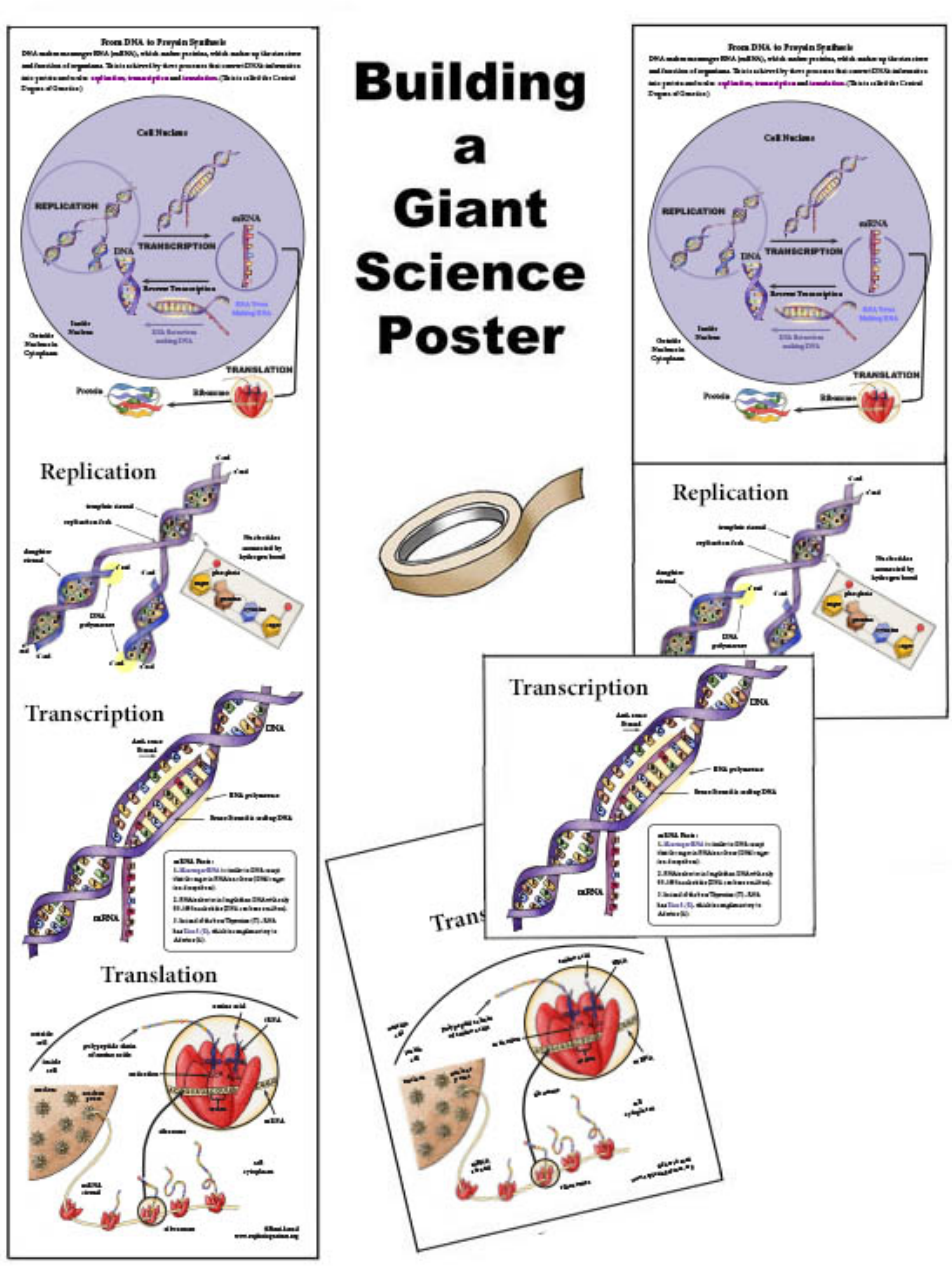
From DNA to Protein Synthesis - Giant Poster Building

