Mr. Kiefer
Room 216
Biology, Course ID #300
January 2007
Duration: 15 days

MINI – COURSE #6
Molecular Basis of Inheritance

Name: _____

Advisory #: _____

Period/Class: _____

Date Started: _____

Date Completed: _____

I. **Introduction:** In LAP #5, we will look at the field of molecular genetics that provides the foundation for much of the research currently being conducted in science. Among other things, people look to molecular genetics for pest-resistant plants, evidence in crime cases (CSI), and cures for diseases or other disorders. With these advances, come social and ethical issues. In order to make informed choices, both personally and socially, we need to understand the molecular structure, function, and processes of DNA.

II. Statement of Earnings:

1. Vocabulary – 30 terms = 60 points
2. Research Report – 2 paragraphs (5-7 sentences per paragraph) on one of 5 Genetic Disorders (Tay-Sachs, Huntington's Disease, Cystic Fibrosis, Sickle Cell Anemia, Hypercholesterolemia), including sources = 50 points
3. In-chapter & end-of-chapter questions, 5 points each: Equals 50 points
4. DNA GMO Crops Assignment = 60 points
5. DNA Transgenic animals assignment = 60 points
6. End of chapter test; 125 points

Total LAP = 405 points; 80% total = 324 points

III. LAP #5 Activities:

B. Topics in LAP #5
   1. Nucleotides
   2. DNA Replication
   3. Transcription (DNA – mRNA)
   4. Translation (mRNA – Proteins)
   5. DNA Technology
   6. Mutations to DNA

C. Note-taking
D. Labs, activities as noted in Core Curriculum Guide
E. Demonstrations
F. Review, Test

IV. LAP #5 Resources:

1 *Holt Biology*, Johnson & Raven: Chapter 9, Parts 2, 3,; Chapter 10, Parts 1, 2; Chapter 11, Parts 1, 2, 3; Chapter 8, Part 4
2 Internet research for information gathering
2 Teacher-generated and Holt-generated Worksheets
3 Core Curriculum Guide worksheets

V. LAP #5 Objectives:

1 The student will be able to (TSWBAT) describe the three components of a nucleotide
2 TSWBAT develop a model of DNA, including relating the role of base pairing rules in the DNA structure
2 TSWBAT summarize the process of DNA replication
3 TSWBAT describe how errors are corrected during DNA replication
4 TSWBAT compare and contrast the structure of DAN with RNA
5 TSWBAT summarize the processes of transcription and translation
6 TSWBAT relate the roles of transcription and translation with DNA, mRNA, tRNA and making a protein.
7 TSWBAT evaluate three ways that point mutations can alter genetic material
8 TSWBAT describe how genetic mutations can cause genetic disorders
9 TSWBAT list two genetic disorders, and describe their causes and symptoms
10 TSWBAT describe four basic steps used in genetic engineering experiments
11 TSWBAT describe ways that genetic engineering techniques have been used to modify/improve farm animals/plants

VI. LAP #5 PA State Standards Addressed:

12 3.8.10 C. Evaluate possibilities, consequences, and impacts of scientific and technological solutions
13 3.3.10 C. Describe how genetic information is inherited and expressed.
14 3.6.10 A. Apply biotechnologies that relate to propagating, growing, maintaining, adapting, treating, and converting

VII. LAP #5 Vocabulary:

1. Sickle Cell Anemia
2. Cystic Fibrosis
3. Huntington Disease
4. Hemophilia
5. Tay-Sachs Disease
6. Double helix
7. Nucleotide
8. Deoxyribose
9. Base pairing rules
10. Complimentary base pair
11. Rosalind Franklin
12. James Watson
13. Francis Crick
14. DNA Replication
15. DNA helicase
16. DNA polymerase
17. replication fork
18. RNA (ribonucleic acid)
19. Uracil
20. Transcription
21. Translation
22. Gene expression
23. RNA polymerase
24. Messenger RNA (mRNA)
25. Codon
26. Genetic code
27. Transfer RNA (tRNA)
28. Anticodon
29. Point mutation
30. Mutant

VIII. LAP #5:

15 Review/Remedial

a. Check understanding of vocabulary, notes, lab results
b. Reading skills determination
c. Review any Special Needs with appropriate teachers
d. Re-teach specific sections based on meeting with student

16 Quest/Enrichment

a. Added assignment based on feedback from/meeting with student
b. Student investigations into other genetic disorders
c. Investigations to environmental factors that cause genetic mutations (UV radiation, chemicals, etc.)