

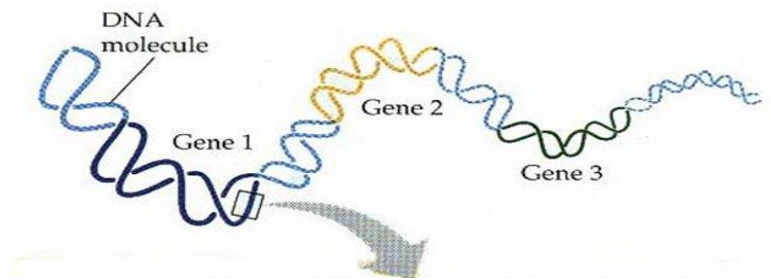
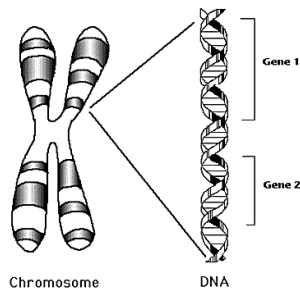
NAME _____

3.2 Review

3.2a. What is the DNA Code 3.2 b What is the connection between genes and proteins?

1. What are the 4 nucleotide bases and what do they pair up with?

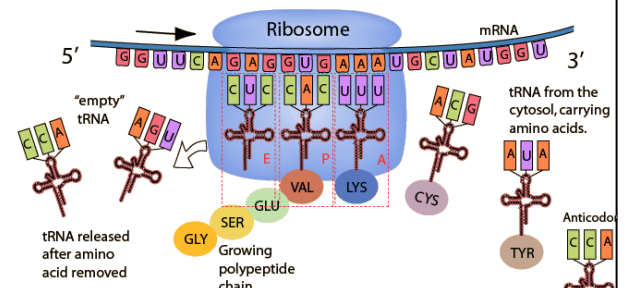
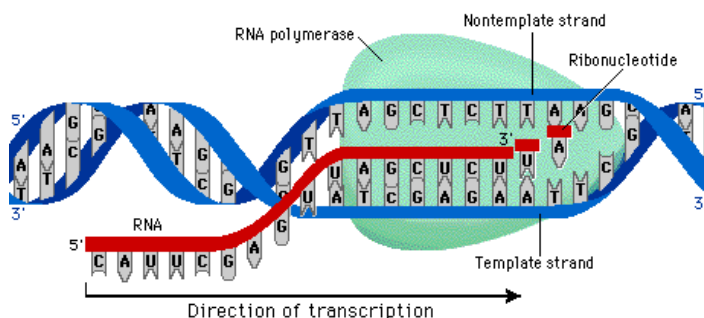
- DNA is read in segments, called genes.
- A gene is a particular sequence of nucleotide bases that code for a protein.
- The sequence of bases determines what sequence the amino acids are in, which determines the protein.



3.2 c. How are proteins produced in the cell? 3.2 d. How does the sequence of nucleotides in DNA determine the sequence of amino acids in a protein?

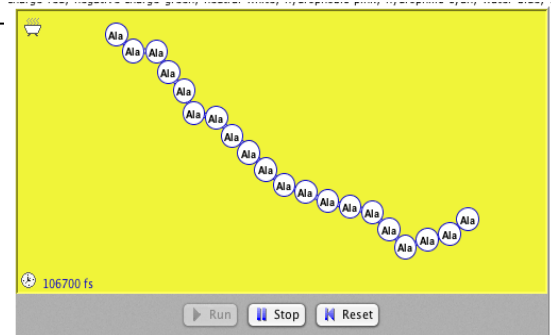
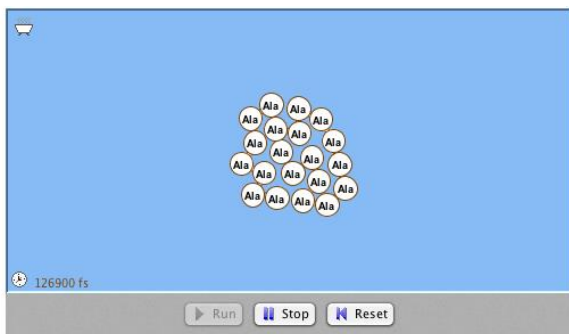
1. What is the difference between transcription and translation?

2. Describe the process of proteins synthesis from beginning to end. Refer to 3.2.1 pdf and SRS for help.



3.2 f. What determines the shape of a protein? 3.2 g. Is the shape of a protein affected by its surrounding environment?

- Many amino acids have different properties (positive, negative, or neutral charge). Therefore the amino acids present and their order in the chain affect the shape of the protein due to the following forces.
1. What are the 4 forces that determine the shape of a protein? Refer to 3.2.3 pdf and SRS for help.
 2. Define hydrophilic and describe what hydrophilic amino acids do in water.
 3. Define hydrophobic and describe what hydrophobic amino acids do in water.
 4. Look at the diagrams below. Determine if they show hydrophilic or hydrophobic amino acids.



3.2 e. What is a mutation? 3.2 h. How does a change in the DNA code affect the shape of a protein? 3.2 i. Can changing just one nucleotide in a gene change the shape of a protein?

1. What is the difference between a point mutation and a frameshift mutation?
- Mutation is a change in one base or bases due to addition or deletion of a base of DNA.
 - This can change the codon, which can change amino acids.
 - If an amino acid of one property is replaced with an amino acid of another property this can change the interactions of the amino acids and the shape of the protein.
 - Examples: Tay Sachs and Sickle Cell
 - A single base changes glutamic acid (hydrophilic amino acid) to change to valine (hydrophobic amino acid)
 - This change causes valine (a hydrophobic amino acid) to stick to the hydrophobic pocket of another hemoglobin.
 - The hemoglobin sticking together causes the cell to be sickle shaped.

| | Normal | Missense Mutation |
|--|----------------------------|----------------------------|
| Partial DNA Sequence of Beta Globin Gene: | CCT GAG GAG GGA CTC CTC | CCT GTG GAG GGA CAC CTC |
| Partial RNA Sequence: | CCU GAG GAG | CCU GUG GAG |
| Partial Amino Acid Sequence for Beta Globin: | Pro — Glu — Glu | Pro — Val — Glu |
| Hemoglobin Molecule: | | |
| Red Blood Cell: | | |