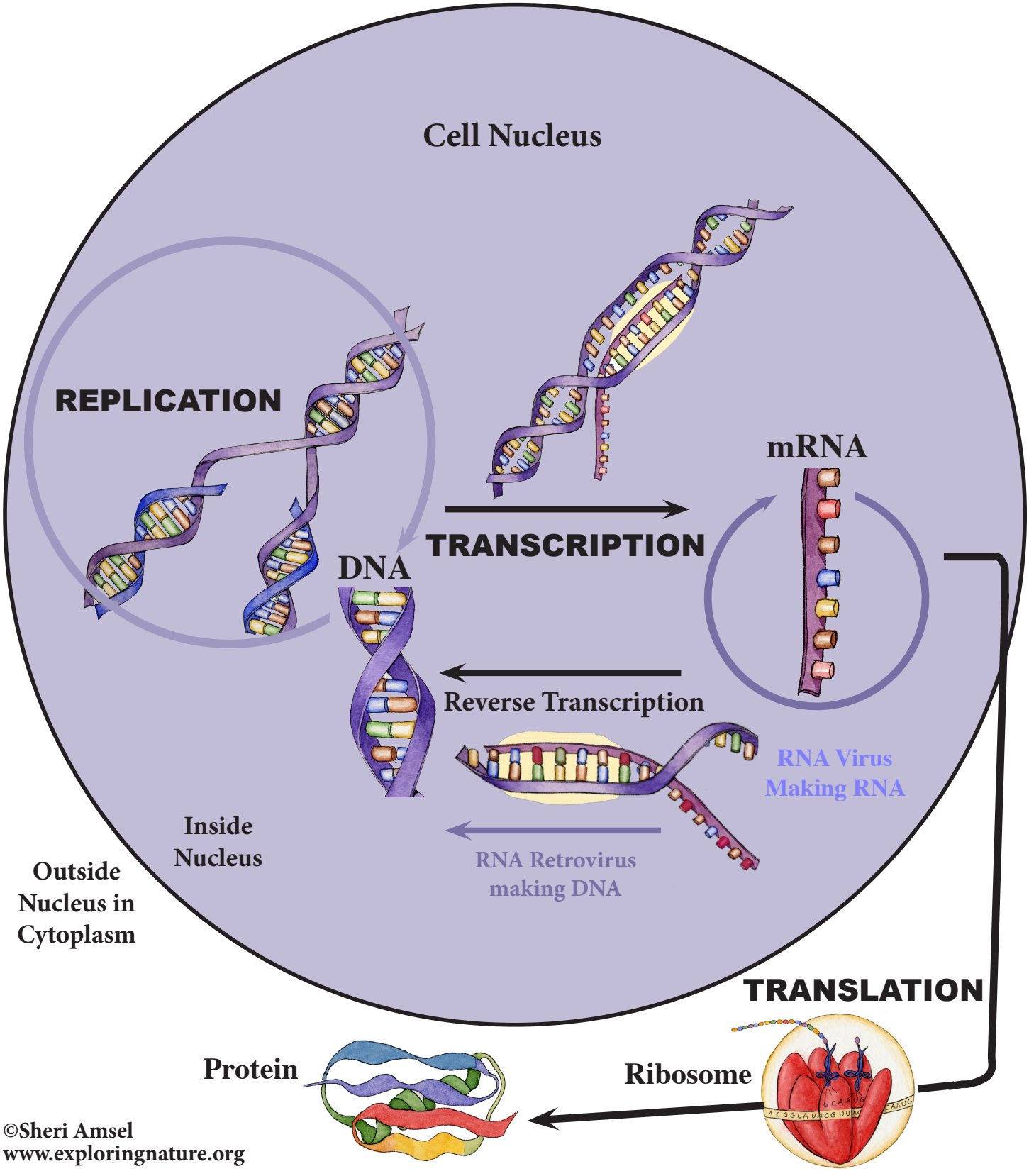
Giant posters are great visual aids to enhance educational topics. In addition to clarifying science concepts, they can represent 2-D Models for science processes and progressions. Print out the four 8.5 x 11" sections and piece them together into one giant, eye catching poster for the classroom or other educational displays.

This bundle includes a 4 page giant poster building resource about the **Central Dogma of Genetics - From DNA to Protein Synthesis**.



