



1. Assembled half of a DNA molecule



2. Messenger RNA complementing the DNA molecule



3. Messenger RNA transferred to ribosome site



4. Transfer RNA triplet with amino acid attached to it



5. Protein chain in place



6. Protein chain in cytoplasm after leaving ribosome site.

### Contents:

The RNA-Protein Synthesis Model has the following parts; 1. Mounting frame, 2. 1/2 of a DNA molecule consisting of 12 color-coded, lettered, large plastic pieces and a long rubber phosphate strand. (The DNA components are furnished with model B118 but are excluded from model B137. The B137 is for use by those who already have or intend to purchase DNA Model B107.). 3. 12 Messenger RNA bases (the small colored plastic pieces). 4. A long rubber strip with round holes representing phosphate. 5. 12 Transfer RNA bases (the medium-sized plastic pieces). 6. Four short rubber strips used to interconnect the transfer RNA bases and the amino acid. 7. Four amino acid pieces.

The colored plastic bases are lettered as follows; A=Adenine, C=Cytosine, T=Thymine, D=Deoxyribose, and U=Uracil. In the protein synthesis reaction these bases join and complement each other according to the code as shown in Table 1.

Table 1

DNA	Messenger RNA	Transfer RNA
A	U	A
C	G	C
G	C	G
T	A	U

### Procedure:

1. To demonstrate the principle of protein synthesis, place the mounting board in the upright position. Place the DNA bases in any desired order on the support rod.

Join the sugar ends of the DNA bases with the phosphate strand, forming 1/2 of a DNA molecule. See Fig. 1.

2. Join the small messenger RNA bases to the DNA bases according to the code in Table 1 as shown in Fig.2. Join the sugar ends of the messenger RNA bases with the shorter phosphate strand.

3. Remove the entire string of messenger RNA bases from the support rod and snap them onto the Ribosome support rod. Be careful not to turn the strip end for end. See Fig. 3.

4. Next attach three Transfer RNA bases to one of the small rubber strips. These bases must conform to the top three messenger bases on the Ribosome support rod according to the code in Table 1. In the upper slotted hole of the short rubber piece place an amino acid piece. Make sure right hand panel of the mounting board is closed and the metal strip is exposed. Mount the transfer RNA triplet on the Ribosome rod, joining the top three messenger bases. The amino acid piece must grip the metal strip magnetically and the rib on the back of the amino acid piece must nest in the groove in the mounting board. See Fig. 4.

5. Complete the set by joining three more transfer RNA triplets to the messenger RNA bases as described in step 4. Each joint between the amino acid pieces represents a peptide bond. The entire chain of four triplets represents a short piece of protein Fig. 5.

6. Carefully open the right hand panel. As the panel swings open the "energy bond" beads of the amino acids will pass through the slots in the triplet strip. Thus the strip of protein passes into Cytoplasm. Fig. 6.