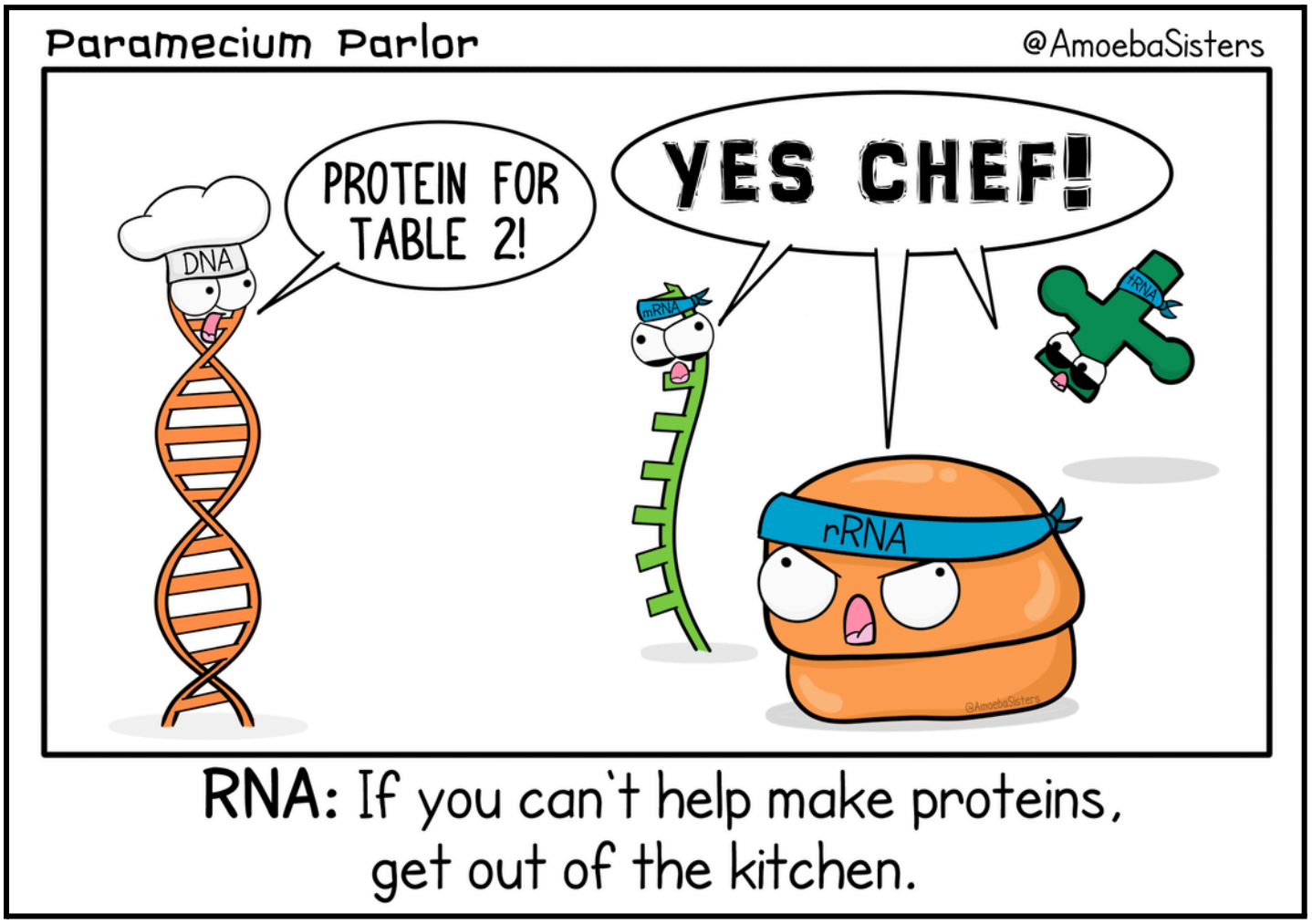
A Level Biology

DNA, mRNA & tRNA

Name:



