

Animation Script for Replication

The numbers on the text passages below correspond to numbered frames in the animation. Look for these numbers in the upper left corner of the animation window.

- 1.** By replicating its DNA, a cell passes on a copy of its genetic information to its offspring. This cell is about to reproduce itself. Watch the dark mass at its center -- its chromosome, made up of DNA.
- 2.** The cell first copies its DNA...
- 3.** ...and then divides in two. Each cell receives one copy of the genetic information.
- 4.** Now let's watch this process at the molecular level.
- 5.** Enzymes called DNA polymerase float inside the cell. They are molecular machines, and their function is to make new DNA strands. When DNA is ready to be copied, a small section of the helix unwinds and molecules of DNA polymerase attach to each strand of the DNA.
- 6.** The DNA polymerase attracts nucleotides floating in the cell that complement, and hydrogen-bond to, the nucleotides on the DNA strand to which it is attached. As the DNA strand moves through the polymerase, more nucleotides are added.
- 7.** On each new strand, DNA polymerase adds nucleotides beginning from what is called the 5' end of the strand and building towards what is called the 3' end. These labels refer to the way that the DNA is constructed chemically. One of the original strands of DNA is oriented so that DNA polymerase can build the new strand continuously, creating a long unbroken sequence of nucleotides as the DNA helix unwinds.
- 8.** The other original DNA strand is oriented in the opposite direction. DNA polymerase must always add nucleotides to the growing strand in the 5' to 3' direction, which in this case is in the direction moving away from the unwinding helix. DNA polymerase builds this new strand in short segments that are later joined together by another enzyme.
- 9.** DNA polymerase keeps adding nucleotides to the new strands until the entire chromosome has been copied.
- 10.** The molecules of DNA polymerase fall off of the DNA, and the two DNA molecules twist into their familiar helix shapes. The cell now contains two identical sets of DNA, each made up of one new and one old strand.
- 11.** The cell can then continue to divide. Each new cell will contain all of the genetic information from the original cell, which includes instructions for creating proteins, like DNA polymerase, that will help the new cells to grow and function. In the upcoming sections, you will find out how the cell makes these proteins from its set of DNA instructions.