From DNA to Protein Synthesis

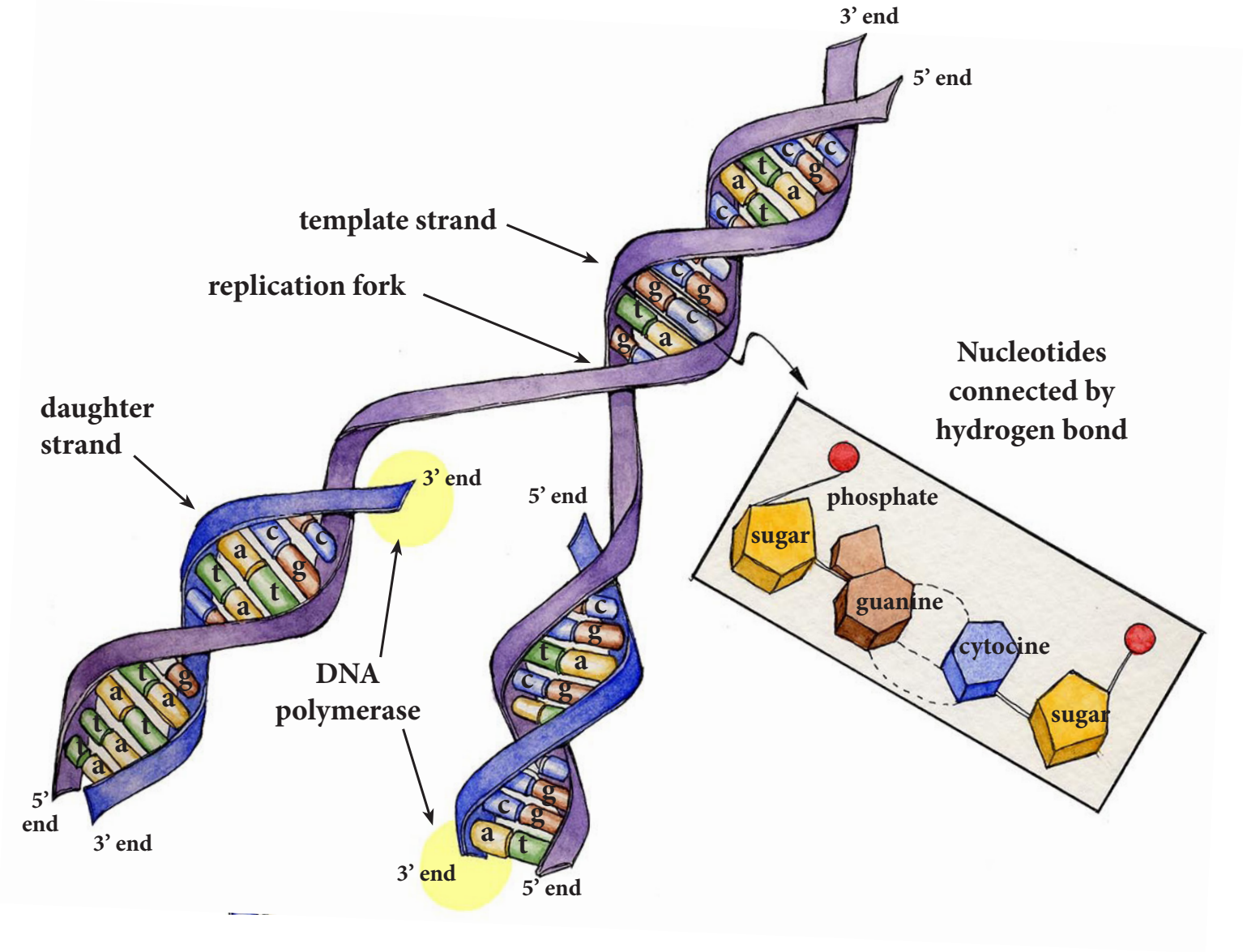
DNA makes messenger RNA (mRNA), which makes proteins, which makes up the structure and function of organisms. This is achieved by three processes that convert DNA's information into protein molecules: **replication, transcription** and **translation**. (This is called the Central Dogma of Genetics.)



