DNA Transcription out of Paper Clips

Background:
- **Transcription** is the process of creating a complementary RNA molecule from a DNA template.
- Unlike DNA replication, transcription results in an RNA molecule that includes uracil (U) in place of thymine (T).
- In this activity, you will construct a model of RNA from the DNA model created in Part I.

Materials: Colored paper clips will represent the following bases:
- (A)denine = Blue
- (T)hymine = Yellow
- (G)uanine = Green
- (C)ytosine = Red
- (U)racil = Silver

PART I: Building a DNA Molecule
1. Construct, by connecting the paper clips (which represent nucleotide bases) in the following DNA sequence.

A	T	G	A	T	G	G	A
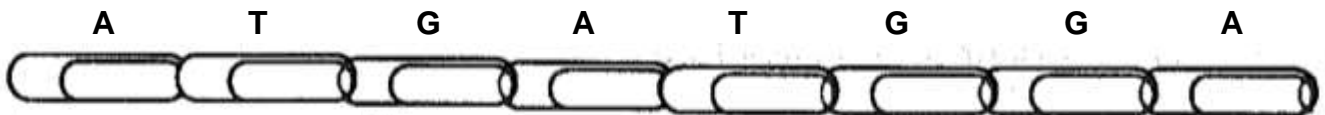
This single stand represents only part of the DNA double helix.

2. Using the base pairing rules (**A**denine to **T**hymine; **G**uanine to **C**ytosine), construct a complementary DNA sequence to complete the double strand. Now you have completed a double strand of DNA that represents a **gene**.
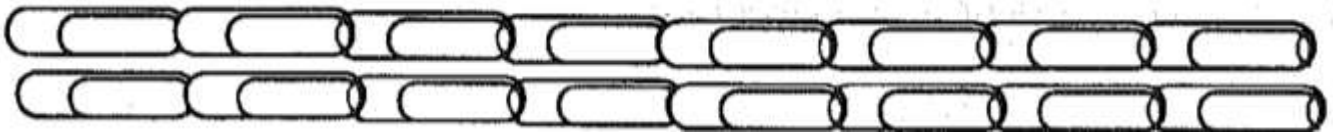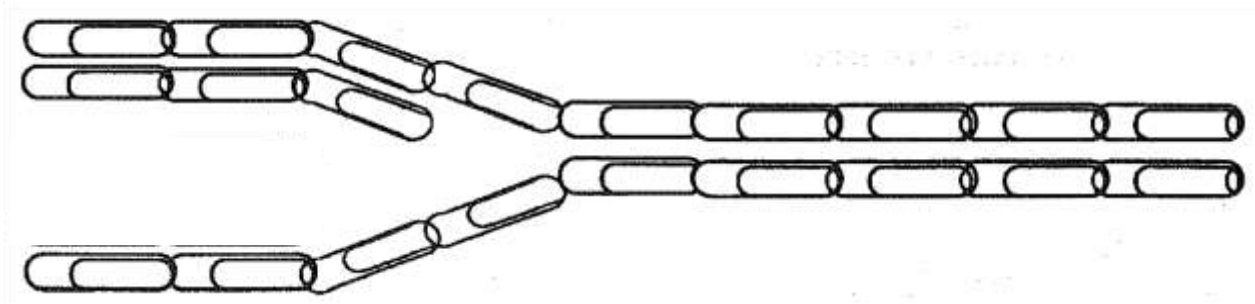

3. Record this complimentary DNA sequence on the data sheet.

PART II: Formation of mRNA
4. Separate the double-strand of DNA.
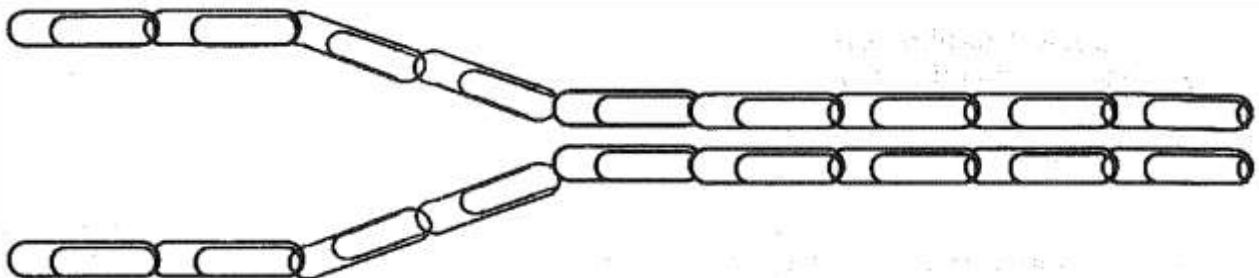
5. Build an mRNA strand that is complimentary to the original DNA strand (shown above).
   a   The same base pairing rules apply, except **A**denine bonds with **U**racil. mRNA does not contain **T**hymine.

6. Set the new mRNA molecule to the side. Record your results in the mRNA (I) blank on the data section.

Data:

Complimentary DNA strand: _____

Complimentary mRNA strand: _____

Questions:

1. Describe how *the process* of RNA transcription is *similar* to DNA replication.

2. Describe how *the process* of RNA transcription is *different* from DNA replication.

3. How is the RNA molecule similar to the DNA molecule?

4. How is the RNA molecule different from the DNA molecule? Give at least 2 differences.

5. Imagine the original DNA sequence was changed so the first nitrogen base (A) was changed to a guanine (G). Give the new complimentary mRNA sequence that would result from this change.