

SAY IT WITH DNA: Making New Messages

Since you will be expected to decipher a DNA message in the unit exam, it would be wise to get as much practice as possible. If you can have fun in the process, so much the better! You are to think up at least one good (clever? funny?) message which can be written using only the 20 symbols representing the 20 amino acids. Those 20 amino acids are represented by a universal single letter code, using all the letters in the English alphabet except B, J, O, U, X, and Z. This means, of course, that your message cannot have any B, J, O, U, X, or Z letters in it! A little restrictive, you see, so you will need to be a bit creative.

After you have created your message (in English) on scratch paper, carefully print its DNA code along the length of a full separate sheet of notebook paper, held horizontally, using DNA triplets ONLY. Try to keep it to one long row; make the letters clear. Do NOT include the English translation; just keep it to your self. Now place your name and period at the top and hand it in. Your message will be exchanged with that from another message-creator for translation practice, and will be entered into our annual DNA Message Contest. CAUTION: obscene or derogatory messages are not acceptable, so use good judgment. You may enter one or more times. Hand in your translated message with your name as "translator".

You will quickly notice that there is more than one codon for nearly every amino acid. Make a point of using different codons whenever you can for the same (amino acid) letter-symbol, especially when they occur side by side in succession.

Use the DNA-Amino Acid Dictionary below to help make your messages. You will need the tRNA Dictionary on your Protein Synthesis Worksheet for solving the messages.

“DNA - AMINO ACID DICTIONARY”

DNA Codons and the Amino Acids (symbols and abbreviations) for which they code.

| DNA codon | AA sym | AA abr |
|-----------|--------|--------|
| CGA | A | ala |
| CGC | A | ala |
| CGG | A | ala |
| CGT | A | ala |
| ACA | C | cys |
| ACG | C | cys |
| CTA | D | asp |
| CTG | D | asp |
| CTC | E | glu |
| CTT | E | glu |
| AAA | F | phe |
| AAG | F | phe |
| CCA | G | gly |
| CCC | G | gly |
| CCG | G | gly |
| CCT | G | gly |

| DNA codon | AA sym | AA abr |
|-----------|--------|--------|
| GTA | H | his |
| GTG | H | his |
| TAA | I | iso |
| TAG | I | iso |
| TAT | I | iso |
| TTC | K | lys |
| TTT | K | lys |
| AAC | L | leu |
| AAT | L | leu |
| GAA | L | leu |
| GAC | L | leu |
| GAG | L | leu |
| GAT | L | leu |
| TAC | M | met |
| TTA | N | asn |
| TTG | N | asn |

| DNA codon | AA sym | AA abr |
|-----------|--------|--------|
| GGA | P | pro |
| GGC | P | pro |
| GGG | P | pro |
| GGT | P | pro |
| GTC | Q | glu |
| GTT | Q | glu |
| GCA | R | arg |
| GCC | R | arg |
| GCG | R | arg |
| GCT | R | arg |
| TCC | R | arg |
| TCT | R | arg |
| AGA | S | ser |
| AGC | S | ser |
| AGG | S | ser |
| AGT | S | ser |

| DNA codon | AA sym | AA abr |
|-----------|--------|--------|
| TCA | S | ser |
| TCG | S | ser |
| TGA | T | thr |
| TGC | T | thr |
| TGG | T | thr |
| TGT | T | thr |
| CAA | V | val |
| CAC | V | val |
| CAG | V | val |
| CAT | V | val |
| ACC | W | trp |
| ATA | Y | tyr |
| ATG | Y | tyr |
| ACT | - | space |
| ATC | - | space |
| ATT | - | space |

Letters NOT available: B J O U X Z