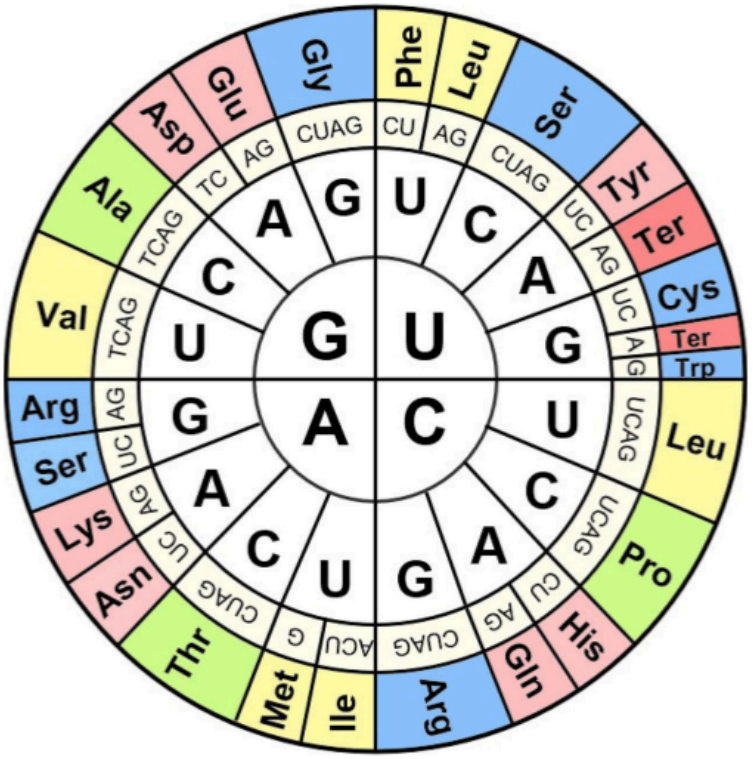
Protein Synthesis

- ➔ **Know that a gene is a sequence of bases on a DNA molecule coding for a sequence of amino acids in a polypeptide chain.**
- ➔ **Know the structure of mRNA including nucleotides, the sugar phosphate backbone and the role of hydrogen bonds.**
- ➔ **Know the structure of tRNA, including nucleotides, the role of hydrogen bonds and the anticodon.**
- ➔ **Understand the processes of transcription in the nucleus and translation at the ribosome, including the role of sense and antisense DNA, mRNA, tRNA and the ribosomes.**
- ➔ **Understand the nature of the genetic code, including triplets coding for amino acids, start and stop codons, degenerate and non-overlapping nature, and that not all the genome codes for proteins.**

1. **What is a gene?**
2. **Explain what is meant by a codon and the idea of a triplet code.**

Notes:

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

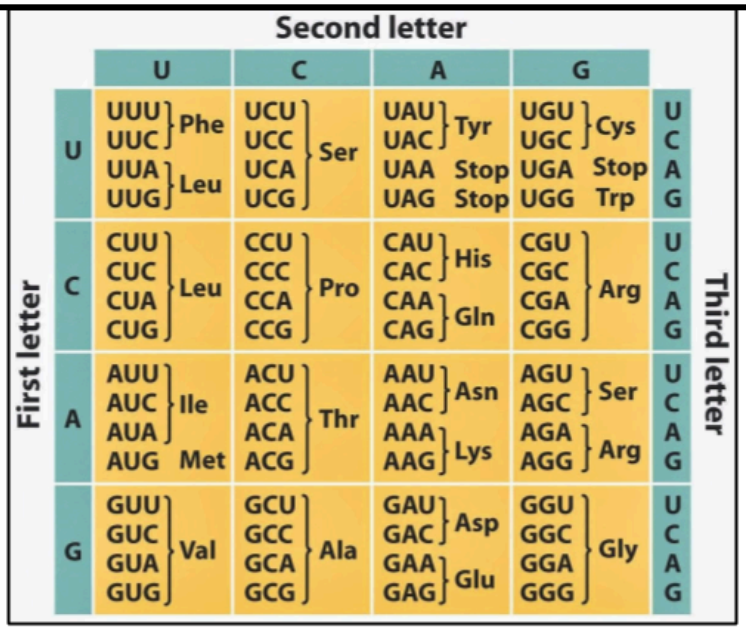


Transcribing DNA to mRNA

Deduce the mRNA sequence that would be **complementary** to the following DNA sequence. (Remember Uracil replaces T in RNA)

