

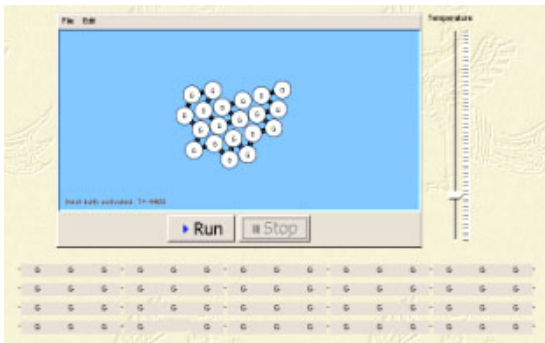
Name _____

Teacher _____

Date _____

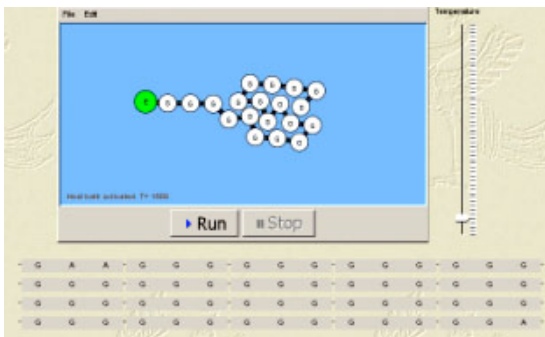
PROTEIN SHAPING**PRE-TEST**

1. The model below represents a protein surrounded by water molecules. It curls into a ball like this.



Notice that each white circle represents the amino acid glycine. Why do you think the protein folds this way?

Scientists substituted the first amino acid (glycine, G) in the chain with another one (E, glutamic acid). Look what happened to the protein (below):



Why do you think this single replacement of an amino acid affected the shape of the protein chain the way it did?

How do you think the shape of this protein will change if the same type of

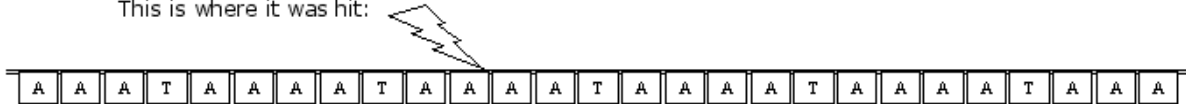
amino acid would be placed on the other end of the protein chain? Explain your prediction or draw what you think the protein would look like.

2. A piece of DNA was hit by radiation, breaking the strand of nucleotides. To repair the damage, a nucleotide was inserted as a patch

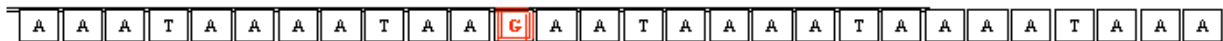
This is your DNA before it was hit by a radiation particle:



This is where it was hit:



This is the same DNA after nucleotide **G** was inserted



Will the DNA always produce a different protein now? On what does this depend?

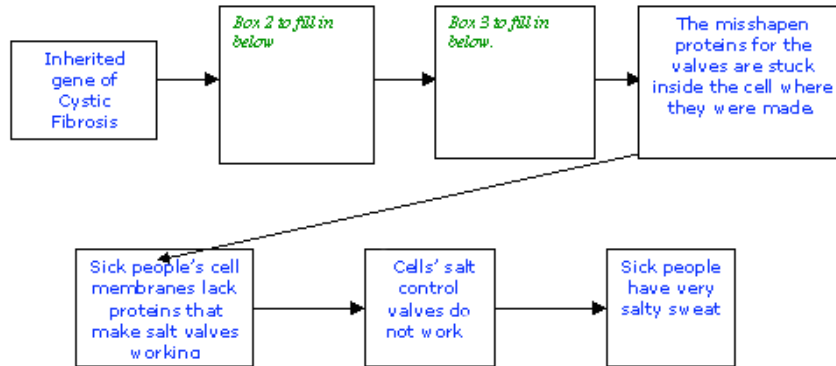
3. There is a dangerous human disease, called Cystic Fibrosis that affects various organs, making it hard to breathe. It often shortens peoples' lifespan. It is known that Cystic Fibrosis is an inherited disease, that is, one that can be passed on from parents to children.

Trying to uncover the cause of the disease and seeking a cure, scientists noticed that those with this disease have very salty (chloride-filled) sweat. Scientists isolated a protein from the skin of healthy individuals and found that it works like a control valve, regulating how much chloride goes out with the sweat. People with Cystic Fibrosis are missing that protein valve. Scientists discovered that, because the protein was misshapen, it could not take its place in the cell membrane, where it controls the flow of salt in and out of the cell.

Imagine yourself working with the team of scientists looking for the cure of Cystic Fibrosis. How would you present the connection between the genes (sequence of DNA) and the "salty sweat" symptoms to fellow

scientists?

A. Fill in the two missing boxes below.



Box 2:

Box 3:

B. How you would possibly attempt to cure the illness?

I would attempt to cure the illness by....