Name _____

Human Biology Lab Manual Lab Report

Laboratory Exercise 11: DNA Biology & Technology

Activity 1: DNA Replication

Replicate DNA by making a complementary strand of the DNA sequence provided. Reminder: base pairs are A-T and G-C.

DNA Replication															
Template DNA	T	A	C	T	A	G	T	C	C	G	G	A	A	T	T
Complementary DNA															

Activity 2: Decoding Transcription and Translation

A. Transcribe the DNA template into messenger RNA. Reminder: base pairs are A-U and G-C.

Transcription															
Template DNA	T	A	C	T	A	G	T	C	C	G	G	A	A	T	T
messenger RNA															

B. Translate the messenger RNA from Part A into an amino acid chain. When copying the mRNA from Part A, be sure to group the bases into codons (triplets). Use the codon chart provided below.

Translation					
messenger RNA					
Amino acid chain					

Second Base

First Base	U	C	A	G	Third Base
U	UUU, UUC — Phenylalanine UUA, UUG — Leucine	UCU, UCC, UCA, UCG — Serine	UAU, UAC — Tyrosine UAA — STOP UAG — STOP	UGU, UGC — Cysteine UGA — STOP UGG — Tryptophan	U, C, A, G
C	CUU, CUC, CUA, CUG — Leucine	CCU, CCC, CCA, CCG — Proline	CAU, CAC — Histidine CAA, CAG — Glutamine	CGU, CGC, CGA, CGG — Arginine	U, C, A, G
A	AUU, AUC, AUA — Isoleucine AUG — Methionine	ACU, ACC, ACA, ACG — Threonine	AAU, AAC — Asparagine AAA, AAG — Lysine	AGU, AGC — Serine AGA, AGG — Arginine	U, C, A, G
G	GUU, GUC, GUA, GUG — Valine	GCU, GCC, GCA, GCG — Alanine	GAU, GAC — Aspartic acid GAA, GAG — Glutamic acid	GGU, GGC, GGA, GGG — Glycine	U, C, A, G

Activity 3: Practice using a Micropipette

Record your observations of comparing the two microcentrifuge tubes with different volumes. Do you notice a difference in volume within the microcentrifuge tube? What difference do you see?

_____

_____

Activity 4: Performing a Restriction Digest

Record the label of the microcentrifuge rack that holds your samples here:_____

Activity 5: Protocol to Extract Your Own DNA

Record your observations (what appears within the large tube):

_____

Answer the following questions:

a. What is DNA? Where is it found? _____

b. What material causes DNA to be released from a cell? _____

c. If DNA is so small that it fits into one cell, how are we able to see it with our eyes after extraction?

_____

_____

Activity 6: Gel Electrophoresis

Record your results:

Which suspect DNA fingerprint matches the Crime Scene DNA fingerprint?:_____

a. What caused the DNA to become fragmented?

_____

b. What determines where a restriction enzyme will cut a DNA molecule?

_____

c. What would be a logical explanation as to why there is more than one band of DNA for each of the samples?

_____

Activity 7: Lab Review

1. What macromolecule is composed of a sugar, phosphate group, and a nitrogenous base? _____
2. What type of nucleic acid stores genetic information? _____

3. What nitrogenous base complementary pairs to adenine in DNA? _____
4. Which type of RNA is complementary to a DNA template? _____
5. Where is transfer RNA found in a cell? _____
6. What nitrogenous base is found in RNA but not DNA? _____
7. What process synthesizes proteins using mRNA as a template? _____
8. What is a sequence of three nucleotides that codes for an amino acid called? _____
9. What technique is used in paternity testing? _____
10. What acts as molecular scissors to cut DNA at specific sequences of base pairs? _____
11. Which size DNA fragments, smaller or larger, move furthest through a gel during electrophoresis? _____