DNA **TAC ATG CGG TTT ACA AGC ACT**

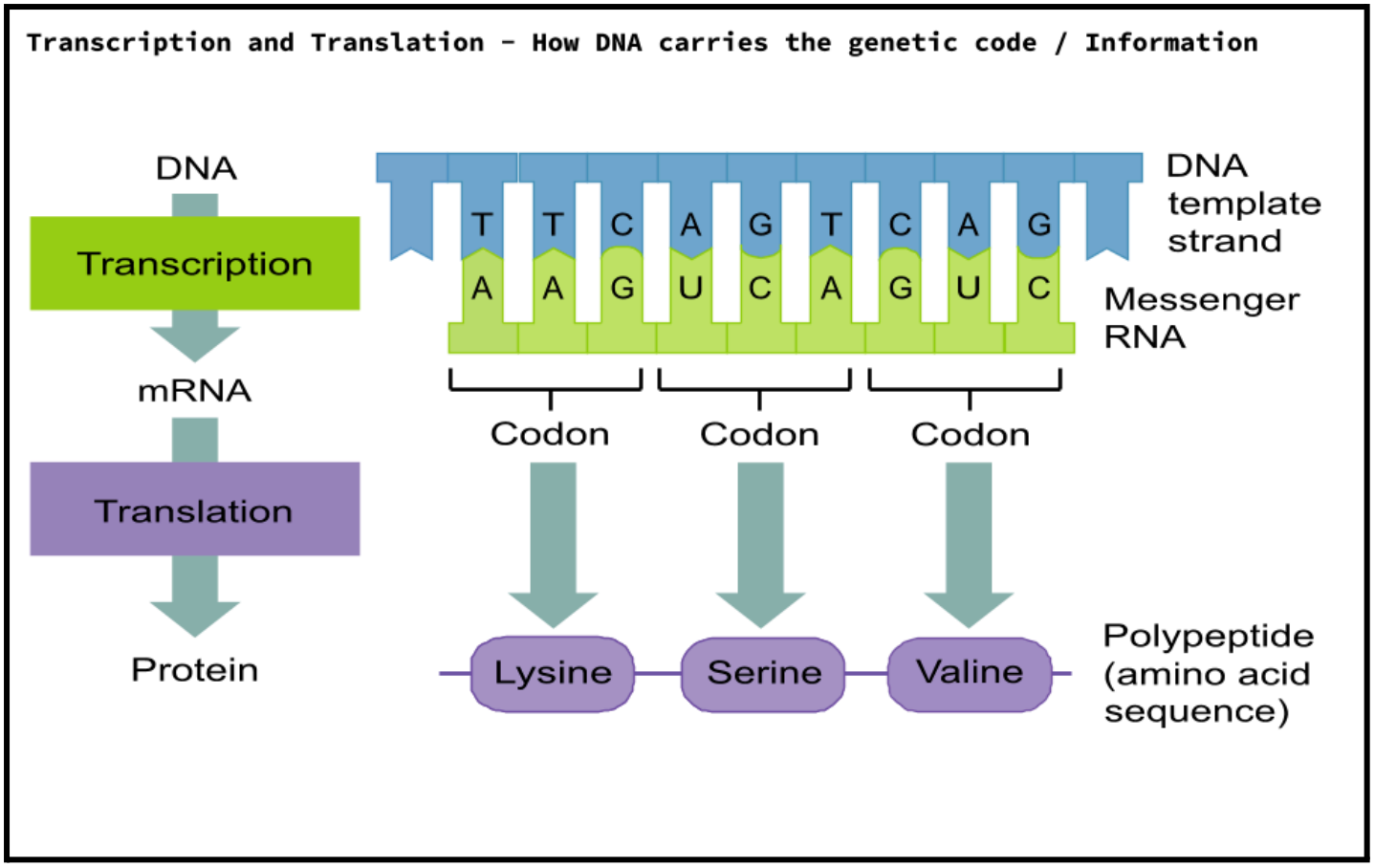
Converting the genetic code into an amino acid sequence.



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

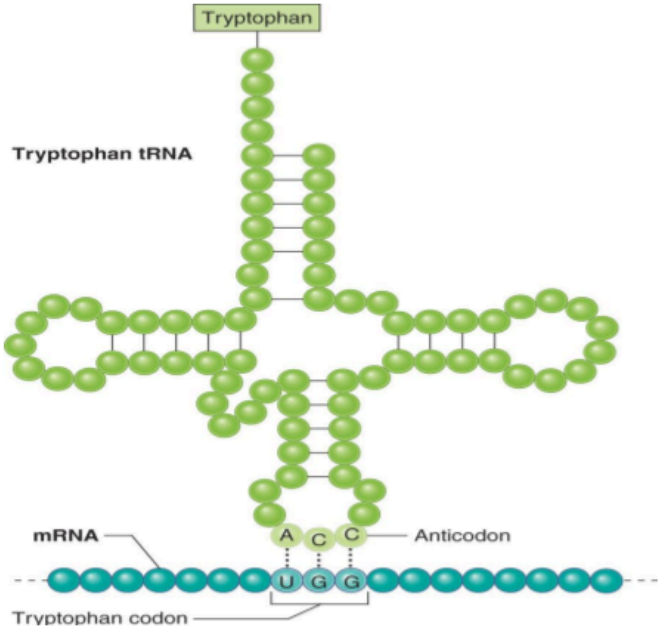
mRNA **AUG UAC GCC AAA UGU UCG UGA**

Transcription and translation



Define the terms transcription & translation.

Comparing mRNA and tRNA



Compare mRNA & tRNA

mRNA	tRNA