

## Genetic Code and Protein Formation

### Learner Outcome:

The student will be able to:

build a DNA molecule out of fuzzy sticks and remove a nitrogen base in the model to represent a mutation in the chromosome to demonstrate the effect on the protein produced (MS-LS3-1).

### Directions:

- 1) Make a complete DNA molecule by filling in the base that matches the base on the DNA strand. A message (RNA) is sent from the DNA code to the ribosomes to put together the amino acids in a certain order to assemble a protein.
- 2) Find the amino acid that would go with the code for each codon on the DNA strand.
- 3) Fill in the amino acids on the blanks on the bottom of the page. When these amino acids are placed together, they form a protein that can determine a trait in the human body.

DNA Strand

C-----

G-----

C-----

T-----

T-----

C-----

G-----

G-----

G-----

T-----

G-----

A-----

GGG=proline amino acid

CGC=alanine amino acid

TGA=threonin amino acid

TTC=lysine amino acid

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = Protein that  
determines a trait in the body

**Additional Directions and Questions:**

1. Sometimes the proteins do not form like they should. In the DNA model, replace the 2<sup>rd</sup> nitrogen base, guanine, with adenine. Circle the base to be changed in your DNA strand. Take off the blue guanine pipe cleaner and replace with the green adenine pipe cleaner.
  
2. Read the section on genetic disorders on page 118 in your text book.
  
3. When an incorrect change to the structure of the DNA occurs, this is called a  
  
\_\_\_\_\_.
  
4. Name 1 genetic disorder from the reading. Describe the nature of the disorder.

## DNA Model Lab

Our genes are made of deoxyribonucleic acid, DNA, DNA contains the code for making proteins that make us up. This includes our hair color, eye color, skin tone, height, etc.

Today, we are going to make a 3-D model of DNA from pipe cleaners.

Black pipe cleaner=sugar/phosphate backbone

Green pipe cleaner=adenine

Red pipe cleaner=thymine

Yellow pipe cleaner=cytosine

Blue pipe cleaner=guanine

Before you can get started, you need to answer some questions.

1. List the 4 nitrogen bases.

- \*
- \*
- \*
- \*

2. What does adenine bond with?

3. What does guanine bond with?
4. A nucleotide is the basic building block of DNA. What 3 parts make up a nucleotide?

- \*
- \*
- \*

5. How many nitrogen bases form a “code”? \_\_\_\_\_

6. Fill in the complimentary strand of DNA to the one listed to make a double stranded molecule of DNA.

DNA Strand

C-----

G-----

C-----

T-----

T-----

C-----

G-----

G-----

G-----

7. What 2 parts of the nucleotide make up the “backbone” of DNA?

\*

\*

8. What part of the nucleotide makes up the “steps” of the ladder?

---

9. Using your pipe cleaners, construct a model of DNA that follows the code in question 6.

10. Describe the shape of your DNA model.

11. How many codons are on your DNA molecule?