BIOLOGY 12: CHAPTER 25 - REVIEW WORKSHEET KEY
DNA REPLICATION, PROTEIN SYNTHESIS, & RECOMBINANT DNA

A. DEOXYRIBONUCLEIC ACID (DNA)

1. Genes are found in DNA. Purines and Pyrimidines.

2. Pentose sugar, nitrogenous base, and phosphate group. Specific base pairings in DNA are A-T, G-C.

3. The two strands of DNA twist about one another to form a double helix with the two strands held together by hydrogen bonds between the purines and pyrimidines.

4. The structure of unwound DNA looks like a step ladder. The sides are the sugar-phosphate backbone, and the rungs are the complementary base pairings.

5. James Watson (US) Francis Crick (UK)

6. DNA must control cellular activities, it replicates itself, and it undergoes mutation and recombinations.

7. a) Helicase = enzyme that attaches to sites called origin of replication, and separate the 2 strands → open a replication bubble.

b) DNA polymerase = enzyme that helps DNA make an exact copy during replication. Elongates new DNA at replication fork, and adds nucleotides 1 by 1. Only synthesizes in 5' to 3' direction.

c) Replication begins at sites called **origin of replication**. Replication proceeds in both directions until entire molecule is copied. Y-shaped **replication fork** marks end of each replication fork. Energy source **NTP**. Leading strand and lagging strand is replicated. Replication bubbles eventually fuse forming 2 daughter helixes.

8. DNA replication is semi-conservative b/c daughter helixes have one old strand from parent and one new strand each. DNA polymerase "proofreads" replicated DNA.

9. One gene can only code for one polypeptide.

10. Transcription = synthesis of RNA under direction of DNA.
Translation = actual synthesis of the polypeptide under direction mRNA.

11. mRNA

12. The genetic code is arranged into a triplet code.

13. a) Codon = Three base sequence in messenger RNA that causes the insertion of a particular amino acid into a protein or termination of translation.