Replication

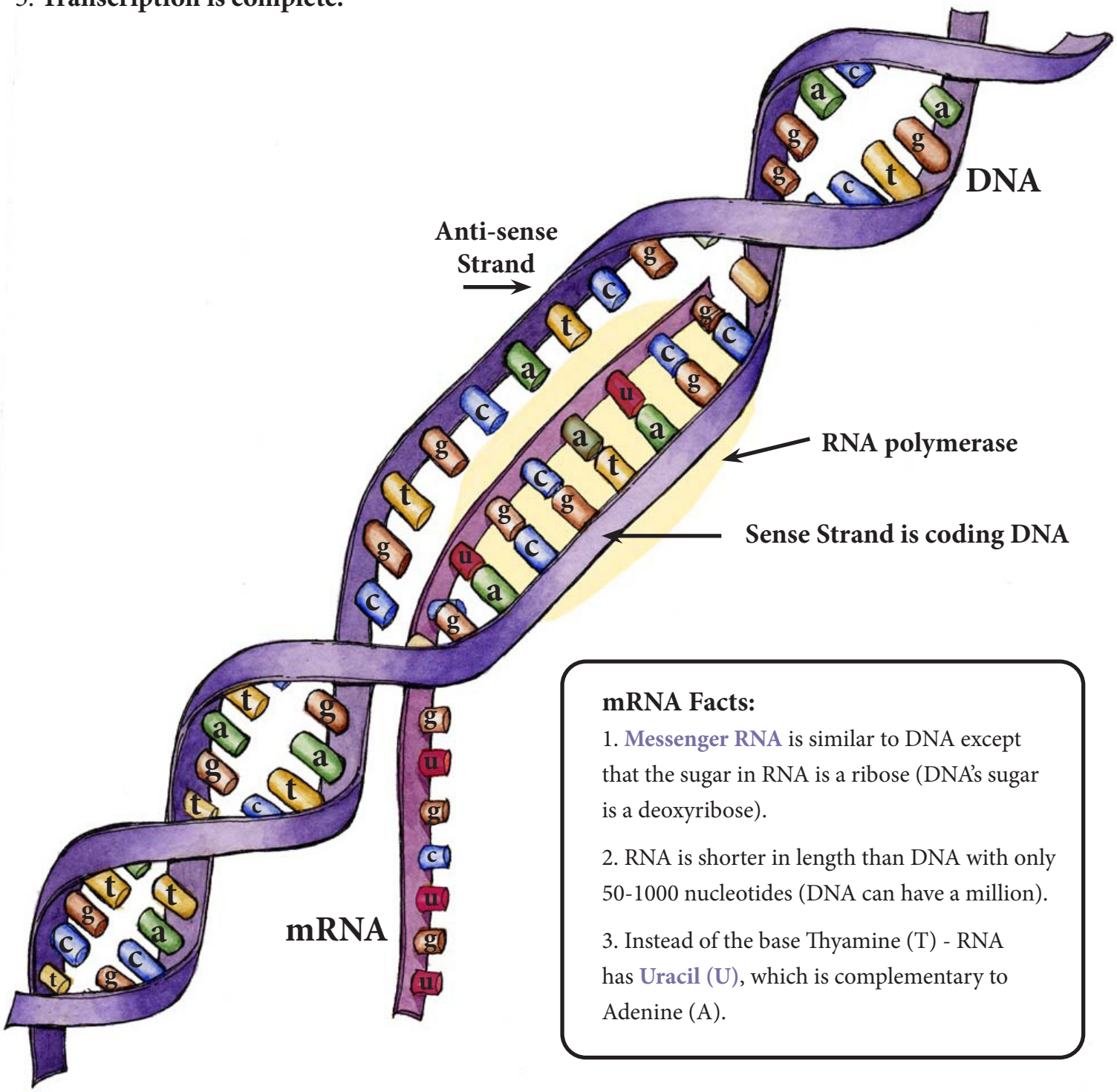
Replication is really just **gene-copying**. Organisms must be able to exactly copy and distribute all their DNA during every cell division. When DNA is ready to multiply, the double helix unwinds and unzips. A new strand will form and bond with the complementary base pairs for each side. Here are the steps:

1. There are free **nucleotides** floating in the cell's cytoplasm.
2. Each one contains one of the **four bases, a sugar and three phosphates**. The base attaches along the strand to its complementary matching base.
3. Non-matching bases are pushed away.
4. As all the matching bases are lined up, an **enzyme** binds the two sides together.
5. This results in two **DNA double helixes** that are identical to the first.
6. A new strand of DNA has been made – **replicated**.



Transcription

1. **Transcription** begins with the DNA double-helix unwinding and unzipping (as in replication).
2. A strand of **messenger RNA** comes in, reads, and copies the section of base pairs.
3. The order of the base pairs is like a code that names amino acids for building **proteins**.
4. mRNA carries the code **out of the nucleus**.
5. **Transcription is complete.**



mRNA Facts:

1. **Messenger RNA** is similar to DNA except that the sugar in RNA is a ribose (DNA's sugar is a deoxyribose).
2. RNA is shorter in length than DNA with only 50-1000 nucleotides (DNA can have a million).
3. Instead of the base Thyamine (T) - RNA has **Uracil (U)**, which is complementary to Adenine (A).

Translation

1. When the **messenger RNA** (mRNA) copy of the code is finally carried out of the nucleus, it leaves through small openings called **nuclear pores** and enters in the cell's cytoplasm.
2. Here the mRNA runs the code through an organelle in the cell called a **ribosome**. The ribosome will do the translation.
3. At the ribosome another molecule, called **transfer RNA** (tRNA), goes to work.
4. Transfer RNA carries a three base "**anticodon**" at one end and an amino acid at the other end. The anticodon binds with the matching codon on the mRNA.
5. In this way tRNA delivers the c**orrect amino acid for the protein** being built.
6. **Protein synthesis** is complete.