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From Genes To Proteins (p. 208 – 214)

I. Decoding The Information In DNA

(Read to make a protein.)

1. **List three main differences between RNA (ribonucleic acid) and DNA.**
   1. RNA has ribose sugar instead of deoxyribose
   2. RNA is generally single-stranded (DNA = double-stranded)
   3. RNA contains uracil instead of cytoplasm (more stable form in cytoplasm)

2. **Match the following terms with the correct definitions.**

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1. C.	Transcription	A. Process by which proteins are made from DNA
2. B.	Translation	B. Reading and assembling of amino acid chains
3. A.	Protein Synthesis	C. Protein instructions passed from a gene to RNA

II. Transfer Of Information From DNA To RNA

1. **Define the term RNA polymerase.**

   RNA polymerase – enzyme that adds and links complementary RNA nucleotides during transcription

"Copy Machine"

2. **Circle the letter of each sentence that is true about transcription.**
   a. During transcription, ~~DNA~~ RNA polymerase binds to ~~RNA~~ DNA & separates the DNA strands.
   b. One strand of DNA is used as a template to assemble nucleotides into a strand of RNA.
   c. RNA polymerase binds only to DNA promoters, which have specific base sequences.
   d. Promoters are signals in ~~RNA~~ DNA that indicate when to begin transcription.

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3. **~~Both~~ One strands of DNA serve as templates during transcription.**

   Circle One : True **False**

4. **Transcription occurs in the nucleus (eukaryotic).**

   Circle One : **True** False

III. The Genetic Code : Three-Nucleotide "Words"

1. **Define the term messenger RNA.**

   Messenger RNA – form of RNA that carries the instructions for making a protein from a gene and delivers it to the site of translation

2. **Proteins are made by joining** amino acids **into long chains called polypeptides.** (Not in the book.)

3. **What is the genetic code?** amino acids and "start" + "stop" signals that are coded for by each of the possible 64 mRNA codons

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4. Define the term codons.

Codons – series of 3-nucleotide sequences of mRNA (specify a specific amino acid)

5. Circle the letter of the number of possible three-base codons.

a. 4 b. 12 (c.) 64 d. 128

6. All amino acids are specified by only one codon.

Circle One : True (False) 6 codons for Leucine

7. Circle the letter of the codon that is not a stop codon.

a. UAA b. UGA c. UAG (d.) AUG "Start" (Methionine)

IV. RNA's Role In Translation (Occurs on ribosomes)

1. Match the following terms with the correct definitions.

1. C. Transfer RNA
2. A Anticodons
3. B Ribosomal RNA

A. Sequence of tRNA complementary to mRNA
B. RNA molecules that are part of ribosomes
C. RNA that carry a specific amino acid on one end

2. List the seven steps of protein synthesis.

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Protein Synthesis Animation → McGraw-Hill

1. rRNA subunits, mRNA, + tRNA (carrying methionine) bind togeth
2. tRNA carrying amino acid specified by codon in A-site arrives
3. Peptide bond forms between adjacent amino acids
4. tRNA in the P-site detaches and leaves amino acid behind
5. tRNA in A-site moves to P-site
6. Steps 2, 3, and 4 repeated (over and over)
7. Stop codon reached / Ribosome complex falls apart

3. For the most part, the genetic code is universal.

Circle One : (True) False

Example: