

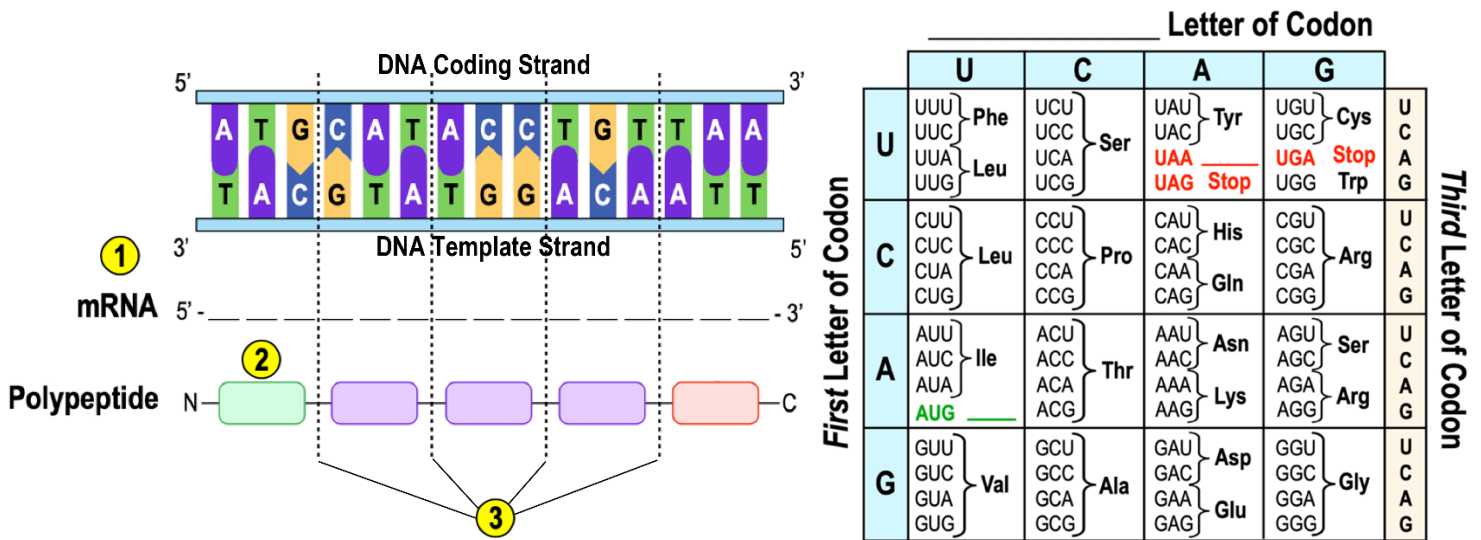
CONCEPT: GENETIC CODE

- **Genetic Code:** a table that reveals how DNA/RNA encode the sequence of amino acids in a protein.
 - Relatively universal across all organisms but can have some differences.
 - Analyzes one _____ at a time, each which reveals one amino acid.

How to Use the Genetic Code

- Using the genetic code is a _____-step process:
 - ① Use the *coding* DNA sequence to reveal the mRNA sequence (replacing **T** with **U**).
 - ② Identify the _____-nucleotide codon *frames* within the mRNA transcript (including start & stop codons).
 - ③ Identify the *amino acid* that corresponds with each codon until a _____ codon is reached.
- The genetic code shows the _____ letter (left side) _____ letter (top) and _____ letter (right side) of all possible codons.

EXAMPLE: Determine the polypeptide sequence from the following DNA sequence:



PRACTICE: The redundancy of the genetic code is a consequence of _____.

- Having more codons than amino acids.
- Having four different letters (As, Cs, Gs, and Us) in the codon alphabet.
- Having fewer codons than there are amino acids.
- Each codon having a single amino acid.

CONCEPT: GENETIC CODE

PRACTICE: A particular triplet of bases in the template strand of DNA is 5'-AGT-3'. What would be the corresponding codon for the mRNA that is transcribed?

- a) 3'-UCA-5'.
- b) 3'-UGA-5'.
- c) 5'-TCA-3'.
- d) 3'-ACU-5'.

PRACTICE: A particular triplet of bases in the coding sequence of DNA is AAA. The anticodon on the tRNA that binds the mRNA codon is _____.

- a) TTT.
- b) UUA.
- c) UUU.
- d) AAA.

Use the codon table on the right to answer the following questions:

PRACTICE: Which of the following sequences of nucleotides are possible in the template strand of DNA that would code for the polypeptide sequence Phe-Leu-Ile-Val?

- a) 5'-TTG-CTA-CAG-TAG-3'.
- b) 5'-AUG-CTG-CAG-TAT-3'.
- c) 3'-AAA-AAT-ATA-ACA-5'.
- d) 3'-AAA-GAA-TAA-CAA-5'.

		Second Letter of Codon				
		U	C	A	G	
First Letter of Codon	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA } Stop UAG } Stop	UGU } Cys UGC } UGA } Stop UGG } Trp	U C A G
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } Arg CGA } CGG }	U C A G
	A	AUU } AUC } Ile AUA } AUG } Start	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } Ala GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U C A G

PRACTICE: What amino acid sequence will be generated, based on the following mRNA codon sequence?

5'-AUG-UCU-UCG-UUA-UCC-UUG-3'

- a) Met-Arg-Glu-Arg-Glu-Arg.
- b) Met-Glu-Arg-Arg-Glu-Leu.
- c) Met-Ser-Leu-Ser-Leu-Ser.
- d) Met-Ser-Ser-Leu-Ser-Leu.

		Second Letter of Codon				
		U	C	A	G	
First Letter of Codon	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA } Stop UAG } Stop	UGU } Cys UGC } UGA } Stop UGG } Trp	U C A G
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } Arg CGA } CGG }	U C A G
	A	AUU } AUC } Ile AUA } AUG } Start	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } Ala GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U C A G