

DNA Detectives What is Your DNA Alias?

The central dogma of molecular biology

http://en.wikipedia.org/wiki/Central_dogma_of_molecular_biology

We use four letters to code all the information contained in DNA: A, T, C and G. The letters are used in groups of three. A group is called a codon.

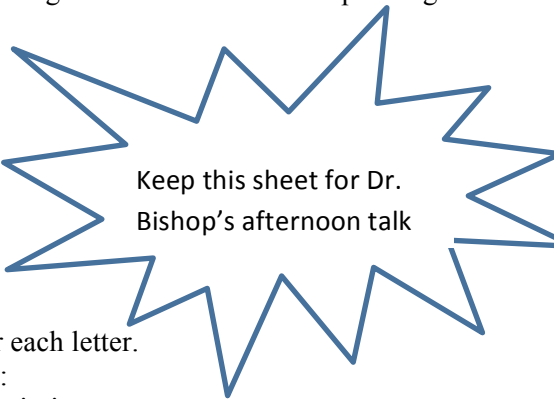
DNA contains the information that is needed by your body to make proteins. The different proteins have specific functions, such as making our hearts, hair, eyes and ears. The smallest part of the proteins are amino acids. There are 20 amino acids. One or more can make up a protein, depending on the specific protein.

Each amino acid is represented by at least one codon. Because each codon is coded with three letters, the string of letters used to represent the amino acids in a specific protein can get pretty long. To avoid this, scientists have made a kind of shorthand, and have given each amino acid its own letter, corresponding to our alphabet.

Using this shorthand to represent the amino acids in a protein is a way of describing, or "spelling" this part of the protein. Written in this shorthand, the code is called the DNA Alias; each letter in the DNA Alias actually represents a group of three letters (a codon).

When scientists see the DNA Alias of a particular protein, they can find the protein's DNA sequence by reversing the coding process. For fun, we can perform the same process on any word by converting each letter to the corresponding codon, and in so doing, find its "DNA sequence". Let's try it with your name.

Write each letter of your FIRST name on the lines below:



Use the table below to help you convert your name into its Amino Acid Alias.

- Step 1:** Find each letter of your FIRST name.
- Step 2:** Look at the Amino Acid Codon column to find the Amino Acid code for each letter.
- Step 3:** Replace each letter of your name with its three-letter Amino Acid codon:
- Step 4:** Write the DNA code from each Amino Acid codon. This is reverse transcription.
- Step 4:** Use the appropriate color to indicate bead color for each DNA code. You may circle, underline, or color the letters with the markers provided. (This will help you make your lanyard)

| AA Codon | DNA Code | AA codon | DNA Code | AA Codon | DNA Code |
|----------|----------|----------|----------|----------|----------|
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |
| AA Codon | DNA Code | AA codon | DNA Code | AA Codon | DNA Code |
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ | _____ | _____ |

Base colors: **A** = green
T = red
C = blue
G = yellow

DNA
Base pair
 pairing
A & T
T & A
C & G
G & C

| Our Alphabet | Amino Acid Name | Amino Acid Codon |
|--------------|-----------------|-------------------------|
| A | Alanine | GCT |
| B | | GCA (Alanine) |
| C | Cysteine | TGC |
| D | Aspartic acid | GAT |
| E | Glutamic acid | GAG |
| F | Phenylalanine | TTT |
| G | Glycine | GGG |
| H | Histidine | CAT |
| I | Isoleucine | ATA |
| J | | ATC (Isoleucine) |
| K | Lysine | AAG |
| L | Leucine | CTC |
| M | Methionine | ATG |
| N | Asparagine | GAC |
| O | | GAT (Asparagine) |
| P | Proline | CCC |
| Q | Glutamine | GAG |
| R | Arginine | CGT |
| S | Serine | TCA |
| T | Threonine | ACT |
| U | | ACG (Threonine) |
| V | Valine | GTC |
| W | Tryptophan | TGG |
| X | | GTA (Valine) |
| Y | Tyrosine | TAC |
| Z | | TAT (Tyrosine) |

(The table shows simplified versions
 Most amino acids are actually
 by multiple codons).

of the codons.
 represented