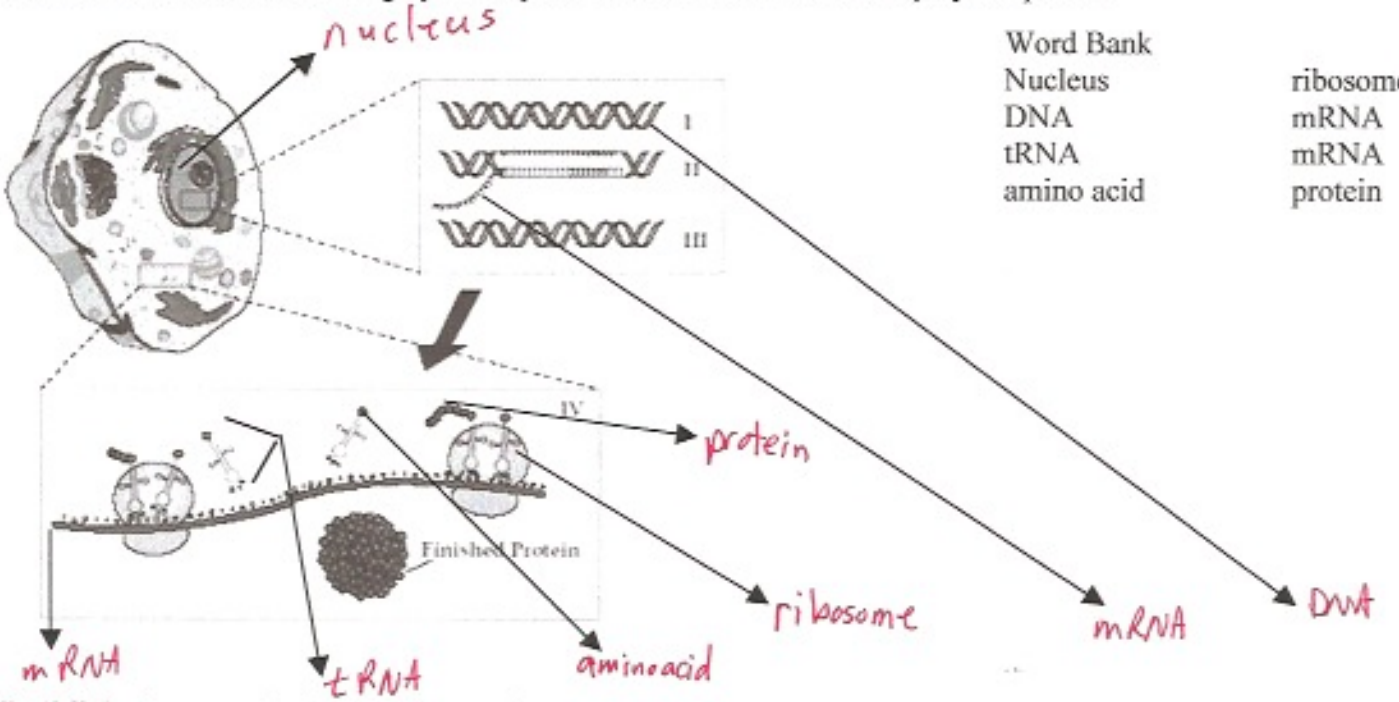
PROTEIN SYNTHESIS WORKSHEET

PART A. Read and Highlight the important information. Circle vocabulary.

Protein synthesis is the process used by the body to make proteins. The first step of protein synthesis is called Transcription. It occurs in the nucleus. During transcription, mRNA transcribes (copies) DNA. DNA is "unzipped" and the mRNA strand copies a strand of DNA. Once it does this, mRNA leaves the nucleus and goes into the cytoplasm. mRNA will then attach itself to a ribosome. The strand of mRNA is then read in order to make protein. They are read 3 bases at a time. These bases are called codons. tRNA is the fetching puppy. It brings the amino acids to the ribosome to help make the protein. The 3 bases on tRNA are called anti-codons. Remember, amino acids are the building blocks for protein. On the mRNA strand, there are start and stop codons. Your body knows where to start and stop making certain proteins. Just like when we read a sentence, we know when to start reading by the capitalized word and when to stop by the period.



