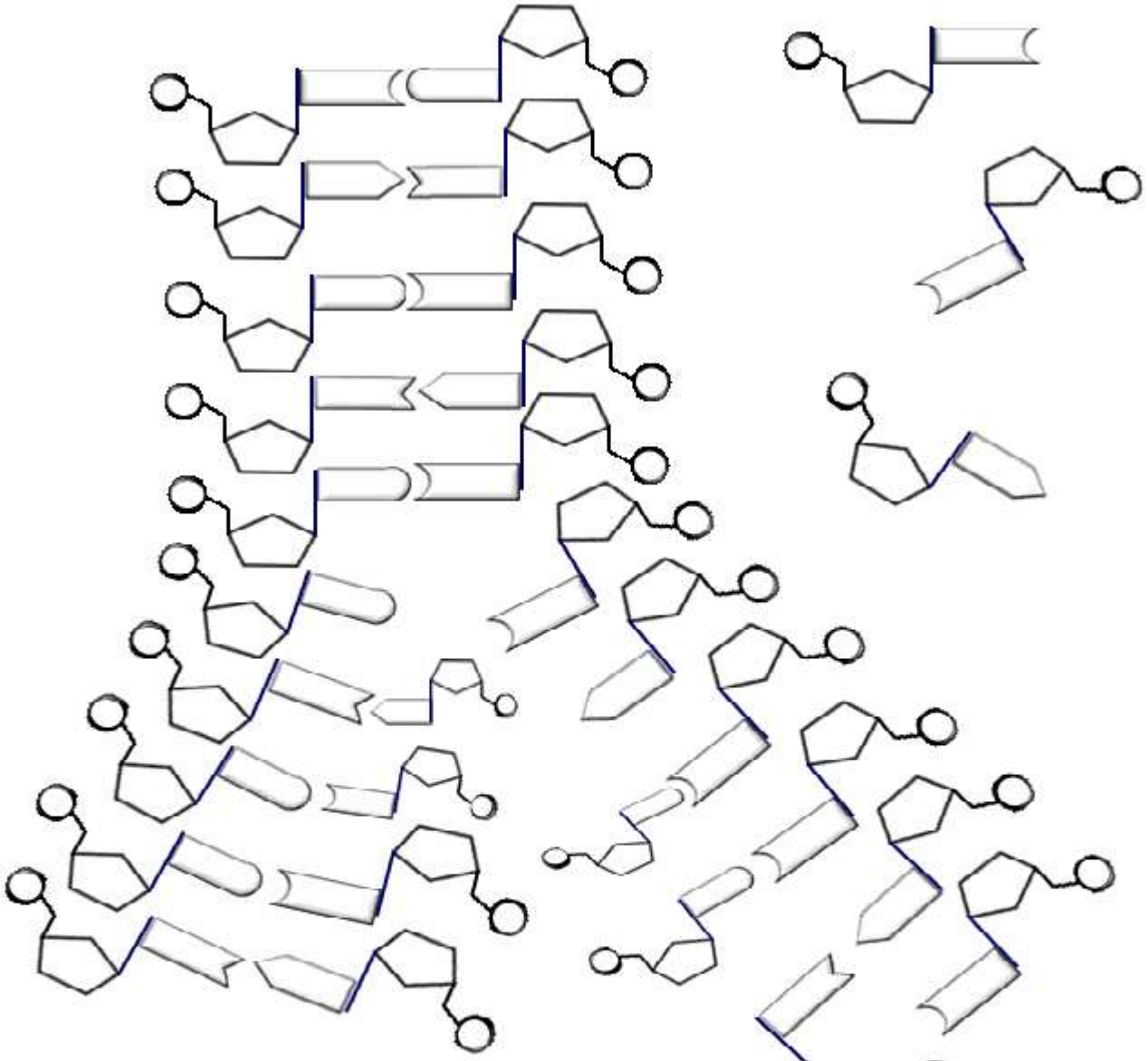
The boxed section shows two new strands of DNA. Colour the old strand (including its base) red and the new strand (including its base) green.

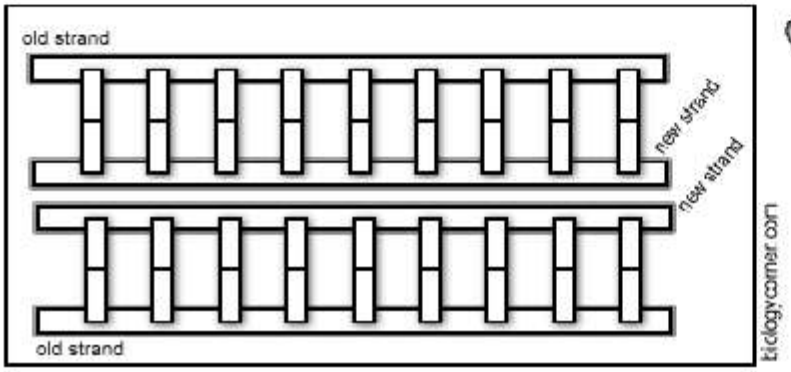
The two sides of the DNA ladder are held together loosely by **<u>hydrogen bonds</u>**. **Color the hydrogen bonds gray**

Color the thymines orange. Color the adenines green.
Color the guanines purple. Color the cytosines yellow.








old strand
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