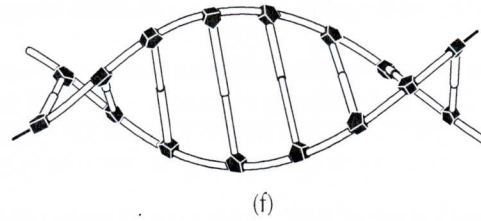
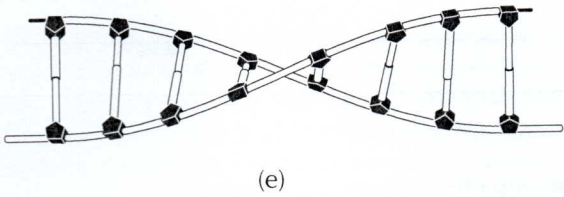


3. To complete the three-dimensional "double helix", gently twist the ladder until it resembles the following illustration (e.) Twist the model until it resembles (f). It will retain this shape.



4. Join your model to others in your class to make a large DNA molecule.

LAB-AIDS® # 71 THE MOLECULAR MODEL OF DNA AND ITS REPLICATION Student Worksheet and Guide (Part II)

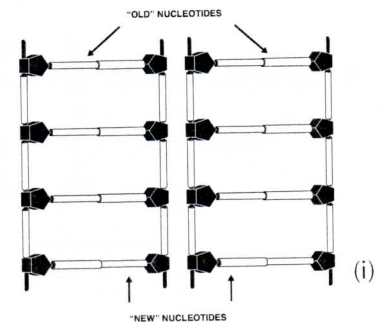
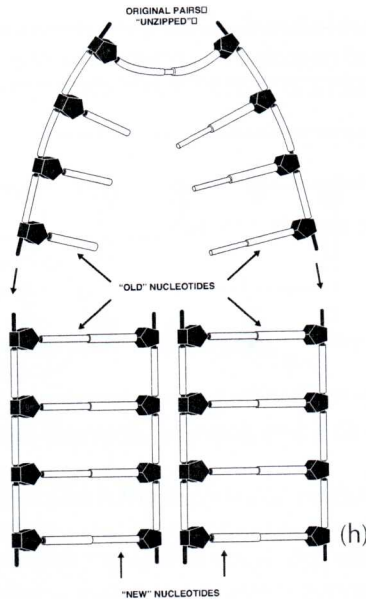
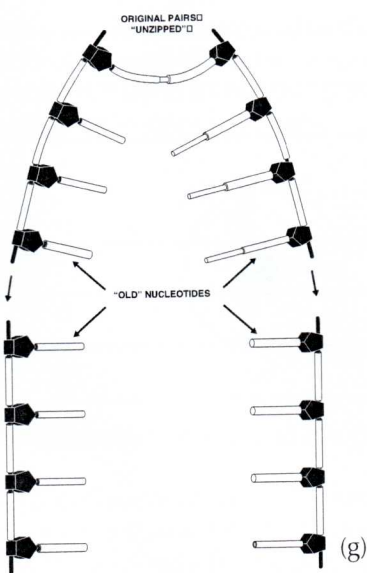
Replication of DNA

Scientists have known from careful measurement that both the chemical structure and amount of DNA in similar kinds of cells remain the same from generation to generation. This means that both the quality and quantity of the DNA must remain the same in cells derived from the same parent cell. If the model is to explain duplication of the DNA molecules, it has to explain how the amount and kind of DNA remains the same.

Imagine that the weak hydrogen bonds that hold the double helix together work similar to a zipper.

Procedure:

- Untwist your DNA to flatten into its ladder shape. Starting at one end of the molecular model, each pair can be separated or unzipped from its base partner one at a time. As a result, for example, this will leave an unpaired guanine (yellow) base end on one strand and an unpaired cytosine (blue) base on the other strand. When the DNA double helix continues to unzip, **new nucleotides** consisting of the deoxyribose sugar, phosphate and nitrogen base that can pair (*following the base pairing rule*) will then pair with the original nucleotides. (as in g)



- A new cytosine nucleotide attaches itself to the guanine by means of a hydrogen bond. On the opposite side of the ladder, the original cytosine forms a bond to a new nucleotide beginning a new double chain. (as in h)

Little by little the double helix unzips along its length and new nucleotides of the proper kind are added. By the time the end of the double helix has been reached, the two strands of DNA have separated. Each strand has manufactured an exact copy of itself. Two identical strands of four rungs each result to replace the original strand. (see illustration i)