

Honors Biology Syllabus - Unit 5: Molecular Genetics

Essential Questions:

1. How does DNA copy itself?
2. How does the information from DNA get converted into traits?
3. How is our ever-increasing knowledge of DNA changing society?

Required Reading:

- Chapter 8 (All)
- Chapter 9 (All)

Classwork:

- “Berry Full of DNA” Lab
- Protein Synthesis Analogy
- “What is a Mutation?” Pear Deck
- “Cracking Your Genetic Code” Video Summary Worksheet
- Gel Electrophoresis Online Activity
- “CSI Wildlife” Click and Learn Worksheet
- Bacterial Transformation Pre-Lab Activity

Homework:

- Unit 5 Vocabulary Checklist
- “Berry Full of DNA” Pre-Lab Activity

Labs:

- “Berry Full of DNA” Lab
- Bacterial Transformation Lab

Quizzes:

- Protein Synthesis Quiz

Unit Exam (60 pts):

- 30 Multiple Choice Questions (30 pts - 1 pt per question)
- 6 Short Answer Questions (30 pts - 5 pts per question)

Date	Lesson Topics	Assignments
Monday 01/06	-New Seating Arrangement -Unit 5 Syllabus and Vocab Checklist -Discuss Book Review -Notes: The Discovery of DNA	Homework -Read 8.1 & Define Key Terms on Vocab Checklist (Due Tuesday, 01/07)
Tuesday 01/07	-Video: “How DNA Is Packaged” -DNA Models	-Upload Image of DNA Models (Due in class) Homework -Read 8.2-8.3 & Define Key Terms on Vocab Checklist (Due Thursday, 01/09) -“Berry Full of DNA” Pre-Lab Activity (Due Thursday, 01/09)
Block Day 01/09	-“Berry Full of DNA” Lab -DNA Replication Video & Simulation	-“Berry Full of DNA” Lab Handout (Due Friday, 01/10) Homework -Read 8.4 & Define Key Terms on Vocab Checklist (Due Friday, 01/10)
Friday 01/10	-Overview of Protein Synthesis -A Familiar Story...	Homework -Read 8.5 & Define Key Terms on Vocab Checklist (Due Monday, 01/13)
Monday 01/13	-Notes: Protein Synthesis in Detail	Homework -Read 8.6 & Define Key Terms on Vocab Checklist (Due Tuesday, 01/14)
Tuesday 01/14	-Write Your Own Protein Synthesis Analogy	-Protein Synthesis Analogy (Due Thursday, 01/16) Homework -Study for Quiz Over Protein Synthesis (Sections 8.4-8.6) -Read 8.7 & Define Key Terms on Vocab Checklist (Due Thursday, 01/16)

Date	Lesson Topics	Assignments
Block Day 01/16	-Protein Synthesis Quiz -"What is a Mutation?" Pear Deck Activity	"What is a Mutation?" Pear Deck Activity (Due in class) Homework -Read 9.1-9.2 & Define Key Terms on Vocab Checklist (Due Friday, 01/17)
Friday 01/17	-Notes: Biotechnology	Homework -Read 9.3 & Define Key Terms on Vocab Checklist (Due Thursday, 01/23)
Monday 01/20	-No School - MLK Day	Homework -Work on Book Review (Due Monday, 03/02)
Tuesday 01/21	-No School - Professional Learning	Homework -Work on Book Review (Due Monday, 03/02)
Block Day 01/23	-Fill Out Unit 5 Test Preparation Checklist -Video: "Cracking Your Genetic Code"	-Video Summary Worksheet (Due in class) Homework -Read 9.4-9.5 & Define Key Terms on Vocab Checklist (Due Friday, 01/24)
Friday 01/24	-Gel Electrophoresis Online Activity	-Gel Electrophoresis Online Activity (Due in class) Homework -Read 9.6 & Define Key Terms on Vocab Checklist (Due Monday, 01/27)
Monday 01/27	-"CSI Wildlife" Click and Learn -Confirm Selection for Book Review	-"CSI Wildlife" Click and Learn Worksheet (Due in class) Homework -Finish Unit 5 Vocabulary Checklist (Due Block Day)
Tuesday 01/28	-Review for Unit 5 Exam	-Study for Unit 5 Exam
Block Day 01/30	-Unit 5 Exam	
Friday 01/31	-Unit 5 Exam Corrections	Homework -Read "Kill All the Mosquitoes?!" (Due Monday 02/03)
Monday 02/03	-Video: Gene Drive & Malaria -Socratic Seminar	
Tuesday 02/04	-Bacterial Transformation Pre-Lab Activity	-Bacterial Transformation Pre-Lab Activity (Due in class)
Block Day 02/06	-Bacterial Transformation Lab	-Work on Bacterial Transformation Lab Handout (Due Friday, 02/07)
Friday 02/07	-Interpret Lab Results -Discuss Book Review Progress	-Bacterial Transformation Lab Handout (Due in class) Homework -Work on Book Review (Due Monday, 03/02)

Unit 5: Molecular Genetics - Learning Targets

- Develop/use a model to illustrate the structure of DNA and demonstrate the process of DNA replication.
 - o Describe the experiments of Griffith, Avery, & Hershey & Chase.
 - o Identify the building blocks of DNA.
 - o Describe the structure of DNA and the rules for base pairing.
 - o Describe the properties of DNA that are observable in a test tube.
 - o Explain how the template mechanism is important in DNA replication.
 - o Describe the process of DNA replication.
- Explain the flow of information from DNA to RNA to protein.
 - o Describe how amino acids are coded.
 - o Describe the process of DNA transcription.
 - o Explain how an RNA message is edited.
 - o Describe how RNA is translated to a protein.
 - o Summarize protein synthesis.
- Describe the cause and effect relationships between DNA, the proteins it codes for, and the resulting traits observed in an organism.
 - o Explain how differences in gene expression can lead to the various cell types that make up a multicellular organism.
 - o Explain how mutations in DNA may or may not affect the structure and function of a protein.
 - o Describe the possible causes of mutations.
 - o Describe techniques used by scientists to manipulate DNA, explain how they could be used to improve human health and safety, and construct an argument for or against their potential use.
 - o Describe how biologists genetically modify plants and animals.
 - o Explain a technique used to clone animals.
 - o Explain how biologists "cut and paste" DNA.
 - o Explain the role of plasmids in engineering bacteria.
 - o Describe the technique that enables scientists to mass-produce specific segments of DNA in a test tube.
 - o Describe a technique used to compare DNA samples.
 - o Describe the uses and limitations of genetic testing.
 - o Describe the risks and potential outcomes involved in genetic medicine and gene therapy.