Word Bank

Nucleus	ribosome
DNA	mRNA
tRNA	mRNA
amino acid	protein

PART B. Answer the following questions:

1. What is the first step of protein synthesis? transcription
2. What is the second step of protein synthesis? translation
3. Where does the first step of protein synthesis occur? nucleus
4. Where does the second step of protein synthesis occur? cytoplasm in cell
5. Nitrogen bases are read 3 bases at a time.
6. The three bases on the mRNA strand are called codons.
7. The three bases on tRNA are called anticodons.
8. What is the start codon? AUG
9. What are the stop codons? UAA UAG UGA
10. A bunch of amino acids put together makes protein.

PART C. Use your codon chart to determine the amino acid sequence. Remember to read through the strand and ONLY start on AUG and STOP when it tells you to stop. Follow example below:

Example:

DNA → AGA CGG TAC CTC CGG TGG GTG CTT GTC TGT ATC CTT CTC AGT ATC

mRNA → UCU GCC AUG GAG GCC ACC CAC GAA CAG ACA UAG GAA GAG UCA UAG

protein → start - glu – ala –thre – hist – asp -glu-threo-stop

acid acid

1. DNA → CCT CTT TAC ACA CGG AGG GTA CGC TAT TCT ATG ATT ACA CGG TTG CGA TCC ATA ATC

mRNA → GGAGAAUGUGUGCCUCCCAUGCGAUAAGAUACUAAUGUGCCAACGCUAGGUAUUAG

protein → start cys pro ser his ala ile arg tyr stop

met

2. DNA → AGA ACA TAA TAC CTC TTA ACA CTC TAA AGA CCA GCA CTC CGA TGA ACT GGA GCA

mRNA → UCUUGUAUUAUGGAGAAUGUGAGAUUCUCGUCGAGGCUACUUGACCUCGU

protein → met glu asn cys glu ile ser gly arg glu ala thr stop

start

3. DNA → TAC CTT GGG GAA TAT ACA CGC TGG CTT CGA TGA ATC CGT ACG GTA CTC GCC ATC

mRNA → AUGGAACCCCUUAUAUGUGCGACCGAAGCUACUUACGCAUGCCAUGAGCGGUAG

protein → met glu pro leu ile cys ala thr glu ala thr stop

start

4. DNA → TAA ACT CGG TAC CTA GCT TAG ATC TAA TTA CCC ATC

mRNA → AUUUGAGCCAUGGAUCUAAUCUAGAUUAAUGGGUAG

protein → met asp arg ile stop

Start

5. DNA → CTA TTA CGA TAC TAG AGC GAA TAG AAA CTT ATC ATC

mRNA → GAUAAUGCUAUGAUCUCGCUUAUCUUUGAAUAGUAG

protein → met leu stop

Start

6. DNA → TAC CTT AGT TAT CCA TTG ACT CGA ATT GTG CGC TTG CTG ATC

mRNA → AUGGAAUCAAUAGGUAACUGA

protein → met glu ser ile gly asn stop

start

7. DNA → ACC CGA TAC CTC TCT TAT AGC ATT ACA AAC CTC CGA GCG

mRNA → UGGGCUAUGGAGAGAAUAUCGUAAUGUUUGAGGCUCGC

protein → start glu arg ile cys stop

met

8. DNA → TAC AGA CGG CAA CTC TGG GTG CTT TGT TCT CTT CTC AGT ATC

mRNA → AUGUCUGCCGUUGAGACCCACGAAACAAGAGAAGUCAUAG

protein → met ser ala val glu thr his glu thr arg glu glu ser stop

Start